Waterloo Westside Transportation Network Assessment Study

Paradigm Transportation Solutions Limited

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Project Summary

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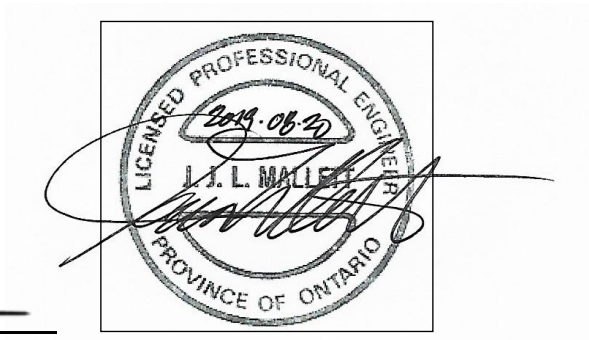
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Westhill District
Transportation Network Assessment Study



Signature Engineer's Seal

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Executive Summary

Content

The Westhill District Landowners retained Paradigm Transportation Solutions Limited (Paradigm) to conduct this Transportation Network Assessment Study as part of the Westhill District Official Plan Amendment application.

Study Purpose

The purpose of the Study is to evaluate the merits of expanding the transportation network by extending the Boardwalk northerly to connect to Erb Street, consider overall transportation impacts associated with the proposed development of the lands and provide input to the Official Plan Amendment.

Planning Policy Direction

The Westhill District Implementation Plan (WDIP) (1999) set the direction for the development of the lands within the area bound by the City limit on the south, the Region of Waterloo Landfill on the West, Erb Street West on the North and Ira Needles Boulevard on the east.

The WDIP set out development policies and a concept plan that included a range of land uses (open space, mixed use activity node, arterial commercial, industrial special policy area, and parkland). The transportation policies identified a conceptual collector road network the ran through the development lands parallel to and ultimately connecting to Ira Needles Boulevard at Westhill Drive.

The framework recognized that the transportation system proposed in the concept plan would be subject to minor variation through approval of development applications. Accordingly, when the Boardwalk lands were developed and Boardwalk Avenue was constructed, appropriate planning instruments were updated. Most notably as part of Official Plan Amendment (OPA) 74 the north/south collector road, developed through The Boardwalk, was planned to extend through a portion of the Study Area in a northerly direction and then connect to Ira Needles Blvd at Westhill Drive.

Historical Transportation Planning Context

Detailed Long-Range Transportation planning in this area has been ongoing for the past two decades. Notable studies include:

- **Region of Waterloo Transportation Master Plan (2011):** Authored in 2011, this study identified several roadway capacity improvements to 2031 on the west side of Waterloo required to accommodate forecast traffic volumes:

- Widening Columbia Street from Fischer-Hallman Road westerly to Erbsville Road (complete);
- Widening Ira Needles Boulevard from Erb Street west southerly to Highpoint Avenue (complete);
- Widening University Avenue West from Ira Needles Boulevard to Fisher-Hallman Road;
- Widening Erbsville Road from Erb Street West to Columbia Street West and the implementation of a roundabout at the intersection with Keats Way.

Aside from the above the RTMP set modal split targets that were aimed at moving travel demand away from the private automobile and established policy direction to support this. Most notable of this is the recent completion and launch of the ION LRT system.

- **Waterloo West Side Integrated Multi-Modal Transportation Study (IMMTS):** The 2018 study reviewed existing traffic conditions and intersection operations; identified planned city and regional transportation improvements; and assessed the impacts additional traffic that was expected as a result of urban growth in the West Waterloo.

  Given the scale of the study area, traffic forecasts were developed using the Region of Waterloo VISUM model, with the only modification being the addition of 8,000 jobs in the zone containing the Waterloo West development lands, split 75%/25% (industrial/office).

  Overall, the forecast increase in population and employment for the broader study area was 21%/22% over the 14-year period 2017-2031, translating to a baseline growth of 1.4% per annum, plus the additional employment lands.

  Based on the results, the study recommended several additional roadway improvements within the study area not already identified in the City and Region capital programmes:

  - **Erbsville Road at Columbia Street West:** Introduce an eastbound right-turn lane, a second eastbound and westbound through lane, a second northbound through lane, a southbound right-turn lane and improve the signal timing plan.
  - **University Avenue West at Ira Needles Boulevard:** Introduce an eastbound right-turn lane; a southbound bypass lane; and a northbound bypass lane
  - **Extend the Boardwalk north to intersect with Erb Street**, and that the intersection be controlled by a roundabout with appropriately designed approaches (eastbound - T/L plus T/R; westbound - T/L plus T/R; northbound - T/L/R; southbound - T/L/R). Further that the City initiate a study to determine the alignment of the Boardwalk extension and take ownership of the

roadway. The Boardwalk is anticipated to have traffic volumes to be classified as a collector road.

The IMMTS also identified that together with the ION LRT and the conventional bus service, the study area will be well served by public transit, with connection to frequent service along key corridors. The study concluded that within the study area transit service does not meet the target of serving 95% of the population, employment and public places within 450 metres of transit service. Accordingly, alternative service delivery models were recommended to increase service.

The IMMTS recommended Active Transportation and TDM measures intended to provide current and future residents and employees in and surrounding the study area with viable active transportation options beyond the private automobile. The active transportation recommendations focussed on the following key themes:

- providing cycling facilities that are separated from motor vehicle traffic;
- focusing on Active School Travel and removing barriers to school-related active transportation trips;
- improving pedestrian and cyclist safety at all intersections and mid-block crossings;
- mandating end-of-trip facilities for active transportation users as part of all development applications; and
- neighbourhood level initiatives to improve the active transportation experience.

TDM recommendations included:

- Businesses located within the study area should be encouraged to participate in and become members of TravelWise.
- Developers be required to work with the City at the site plan stage of development/redevelopment and incorporate pedestrian and cycling networks through their parking lots by creating linkages where none currently exist or enhancing existing linkages by improving the pedestrian and cycling experience.
- End of trip (cycling) facilities be provided at all existing commercial buildings and mandated for all new development applications.

- **Erb Street West Class Environmental Assessment (2018):** In consideration of the varying sections and needs of Erb Street throughout the project limits, technical information gathered for this project, as well as a review of all public comments received, a modified version of Alternative 2C (Alternative 2C (Modified) - Widen the Road to Four Lanes and Add Active Transportation Facilities for Sidewalks, Multi-Use Trail and Cycle Tracks) was identified as the

Recommended Design Alternative for Erb Street Improvements, from Fischer-Hallman Road to Wilmot Line. The Recommended Design Alternative includes:

- Urbanizing and widening Erb Street to four lanes from Fischer-Hallman Road to the roundabout at Gate 2 of the Region's Waste Management Centre (east of Wilmot Line);
- Construction of an eastbound left-turn lane on Erb Street at Beechwood Place and extension of existing turn lanes at intersections;
- Removing the right-turn lane to the Bilingual School entrance on the northern side of Erb Street east of Erbsville Court;
- Roadway illumination on both sides of the road;
- Completing the sidewalk on the southern side of Erb Street between Gateview Drive and Erbsville Court, and on the southern side of Erb Street from the commercial plaza entrance west of Ira Needles Boulevard to the traffic signals at the Westside Marketplace entrance;
- Constructing a multi-use trail on the northern side of Erb Street from the Westside Marketplace entrance to the roundabouts at the Costco site entrance;
- Maintaining existing on-road bike lanes between Erbsville Court and Wilmot Line;
- Constructing cycle tracks on both sides of Erb Street from Fischer-Hallman Road to Erbsville Court; and
- Constructing noise walls abutting residential properties along the northern side of Erb Street from Beechwood Drive westerly for approximately 170 metres, and southern side of Erb Street from Gateview Drive westerly for approximately 340 metres where noise walls do not currently exist.

The preliminary Recommended Design Alternative 2C (Modified) considered public comments and Regional Council input received regarding future development on the southern side of Erb Street west of Ira Needles Boulevard, and a potential future intersection improvement at the existing Westside Marketplace signalized intersection has been shown on this plan.

Study Area

The identified overall study area follows the Waterloo West Side Integrated Multi Modal Transportation Study[1]. It is bound on the west by Wilmot Line, on the north by Columbia Street, on the east by Ira Needles Boulevard and on the south by University Avenue. East of the study area is the Westvale neighbourhood.

[1] Waterloo Multi-Modal Transportation Study – DRAFT report, City of Waterloo, WSP, June 2018.

The subject lands are within the overall study area, north of The Boardwalk commercial development, west of Ira Needles Boulevard and south of Erb Street. This is referred to as the “primary study area”.

Scope

This report documents the additional traffic that is forecast to occur as a result of future development of the subject lands and the identification of:

- the current traffic and operations of the intersections within the study area;
- the impact of the net increase in traffic on the intersections within the study area; and
- the appropriateness and effectiveness of the alternative connections to the existing road network.

The findings, conclusions and recommendations of this study are summarized below and discussed in more detail in the body of this document.

Existing Conditions

The study area intersections were analyzed using existing traffic volumes, current geometry and signal timing and phasing plans. The analyses show that under current conditions all intersections operate within acceptable Regional Standards with respect to delay and LOS during all peak hours, except for:

- **Ira Needles Boulevard/Erbsville Road and Erb St West** eastbound movements operate at LOS F with a v/c > 1.0 during all peak hours. The westbound movements operate at LOS F and v/c > 1.0 during the PM peak hour. The southbound movements operate at LOS F and a v/c of approximately 1.0 during the PM and Saturday peak hours. Overall the intersection operates at a LOS F during the PM and Saturday peak hours;
- **Erb Street West and Waterloo Commons Access** northbound right-turn movement operates at LOS E during the Saturday peak hour;
- **Ira Needles Boulevard and Boardwalk Entrance 2 (Lifestyle Way)** eastbound left-turn movement operates at LOS E during the AM peak hour, and LOS F during the PM and Saturday peak hours; and
- **University Ave W and Ira-Needles Boulevard** northbound movements operate under a v/c > 0.85 during the AM and PM peak hours. The southbound movements operate at LOS F and a v/c of 1.0 during the PM peak hour.

These findings are consistent with those drawn in the Waterloo West Integrated Mobility Study for the weekday PM peak hour.

Future Growth and Development Conditions

Waterloo West Side Employment Lands

Within the larger study area, there continues to be development primarily focused on the north side of Erb Street, west and north of the recently constructed Costco store. The City of Waterloo has identified the potential for an additional 8,000 employees (6,000 manufacturing, 1,680 office and 320 retail) along the extension of Platinum Drive to Columbia Street West.

In terms of building footprints, the West Side Lands are planned to create more than 59,000 ft^2 of commercial space and about 4.0M ft^2 of industrial and office uses.

These lands are currently being graded and serviced and expected to by fully constructed and occupied by 2031. At full development, collectively these lands are forecast to add nearly 1,600 PM peak hour vehicle trips to the area network.

Costco Site

The Costco site was constructed in 2017 with the main commercial building and gas bar. There remain two pad sites on the lands between the Costco store and Erb Street that are to be developed. The TIS report prepared in support of the planning application suggest that the GFA for the pad sites total 70,422 ft^2 of retail uses.

The lands are forecast to add about 380 new vehicle trips to the area road network during the PM peak hour.

Boardwalk Completion

Completion of the existing Boardwalk site will entail the 111,300 ft^2 office building currently under construction and two other commercial buildings totalling 51,700 ft^2.

The lands are forecast to add about 170 new vehicle trips to the area road network during the PM peak hour.

Westhill Development Area

The lands located north of The Boardwalk site and south of Erb Street West are expected to comprise of approximately 1.17 million ft^2 of gross floor area (GFA) for prestige office space and 123,000 ft^2 GFA for commercial space and is split between four properties:

- 1180413 Ontario Inc.;
- Home Hardware Stores Limited;
- The INCC Corp.; and
- Waterloo Commons JV Inc.

1180413 Ontario Inc.

Detailed plans for these lands are currently unknown. The City of Waterloo Official Plan[2] has identified these lands as "Employment" with the preferred land use being "prestige office". Preliminary calculations suggest a reasonable development yield of 552,000 ft^2 of prestige office space for the 5.13 ha site.

Collectively these lands are forecast to add 577 vehicle trips to the area network during the PM peak hour.

Home Hardware

The lands owned by Home Hardware total 7.99 hectares. Detailed plans for these lands are currently unknown. The City of Waterloo Official Plan[3] has identified these lands as "Employment" with the preferred land use being "prestige office". Within these lands the City has created a special policy (SPA 40) that reserved 3.44 hectares of the land to permit a home building centre and associated parking immediately adjacent to Ira Needles Boulevard with at least 100 metres of frontage on Ira Needles Boulevard. Preliminary information suggests that the site could reasonable contain a store in the order of 65,000 ft^2.

For analysis purposes, the remaining lands are assumed to be developed as "Prestige Office" with a Floor Area Ratio (FAR) of 1.0. This translates into about 490,000 ft^2 of Gross Floor Area (GFA).

Collectively these lands are forecast to add 649 vehicle trips to the area network during the PM peak hour.

The INCC Corp

Detailed plans for these lands are currently unknown. The City of Waterloo Official Plan[4] has identified these lands as "Employment" with the preferred land use being "prestige office". Preliminary calculations suggest a reasonable development yield of 43,000 ft^2 of prestige office space for the 0.40 ha site.

These lands are forecast to add 146 vehicle trips to the area network during the PM peak hour.

Waterloo Commons JV Inc.

Detailed plans for these lands are currently unknown. The City of Waterloo Official Plan[5] has identified these lands as "Mixed-Use Commercial".

[2] Official Plan, City of Waterloo, November 2012
[3] Official Plan, City of Waterloo, November 2012
[4] Official Plan, City of Waterloo
[5] Official Plan, City of Waterloo

Preliminary calculations suggest a reasonable development yield of 58,125 ft^2 of mixed-use commercial for the 2.16 ha site.

Collectively these lands are forecast to add 221 vehicle trips to the area network during the PM peak hour.

Future Committed Road Construction

The Region of Waterloo has recently completed its Transportation Master Plan and has not identified the need for infrastructure upgrades within the primary study area, specifically for Erbsville Road and Platinum Drive, over the 2019 to 2031 period. It should be noted that the intersection of Erbsville Road and Keats Way is planned to be upgraded to a roundabout under the infrastructure upgrades.

Erb Street Road Municipal Class Environmental Assessment also identified that Erb Street is to be widened to four lanes to Wilmot Line.

2031 Do-Nothing Traffic Operational Assessment

Under the **Do-Nothing Case**, there are multiple operational issues including:

- **Erbsville Road and Columbia St West** eastbound shared through-right-turn movements are forecast to operate at a LOS F with a v/c > 1.0 during both the AM and PM peak hours. The westbound left-turn movement is forecast to operate at a LOS F with a v/c > 1.0 during all peak hours. The northbound left-turn movement is forecast to operate at LOS F with a v/c > 1.0 during the AM peak hour. The southbound left-turn movement is forecast to operate at LOS F with a v/c > 1.0 during the AM peak hour, and the shared through-right movement is forecast to operate at LOS F with a v/c > 1.0 during the PM Peak Hour. Overall the intersection is forecast to operate at a LOS E during the AM and LOS F during PM peak hour;
- **Ira Needles Boulevard/Erbsville Road and Erb St West** eastbound approach is forecast to operate at LOS F with a v/c > 1.0 during all peak hours. The westbound approach is forecast to operate at LOS F with a v/c > 1.0 during all peak hours. The northbound approach is forecast to operate at LOS F with a v/c > 1.0 during all peak hours. The southbound approach is forecast to operate at LOS F with a v/c > 1.0 during all peak hours. Overall the intersection is forecast to operate at a LOS F with a v/c > 1.0 during all peak hours;
- **Ira Needles Boulevard and Westhill Drive** eastbound right-turn movement is forecast to operate at LOS F with a v/c > 1.0 during the PM peak hour;
- **Ira Needles Boulevard and The Boardwalk/Thorndale Drive** eastbound approach is forecast to operate at LOS F with a v/c > 1.0 during the PM peak hour. The westbound approach is forecast to operate at LOS F with a v/c > 1.0 during all peak hours. The northbound approach is forecast to operate at LOS F with a v/c > 1.0

during the AM and Saturday peak hours. The southbound approach is forecast to operate at LOS F with a v/c > 1.0 during the PM and Saturday peak hours. Overall the intersection is forecast to operate at a LOS F during all peak hours;

- **Ira Needles Boulevard and Boardwalk Entrance 1** eastbound right-turn movement is forecast to operate at a LOS E during the PM peak hour; and
- **Ira Needles Boulevard and Boardwalk Entrance 2 (Lifestyle Way)** eastbound left-turn movement is forecast to operate at LOS F during all peak hours with a v/c > 1.0 during the PM and Saturday peak hours. The eastbound right-turn movement is forecast to operate at LOS F during the PM peak hour. The northbound left-turn movement is forecast to operate at LOS F during the PM peak hour. Overall the intersection is forecast to operate at LOS F during the PM hour; and
- **University Ave W and Ira-Needles Boulevard** eastbound movements are forecast to operate at LOS F and a v/c > 1.0 during the PM peak hour. The westbound movements are forecast to operate at LOS F and a v/c > 1.0 the PM and Saturday peak hours. The northbound movements are forecast to operate at LOS F and a v/c > 1.0 during the all peak hours. The southbound movements are forecast to operate at LOS F and a v/c > 1.0 during the PM and Saturday peak hours. Overall the intersection is forecast to operate at a LOS F during all peak hours.

Problem Statement

With the 2031 “Do-Nothing” transportation network and intersection configurations and with the forecast additional traffic arising from the developments, some study area intersections are forecast to operate with delays above desired levels. To mitigate the network and intersection deficiencies, consideration is given to the RTMP and IMMTS transportation improvements, including the northerly extension of the Boardwalk as a new collector road.

Collector Road Alternatives

Overall the Westhill District is being developed with the following guiding principles in mind:

- Integration with the Existing Development
- Transportation Network Efficiency
- Development Intensity and Distribution

Based on the above (and the “Do-Nothing assessment), an evaluation of extending the Boardwalk northerly to Erb Street West as a collector road was undertaken. The following three alternatives were assessed:

- **Alternative A:** Extension Northwesterly to the BMO Access Signalized Intersection;
- **Alternative B:** Extension Northwesterly to New Intersection on Hydro One lands; and
- **Alternative C:** Extension Northwesterly to Costco Roundabout via the Waterloo Waste Road.

Evaluation of Alternatives

The primary benefit observed from the use of these roads is the diversion of traffic from Ira Needles Boulevard onto the proposed Boardwalk extension between Erb Street West and Thorndale Drive. From this analysis it was found Alternative A would keep most in line with the guiding principles have the greatest diversion from the Ira Needles corridor at about 65% of the site traffic.

Preferred Alternative

Alternative A will have the highest usage and divert the highest volumes from Ira Needles Boulevard resulting in the greatest benefit to the corridor. Microsimulation results indicate that compared to the “Do-Nothing” network, Alternative A reduces the forecast overall network travel time by as much as 7.4% (Saturday Peak hour), overall travel delay by 7.8% (Saturday Peak hour) and the fuel consumption by 7.3% (AM Peak hour). Therefore, from a transportation planning perspective, Alternative A is the preferred option

2031 Traffic Operational Assessment with The Boardwalk Extension

Under the **Alternative A extension**, there are multiple operational issues including the following:

- **Erbsville Road and Columbia St West** eastbound shared through-right movements are forecast to operate at a LOS F and a v/c > 1.0 during both the AM and PM peak hours. The westbound left movements are forecast to operate at a LOS F and a v/c > 1.0 during all peak hours. The northbound left movements are forecast to operate at LOS F and a v/c > 1.0 during the AM peak hour. The southbound left-turn movements are forecast to operate at LOS F and a v/c > 1.0 during the AM Peak hour, and the shared through-right movements are forecast to operate at LOS F and a v/c > 1.0 during the PM Peak Hour. Overall the intersection is forecast to operate at a LOS E and LOS F during the AM and PM peak hour, respectively;
- **Ira Needles Boulevard/Erbsville Road and Erb St West** eastbound movements are forecast to operate at LOS F and a v/c > 1.0 during all peak hours. The westbound movements are forecast to operate at LOS F and a v/c > 1.0 during all peak hours. The northbound movements are forecast to operate at LOS F and a v/c > 1.0 during

the AM and Saturday peak hours, and a LOS E and v/c > 0.85 during the PM peak hour. The southbound movements are forecast to operate at LOS F and a v/c > 1.0 during the PM and Saturday peak hours. Overall the intersection is forecast to operate at a LOS F during all peak hours;

- **Ira Needles Boulevard and Westhill Drive** eastbound right movements are forecast to operate at LOS F and a v/c > 0.85 during the PM peak hour;
- **Ira Needles Boulevard and The Boardwalk/Thorndale Drive** eastbound movements are forecast to operate at LOS F and a v/c > 1.0 during the PM peak hour. The westbound movements are forecast to operate at LOS F and a v/c > 1.0 during all peak hours. The northbound movements are forecast to operate at LOS F and a v/c > 1.0 during the AM hour, and LOS E and a v/c > 0.85 during the Saturday peak. The southbound movements are forecast to operate at LOS F and a v/c > 1.0 during the PM and Saturday peak hours. Overall the intersection is forecast to operate at a LOS F during all peak hours;
- **Ira Needles Boulevard and Boardwalk Entrance 1** eastbound right-turn movements are forecast to operate with a LOS E during the PM peak hour; and
- **Ira Needles Boulevard and Boardwalk Entrance 2 (Lifestyle Way)** eastbound left-turn movement is forecast to operate with a LOS F during all peak hours and a v/c > 1.0 during the PM and Saturday peak hours. The eastbound right-turn movement is forecast to operate with a LOS F during the PM peak hour. The northbound left-turn movement is forecast to operate with a LOS F during the PM peak hour. Overall the intersection is forecast to operate at a LOS F during the PM hour; and
- **University Ave W and Ira-Needles Boulevard** eastbound movements are forecast to operate at LOS F and a v/c > 1.0 during the PM peak hour. The westbound movements are forecast to operate at LOS F and a v/c > 1.0 the PM and Saturday peak hours. The northbound movements are forecast to operate at LOS F and a v/c > 1.0 during the all peak hours. The southbound movements are forecast to operate at LOS F and a v/c > 1.0 during the PM and Saturday peak hours. Overall the intersection is forecast to operate at a LOS F during all peak hours.

New Transportation Opportunities

The completion of the Boardwalk as an extension through the Westhill District to Erb Street offers the City an improved network and has the potential to off-load some traffic from Erb Street and Ira Needles Boulevard. In addition, this extension will result in other transportation improvements to the area including:

- reducing traffic volumes at the Erb Street/ Ira Needles Blvd roundabout;
- improving traffic flow and connections;
- providing improved vehicular circulation and accessibility to the lands in Westhill, with independent access via the collector to Erb Street;
- providing a secondary vehicle connection to southbound traffic, for emergency response vehicles and access to/from the Regional landfill;
- providing improved vehicular access to Waterloo Commons;
- providing improved cycling and pedestrian connections; and
- providing an opportunity to increase the number of people, jobs and public places served by public transit.

Recommendations

It is recommended that the OPA for the Westhill District Plan provide for the extension of the Boardwalk as a collector road northerly to connect to Erb Street at the existing signalized intersection west of the Erb Street/Ira Needles roundabout and that the intersection be designed as a modern roundabout in accordance with the details contained in the appended Intersection Control Study.

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1 Introduction

An Official Plan Amendment (OPA) has been submitted with the objective of identifying the preferred alignment of the northerly extension of the Boardwalk through the Westhill District. The Westhill District is located to the west of Ira Needles Boulevard and south of Erb Street, in the City of Waterloo, Ontario. **Figure 1.1** shows the location of the Westhill District.

The Westhill District is proposed to contain a mix of commercial and prestige office uses and is planned to be built out and occupied by the year 2031.

1.1 Study Purpose

The purpose of the planning application is to determine the appropriate alignment for a new public collector road that has been planned as an extension of The Boardwalk from the roundabout at Thorndale Drive to Erb Street West. A master servicing strategy for the Study Area will also be completed. This road alignment and servicing strategy will be confirmed through an Official Plan Amendment and an update to the Westhill District Plan[6].

Paradigm Transportation Solutions Limited has been retained to conduct this Transportation Network Assessment Study in support of the Westhill OPA and to assist with developing the preferred road network plan. The scope of the study includes:

- Assessing current traffic and site conditions near the Westhill District;
- Providing estimates of the additional traffic that is likely to be generated in the area;
- Assessing roadway network capacity to accommodate this demand;
- Providing transportation input regarding the Boardwalk extension and its impact on the existing network; and
- Providing an Intersection Control Study (ICS) for the intersection of the identified collector road alignment with Erb Street West.

More specifically, the purpose of this report is to address the anticipated traffic demands of the proposed development by determining the impacts of traffic generated by the site on the adjacent street network within the study area boundaries.

Figure 1.1 illustrates the study area for the transportation network assessment.

[6] Planning & Existing Conditions Report, MHBC, 2018

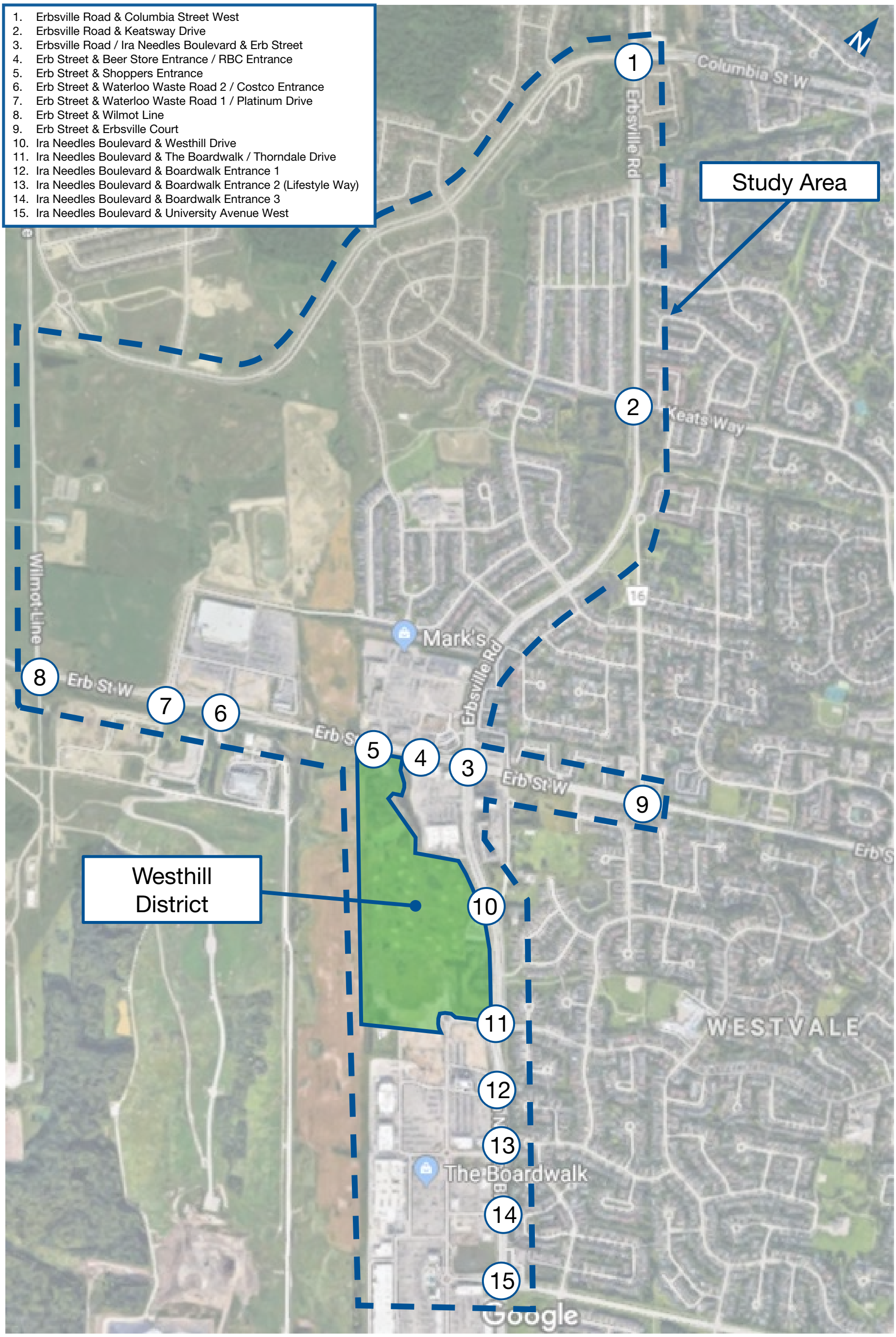
1.2 Study Scope

At the outset of this study, discussions were held with the City of Waterloo and the Region of Waterloo staff to discuss the project and to confirm the study scope. The following intersections have been identified as intersections that should be assessed in this study:

- Erbsville Road and Columbia Street West;
- Erbsville Road and Keats Way;
- Erbsville Road/Ira Needles Boulevard and Erb Street West;
- Erb Street West and RBC / Beer Store Access;
- Erb Street West and BMO Access;
- Erb Street West and Waterloo Waste Road 2/Costco Entrance;
- Erb Street West and Waterloo Waste Road 1/Platinum Drive;
- Erb Street West and Wilmot Line;
- Erb Street West and Erbsville Court;
- Ira Needles Boulevard and Westhill Drive;
- Ira Needles Boulevard and The Boardwalk/Thorndale Drive;
- Ira Needles Boulevard and Boardwalk Entrance 1;
- Ira Needles Boulevard and Boardwalk Entrance 2 (Lifestyle Way);
- Ira Needles Boulevard and Boardwalk Entrance 3; and
- Ira Needles Boulevard and University Avenue West.

The impact assessment includes:

- An analysis of existing traffic conditions;
- A description the proposed development;
- Forecasts of traffic volumes to a 2031 horizon;
- An analysis of the 2031 baseline “Do-Nothing” network including the connections currently identified in the Westhill District Plan;
- An analysis of the three proposed alternatives of The Boardwalk extension to Erb Street; and
- Recommends improvements to mitigate future traffic conditions.



Study Area and Westhill District Location

Westhill District TNS
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Figure 1.1

2 Historical Area Transportation Planning

The following section provides an overall assessment of the 2031 conditions on the study area giving full consideration to the planned and committed development interests in the area as well as all identified major Regional Capital Transportation Improvement projects identified in the current 10-year Transportation Capital Program and the recently completed Regional Transportation Master Plan[7].

2.1 Planning Direction

2.1.1 City of Waterloo Official Plan

The City of Waterloo Official Plan[8] designates the portion of the Study Area closest to Ira Needles Blvd as Employment, and the remainder of the lands Open Space. The existing commercial development at the corner of Erb St Wand Ira Needles Blvd and the existing Boardwalk commercial development are designated Commercial.

Specific Provision Area 41(SPA 41) of the City of Waterloo Official Plan applies to Part of the Westhill District, as identified on Schedule A6 - Specific Provision Areas of the Official Plan, included as Figure 5. SPA 41 contains the following policy:

> "*Prior to, or in conjunction with any plan of subdivision application or site plan application, the planned road network shall be adequately addressed. This may necessitate an amendment to Westhill District Implementation Plan.*"

The Official Plan identifies Erb Street West and Ira Needles Blvd as Regional Arterial Roads, Thorndale Drive as a Minor Collector Road, and Platinum Drive as a Proposed Major Collector Road. The City of Waterloo Official Plan generally supports a multi-modal transportation network which supports walking, cycling and transit use.

2.1.2 Westhill District Implementation Plan

The subject lands are located within Westhill District Implementation Plan (WDIP) area. The WDIP is a land use policy document which provides greater detail for implementation of the Official Plan in the west side of Waterloo. The WDIP serves as the key planning document between the broad policies of the Official Plan and the more detailed stages of development, related various to planning applications.

The Westhill District is located in the southwest corner in the City of Waterloo, and is bounded by Erb Street West and the Clair Hills district to the north by Erb Street West, Ira Needles Blvd and the Westvale District to the east, and

[7] Moving Forward 2031, Region of Waterloo Transportation Master Plan, Regional Municipality of Waterloo, June 2010
[8] City of Waterloo Official Plan, City of Waterloo, November 2012

by the City of Kitchener and Township of Wilmot borders to the south and west, respectively.

The Westhill district is distinguished by unique land uses, including the Region of Waterloo Landfill site and recycling depot, and the Ontario Hydro transmission corridor, which occupies approximately three quarters of the District. At the time of the preparation of the Implementation Plan, the remaining lands in the Westhill district were comprised of a golf course (Westhill Meadows), agricultural uses and estate residential properties. These are considered interim uses.

The Implementation Plan includes development policies and a development concept plan. The development concept plan included a range of land uses, including open space, mixed use activity node, arterial commercial, industrial special policy area, and parkland. The transportation policies note that the transportation system proposed in the concept plan, will be subject to minor variation through approval of development applications.

The WDIP was completed and resulted in the recommendation for the City of Waterloo to initiate a study to determine the alignment of a new collector road to facilitate The Boardwalk Avenue extension to the north.

The WDIP was amended as part of Official Plan Amendment (OPA) 74. The amendment related to the addition of the Mixed-Use Commercial Centre as a land use as well as a minor relocation of collector roads. The north/south collector road, developed through The Boardwalk, is shown as extending through a portion of the Study Area in a northerly direction and then connecting to Ira Needles Blvd.

The WDIP recognizes that the location of roads will be determined through the review and approval of Draft Plans of Subdivision, severances, zone changes, site plan and other development applications.

The amendment to the District Plan will illustrate the new collector road location and associated servicing strategy, along with stormwater management facilities.

2.2 Transportation Master Planning

2.2.1 Regional Transportation Master Plan (2011)

The Regional Transportation Master Plan (RTMP) reflects the policy direction of the Regional Official Plan. The RTMP promotes the role of public transit in a more balanced transportation system and is based on several goals:

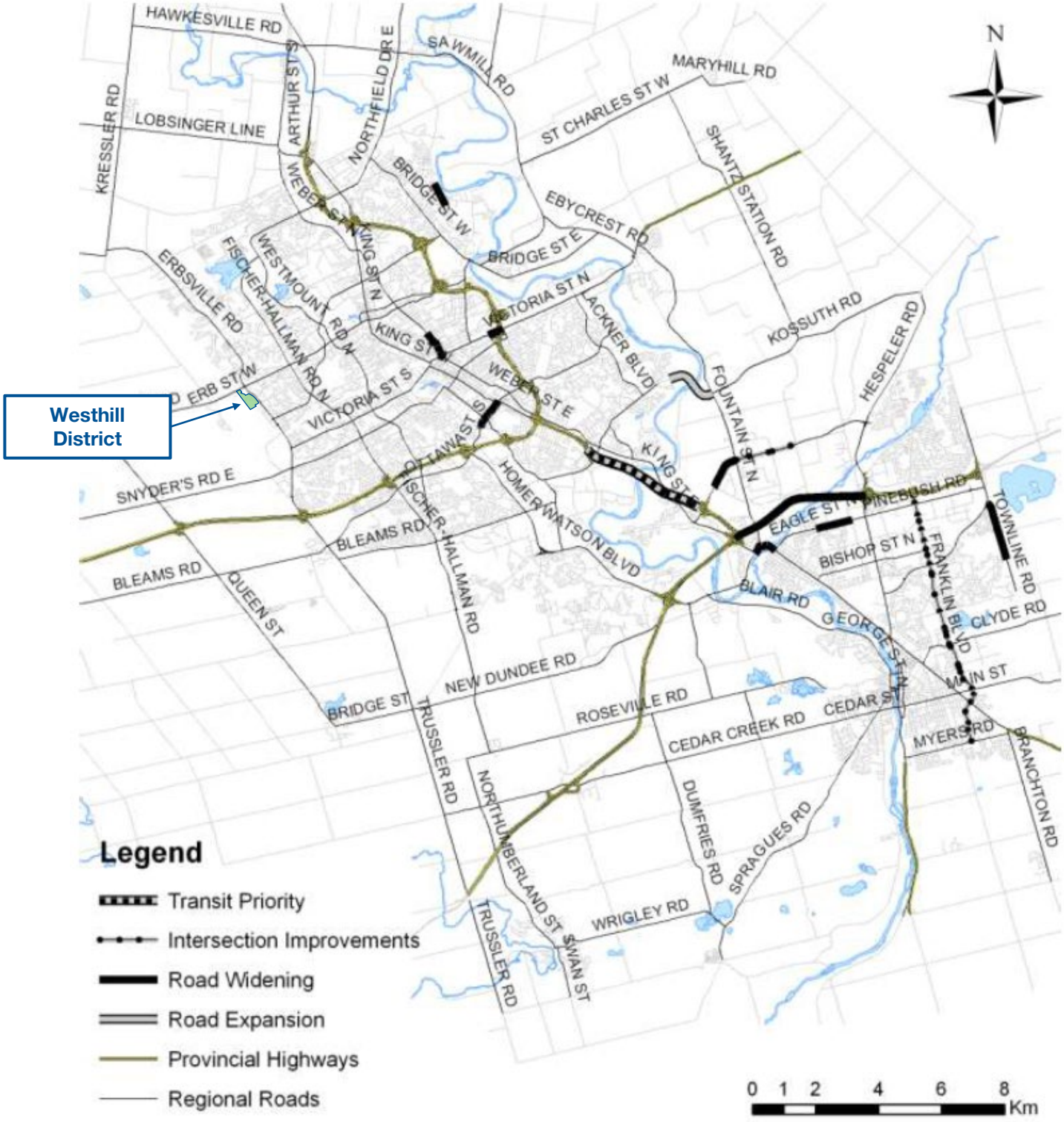
- optimizing the transportation system (making the most of what exists);
- promoting transportation choice;
- fostering a strong economy; and
- supporting sustainable development.

The RTMP includes a complementary road network plan, which was developed to assist in prioritizing road network improvements including some expansions, widenings, intersection improvements and transit priority improvements. The RTMP includes a road network plan and related short (0-5 years), medium (5-10 years) and long-term (10-20 years) road improvement priorities.

Figure 2.1, **Figure 2.2** and **Figure 2.3** illustrate the planned network improvements described by the short, medium and long-term road improvements, respectively.

The RTMP confirms that as the community grows, congestion will increase throughout the Region and as a result, transit will become a more competitive travel choice if higher quality transit service is provided. The RTMP acknowledges the increased emphasis on transit may result in a period of transition where vehicle delay experienced on the road network will increase and there may be public pressure to widen/expand roadway infrastructure, for example the West Side of Waterloo.

The proposed collector road would provide both for vehicular and transit connections on the West Side of Waterloo. The design of the collector road will also provide opportunity for additional modes of travel, including walking and cycling.

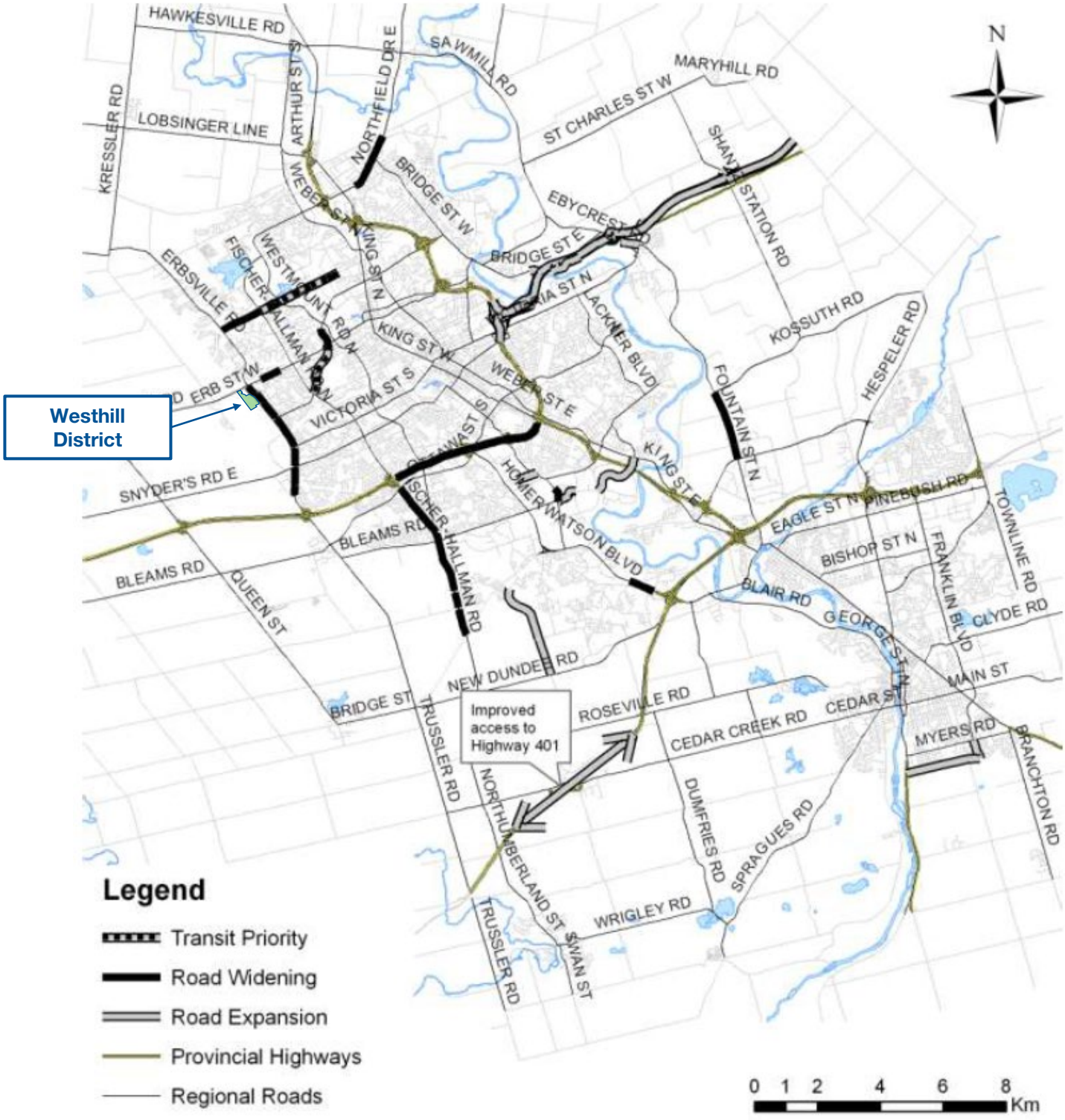


Source: Moving Forward 2031, Region of Waterloo, 2011

0-5 Year Road Improvement Plans

West Hills Commercial
180136

Figure 2.1



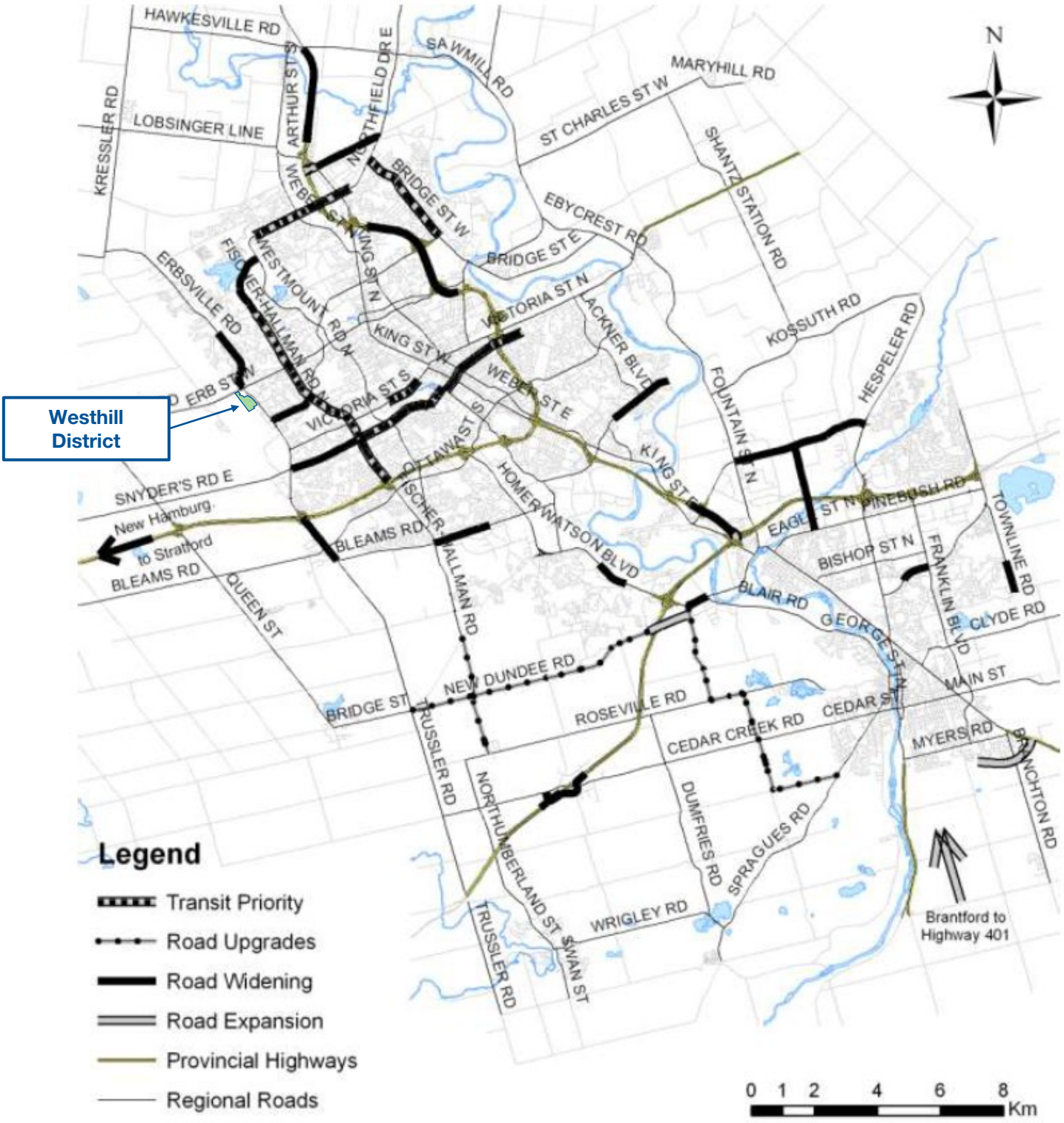
Source: Moving Forward 2031, Region of Waterloo, 2011

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5-10 Year Road Improvement Plans

West Hills Commercial
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Figure 2.2



Source: Moving Forward 2031, Region of Waterloo, 2011

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10-20 Year Road Improvement Plans

West Hills Commercial
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Figure 2.3

2.2.2 Waterloo West Side Integrated Multi Modal Transportation Study (IMMTS)

The 2018 study reviewed existing traffic conditions and intersection operations; identified planned city and regional transportation improvements; and assessed the impacts additional traffic that was expected as a result of urban growth in the West Waterloo.

Given the scale of the study area, traffic forecasts were developed using the Region of Waterloo VISUM model, with the only modification being the addition of 8,000 jobs in the zone containing the Waterloo West development lands, split 75%/25% (industrial/office).

Overall, the forecast increase in population and employment for the broader study area was 21%/22% over the 14-year period 2017-2031, translating to a baseline growth of 1.4% per annum, plus the additional employment lands.

Based on the results, the study recommended several additional roadway improvements within the study area not already identified in the City and Region capital programmes:

- **Erbsville Road at Columbia Street West:** Introduce an eastbound right-turn lane, a second eastbound and westbound through lane, a second northbound through lane, a southbound right-turn lane and improve the signal timing plan;
- **University Avenue West at Ira Needles Boulevard:** Introduce an eastbound right-turn lane; a southbound bypass lane; and a northbound bypass lane;
- **Platinum Drive extension at Columbia Street West:** An extension of Platinum Drive to Columbia Street West at Ladyslipper Drive, with a roundabout intersection; and
- **Extend the Boardwalk north to intersect with Erb Street**, and that the intersection be controlled by a roundabout with appropriately designed approaches (eastbound - T/L plus T/R; westbound - T/L plus T/R; northbound - T/L/R; southbound - T/L/R). Further that the City initiate a study to determine the alignment of the Boardwalk extension and take ownership of the roadway. The Boardwalk is anticipated to have traffic volumes to be classified as a collector road.

The IMMTS also identified that together with the ION LRT and the conventional bus service, the study area will be well served by public transit, with connection to frequent service along key corridors.

The IMMTS recommended Active Transportation and Transportation Demand Management (TDM) measures intended to provide current and future residents and employees in and surrounding the study area with viable active transportation options beyond the private automobile. The proposed road extension would be designed with cycling and pedestrian facilities.

2.3 Detailed Roadway Improvements

2.3.1 Erb Street Road Municipal Class Environmental Assessment

A Class Environmental Assessment (Class EA)[9] is being undertaken by the Region of Waterloo for Erb Street West. The Class EA makes provision for the introduction of a roundabout to replace the existing signalized intersection on Erb Street West and where the future extension of the Boardwalk identified in the IMMTS will connect.

The Recommended Design Alternative includes:

- Urbanizing and widening Erb Street to four lanes from Fischer-Hallman Road to the roundabout at Gate 2 of the Region's Waste Management Centre (east of Wilmot Line);
- Constructing an eastbound left-turn lane on Erb Street at Beechwood Place and extending existing turn lanes at intersections;
- Removing the right-turn lane to the Bilingual School entrance on the northern side of Erb Street east of Erbsville Court;
- Roadway illumination on both sides of the road;
- Completing the sidewalk on the southern side of Erb Street between Gateview Drive and Erbsville Court, and on the southern side of Erb Street from the commercial plaza entrance west of Ira Needles Boulevard to the traffic signals at the Westside Marketplace entrance;
- Constructing a multi-use trail on the northern side of Erb Street from the Westside Marketplace entrance to the roundabouts at the Costco site entrance;
- Maintaining existing on-road bike lanes between Erbsville Court and Wilmot Line;
- Constructing cycle tracks on both sides of Erb Street from Fischer-Hallman Road to Erbsville Court; and
- Constructing noise walls abutting residential properties along the northern side of Erb Street from Beechwood Drive westerly for approximately 170 metres, and southern side of Erb Street from Gateview Drive westerly for approximately 340 metres where noise walls do not currently exist.

[9] Erb Street West Environmental Study Report, Walterfedy, 2019.

3 Existing Conditions Assessment

This section documents current traffic conditions, operational deficiencies, and constraints experienced by the public travelling at the intersections within the study area. The operational deficiencies and constraints identified at this stage will be fundamental to the process of defining the required remedial measures.

3.1 Road Network

The study-area roadways include:

- **Erbsville Road** a Regional Road that has a 2-lane cross-section north of Royal Beach Drive, a 4-lane cross-section between Royal Beach Drive and Erb Street West, and posted speed limit of 60 km/hr.
- **Ira Needles Boulevard** a Regional Road that has a 4-lane cross-section within the study area and a posted speed limit of 60 km/hr.
- **Erb Street West** a Regional Road that has a 2-lane cross-section, between the BMO Access and the Costco Entrance, and west of Platinum Drive. It has a 4-lane cross-section for all other areas within the study area and a posted speed limit of 60 km/hr.
- **Keats Way** a local road that has a 2-lane cross-section within the study area and an assumed speed limit of 50 km/hr.
- **Columbia Street West** a local road that has a 4-lane cross-section east of Erbsville Road, and a posted speed limit of 60 km/hr. It also has a 2-lane cross-section west of Erbsville Road and a posted speed limit of 50 km/hr.
- **Thorndale Drive** a local road that has a 2-lane cross-section within the study area and a posted speed limit of 50 km/hr.
- **University Ave West** a Regional Road that has a 2-lane cross-section within the study area and a posted speed limit of 60 km/hr.
- **Erbsville Court** a local road that has a 2-lane cross-section within the study area and a posted speed limit of 50 km/hr.
- **Platinum Drive** a local road that has a 2-lane cross-section within the study area and an assumed speed limit of 50 km/hr.
- **Wilmot Line** a local road that has a 2-lane cross-section within the study area and a posted speed limit of 60 km/hr.
- **The Boardwalk** a private road that has a 2-lane cross-section within the study area and an assumed speed limit of 50 km/hr.

The study area is primarily a commercial area, bordered by low to medium density residential areas.

The following intersections within the study area are signalized:

- Columbia Street West and Erbsville Road;
- Keats Way and Erbsville Road;
- Erb Street West and Erbsville Court; and
- Erb Street West and BMO Access.

The following intersections within the study area are roundabouts:

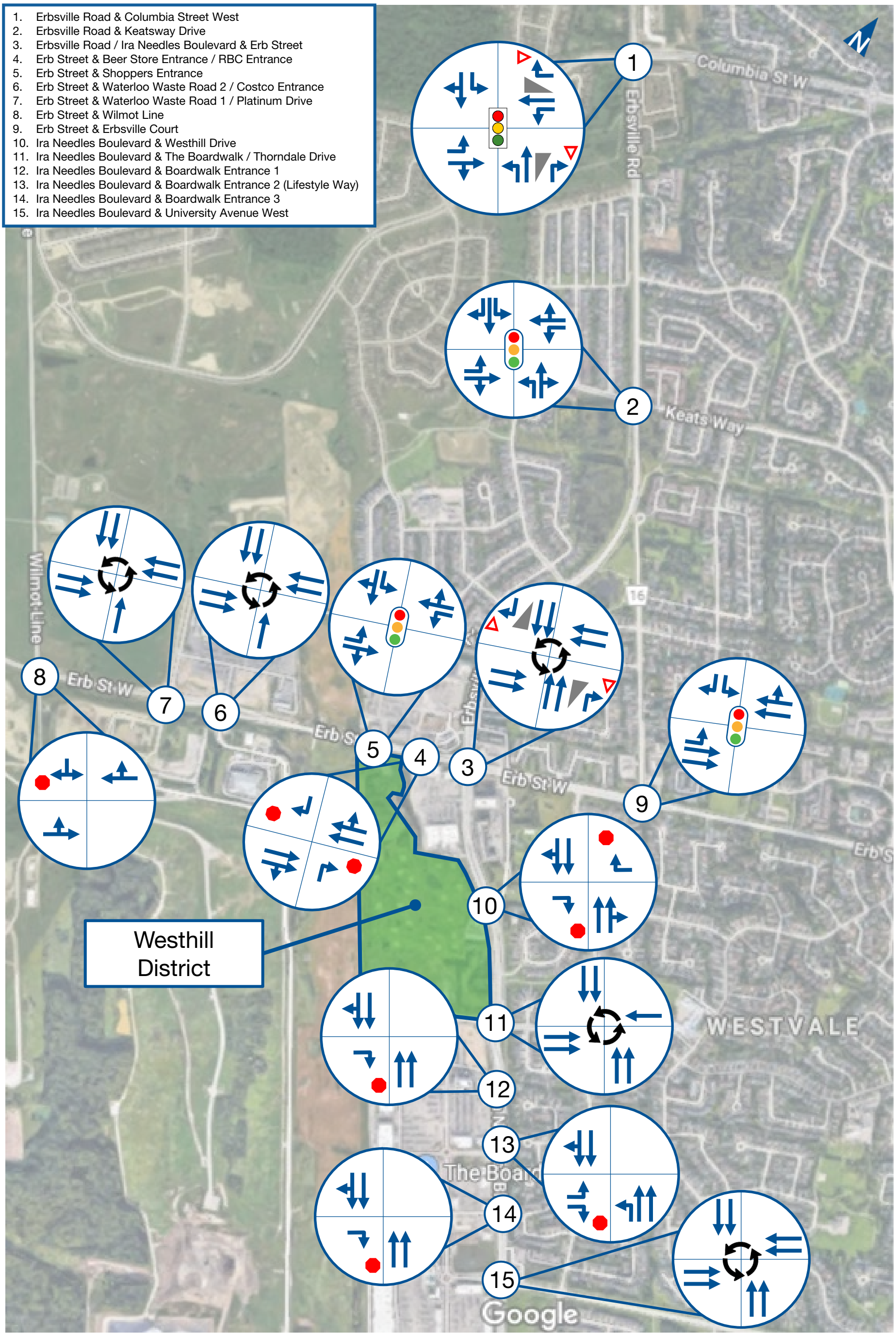
- Erb Street West and Costco Entrance West;
- Erb Street West and Costco Entrance East;
- Erb Street West and Ira Needles Boulevard;
- The Boardwalk/Thorndale Drive and Ira Needles Boulevard; and
- University Avenue West and Ira Needles Boulevard.

The following intersections observed are unsignalized:

- Erb Street West and Wilmot Line;
- Erb Street West and RBC / Beer Store Access;
- Westhill Drive and Ira Needles Boulevard; and
- Boardwalk Accesses (3) and Ira Needles Boulevard.

Figure 3.1 displays existing lane configurations and traffic controls of intersections within the study area.

1. Erbsville Road & Columbia Street West
2. Erbsville Road & Keatsway Drive
3. Erbsville Road / Ira Needles Boulevard & Erb Street
4. Erb Street & Beer Store Entrance / RBC Entrance
5. Erb Street & Shoppers Entrance
6. Erb Street & Waterloo Waste Road 2 / Costco Entrance
7. Erb Street & Waterloo Waste Road 1 / Platinum Drive
8. Erb Street & Wilmot Line
9. Erb Street & Erbsville Court
10. Ira Needles Boulevard & Westhill Drive
11. Ira Needles Boulevard & The Boardwalk / Thorndale Drive
12. Ira Needles Boulevard & Boardwalk Entrance 1
13. Ira Needles Boulevard & Boardwalk Entrance 2 (Lifestyle Way)
14. Ira Needles Boulevard & Boardwalk Entrance 3
15. Ira Needles Boulevard & University Avenue West



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Existing Lane Configurations & Traffic Control

Westhill District TNS
180136

Figure 3.1

3.2 Transit Service

Grand River Transit currently operates nine routes in the study area, all with a major timed-transfer terminal at The Boardwalk:

- **Route 1: Queen-River**
- **Route 4: Glasgow**
- **Route 5: Erb**
- **Route 13: Laurelwood**
- **Route 20: Victoria-Frederick**
- **Route 29: Keats Way**
- **Route 77: Wilmot**
- **iXpress 202: The Boardwalk/Conestoga Mall**
- **iXpress 204: The Boardwalk to Ottawa/Lackner**

The routes noted above (except for Route 77) connect directly to the ION LRT, which provides higher order transit throughout the Region. These routes operate every 15 – 30 minutes between 5:00 AM and 1:00 AM on weekdays and provide weekend service on a reduced schedule.

Figure 3.2 displays the map of the transit network around the subject site, as of 21 June 2019.

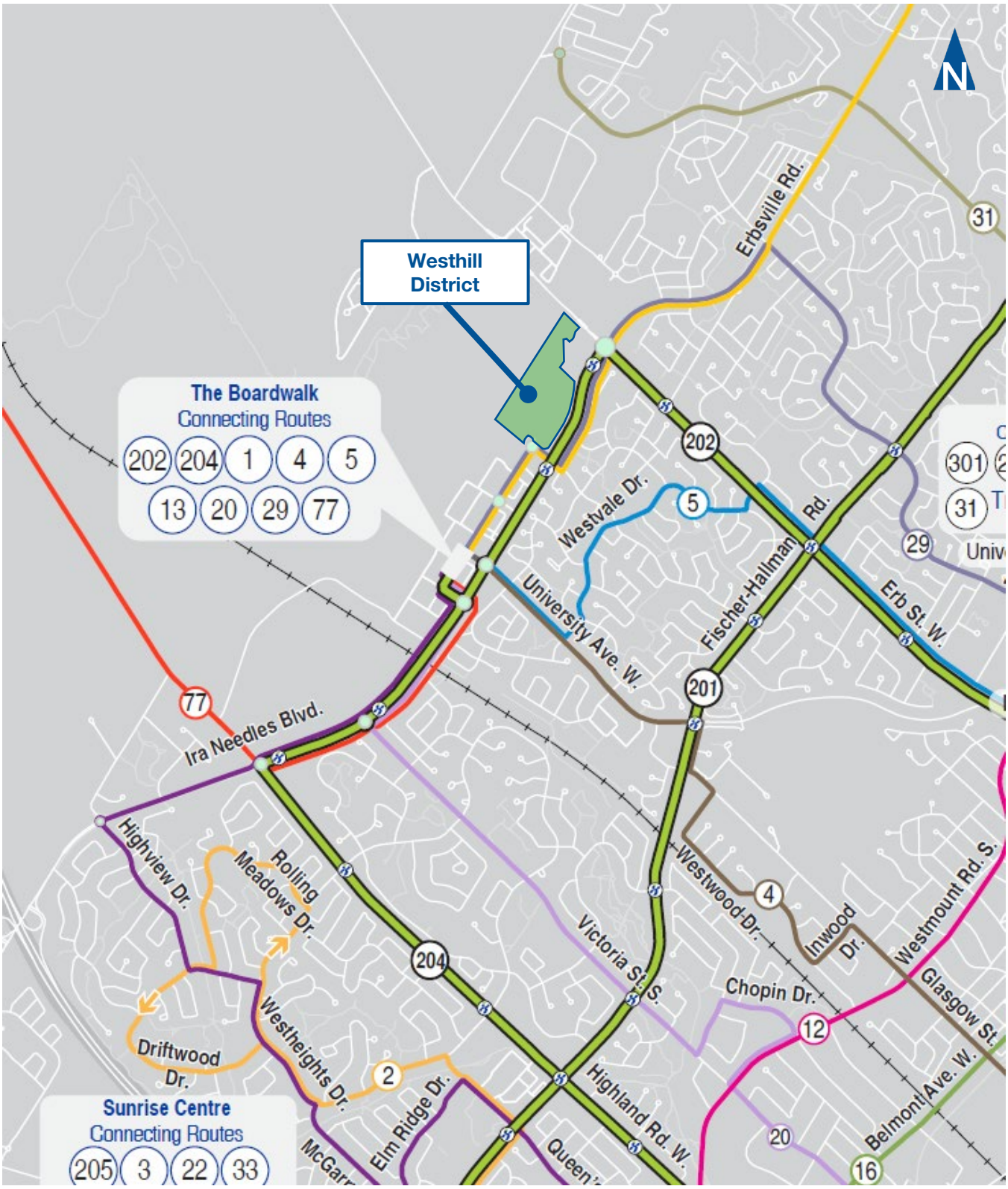
3.3 Cycling and Pedestrian Facilities

Most streets within the study area provide sidewalk infrastructure on both sides of the street, except for Erb Street West to the west of Ira Needles Boulevard, with a sidewalk only on the north side. The northern Erb Street West sidewalk has breaks between the BMO Access and the Costco Entrance, and it terminates west of Platinum Drive. Erbsville road also has no sidewalk on the east side between most of Keats Way and Columbia Street West. There are no pedestrian facilities on Wilmot Line.

Most streets within the study area provide dedicated on-road cyclist facilities except Thorndale Drive, Wilmot Line, Keats Way (west of Erbsville Road) and Erb Street West (west of Erbsville Road). It is noted that there are multi-use trails on Ira Needles Boulevard and Erbsville Road to Keats Way, and Columbia Street W to the east of Erbsville Road.

There are multiple trails within the study area as well as planned major active transportation routes on Columbia Street West and University Avenue West, providing a large network of active transport infrastructure, connecting The Boardwalk to the University of Waterloo and Uptown Waterloo.

Figure 3.3 displays the map of the existing and planned cycling and pedestrian facilities in the area.



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Transit Network
June 2019

West Hills Commercial
180136

Figure 3.2



Existing Pedestrian and Trail Network

West Hills Commercial
180136

Figure 3.3

3.4 Base Year Traffic Volumes

In November 2018, Paradigm collected study area peak hour intersection turning movement data using Miovision cameras.

Figure 3.4, **Figure 3.5** and **Figure 3.6** summarizes the existing AM, PM and Saturday peak hour traffic volumes, respectively. **Appendix A** contains the existing count data.

3.5 Traffic Operations

The operations of the intersections in the study area were evaluated using the existing lane configurations, traffic controls and the existing traffic peak hour volumes.

Intersection level of service (LOS) is a recognized method of quantifying the efficiency of traffic flow at intersections. It is based on the delay experienced by individual vehicles executing the various movements. The delay is related to the number of vehicles desiring to make a movement, compared to the estimated capacity for that movement. The capacity is based on several criteria related to the opposing traffic flows. The highest possible rating is LOS A, under which the average total delay is equal or less than 10.0 seconds per vehicle. When the average delay exceeds 80 seconds at signalized intersections (50 seconds at unsignalized intersections), the movement is considered to have a LOS F and remedial measures are usually implemented, if they are feasible.

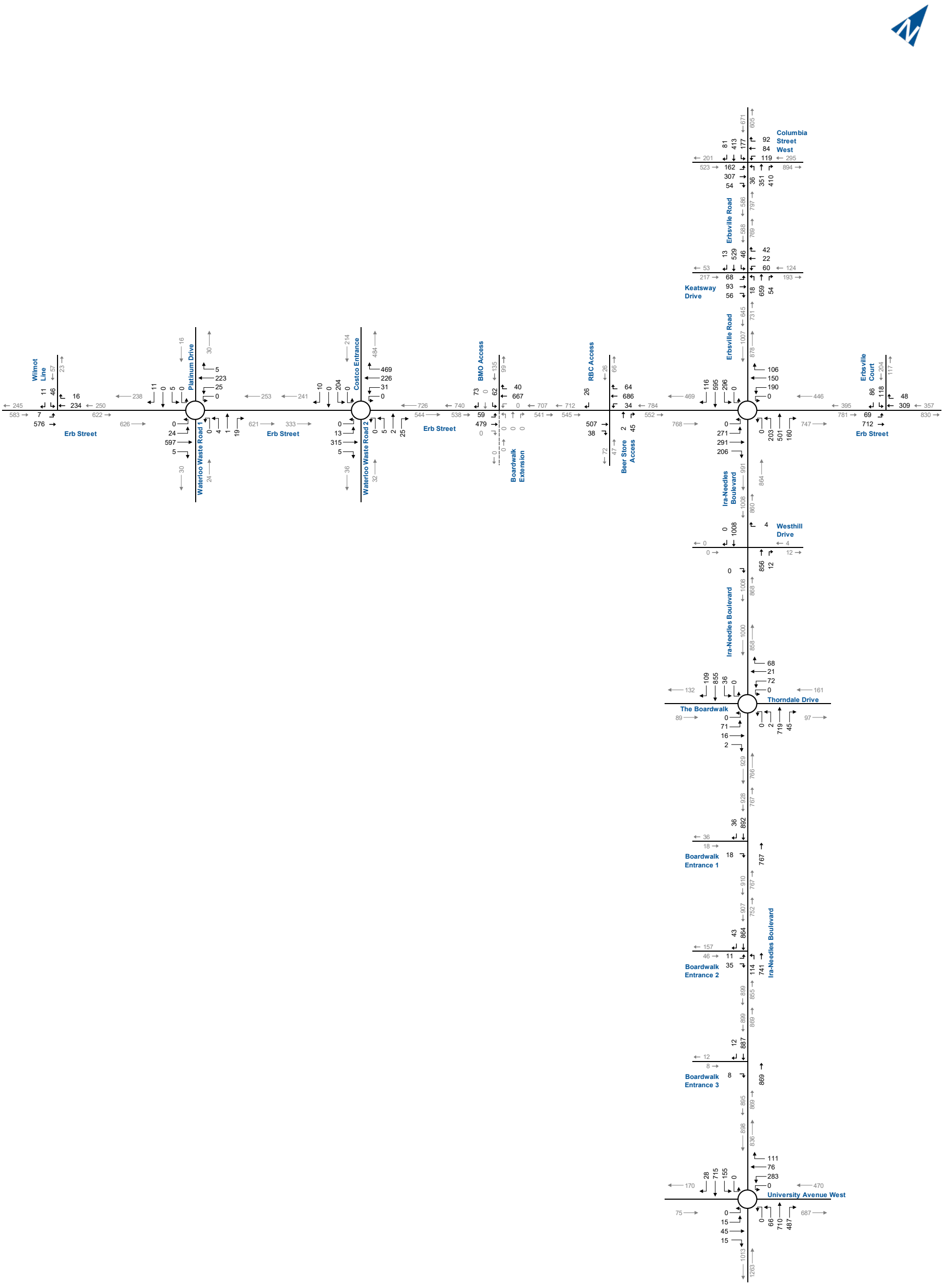
The level of service conditions on the existing road network have been assessed using Synchro 9. The “critical intersection” criteria, defined by the Region of Waterloo[10] are:

- overall Level of Service E or F (i.e. average control delay per vehicle greater than 55 seconds) for signalized intersections; and
- overall Level of Service E or F (i.e. average control delay per vehicle greater than 35 seconds) for unsignalized intersections.

while “critical movements” are when:

- the average control delay for individual movements is greater that 55 seconds;
- the estimated 95th percentile queue length for an exclusive movement exceeds the available storage space;
- the estimated 95th percentile queue length for an individual movement will block an existing access;
- exclusive turning lanes are inaccessible because of queue lengths in adjacent through lanes; and
- there exists poor quality of service for non-auto modes.

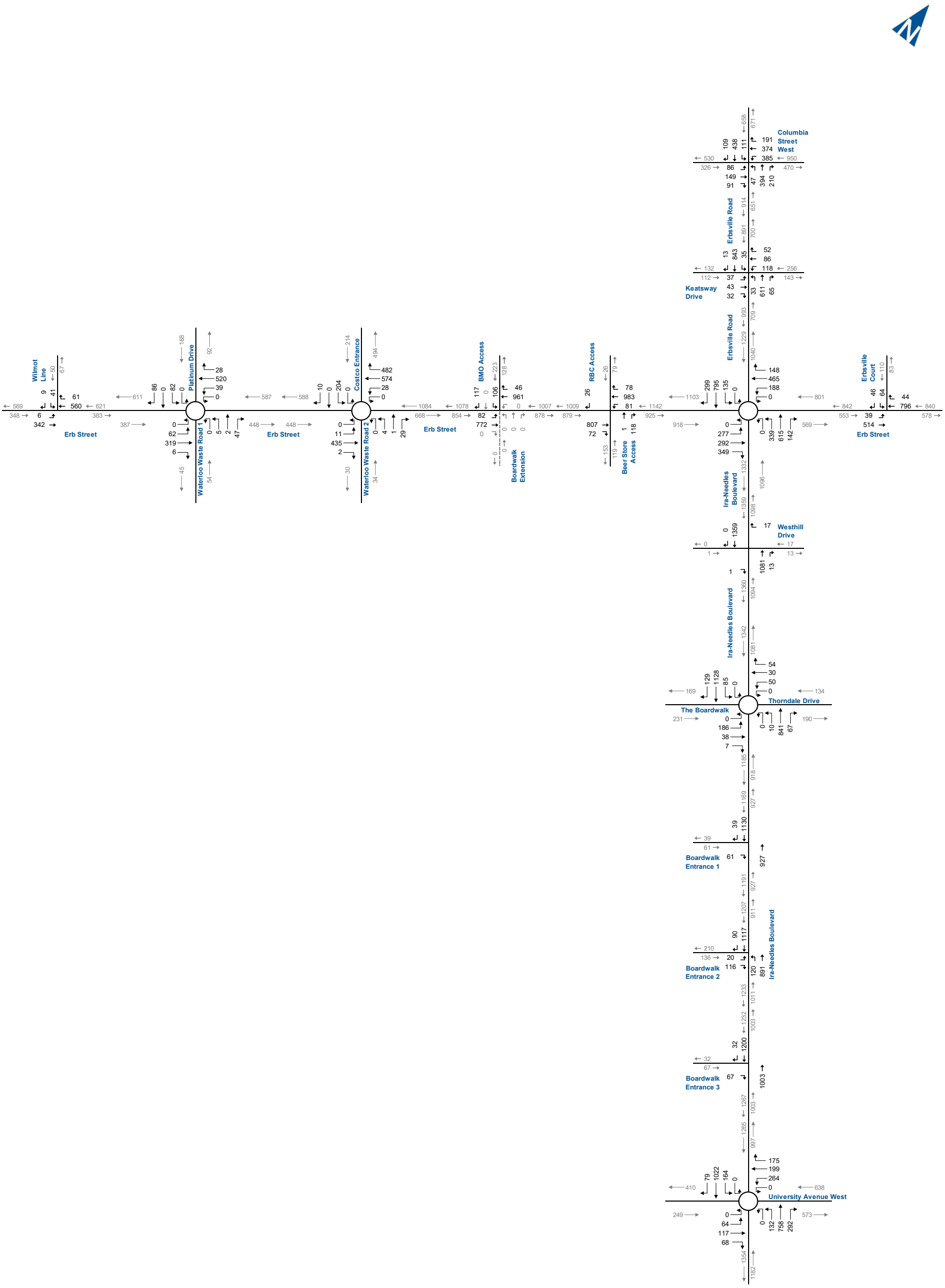
[10] Transportation Impact Study Guidelines, Region of Waterloo, July 2014



Existing Traffic Volumes – AM Peak Hour

Westhill District TNS
180136

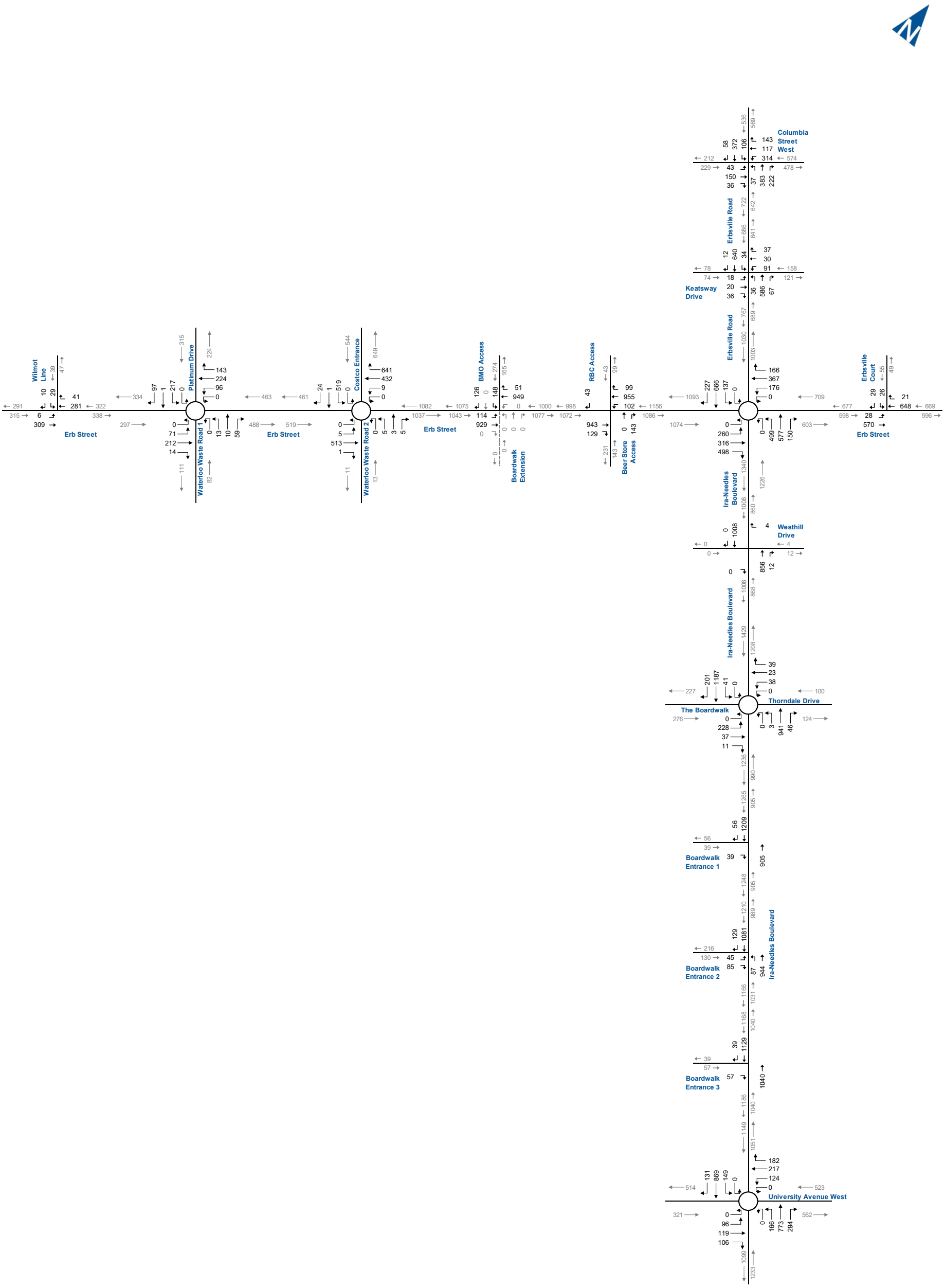
Figure 3.4



Existing Traffic Volumes – PM Peak Hour

Westhill District TNS
180136

Figure 3.5



Existing Traffic Volumes – Saturday Peak Hour

Figure 3.6

Westhill District TNS
180136

Figure 3.7, Figure 3.8 and **Figure 3.9** summarize the LOS at all signalized and unsignalized intersections studied and other performance measures for the AM, PM and Saturday peak hour hours, respectively.

The analyses indicate that most intersections and individual movements within the study area are currently operating overall at acceptable levels of services with the following critical intersections and movements:

- **Ira Needles Boulevard/Erbsville Road and Erb St West** eastbound approach operates at LOS F with a v/c > 1.0 during all peak hours. The westbound approach operates at LOS F and v/c > 1.0 during the PM peak hour. The southbound approach operates at LOS F with a v/c of approximately 1.0 during the PM and Saturday peak hours. Overall the intersection operates at a LOS F during the PM and Saturday peak hours;
- **Erb Street West and Waterloo Commons Access** northbound right-turn movement operates at LOS E during the Saturday peak hour;
- **Ira Needles Boulevard and Boardwalk Entrance 2 (Lifestyle Way)** eastbound left-turn movement operates at LOS E during the AM peak hour, and LOS F during the PM and Saturday peak hours; and
- **University Ave W and Ira-Needles Boulevard** northbound approach operates with a v/c > 0.85 during the AM and PM peak hours. The southbound approach operates at LOS F with a v/c of 1.0 during the PM peak hour.

Appendix B contains the supporting detailed Synchro reports.



1. Erbsville Road & Columbia Street West
2. Erbsville Road & Keatsway Drive
3. Erbsville Road / Ira Needles Boulevard & Erb Street
4. Erb Street & Beer Store Entrance / RBC Entrance
5. Erb Street & Shoppers Entrance
6. Erb Street & Waterloo Waste Road 2 / Costco Entrance
7. Erb Street & Waterloo Waste Road 1 / Platinum Drive
8. Erb Street & Wilmot Line
9. Erb Street & Erbsville Court
10. Ira Needles Boulevard & Westhill Drive
11. Ira Needles Boulevard & The Boardwalk / Thorndale Drive
12. Ira Needles Boulevard & Boardwalk Entrance 1
13. Ira Needles Boulevard & Boardwalk Entrance 2 (Lifestyle Way)
14. Ira Needles Boulevard & Boardwalk Entrance 3
15. Ira Needles Boulevard & University Avenue West

Overall Intersection LOS
- LOS A – D
- LOS E
- LOS F

Specific Movement LOS
- LOS E
- LOS F

Westhill District

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Existing AM Peak Hour Traffic Operations

Westhill District TNS
180136

Figure 3.7

1. Erbsville Road & Columbia Street West
2. Erbsville Road & Keatsway Drive
3. Erbsville Road / Ira Needles Boulevard & Erb Street
4. Erb Street & Beer Store Entrance / RBC Entrance
5. Erb Street & Shoppers Entrance
6. Erb Street & Waterloo Waste Road 2 / Costco Entrance
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13. Ira Needles Boulevard & Boardwalk Entrance 2 (Lifestyle Way)
14. Ira Needles Boulevard & Boardwalk Entrance 3
15. Ira Needles Boulevard & University Avenue West

Overall Intersection LOS
- LOS A – D
- LOS E
- LOS F

Specific Movement LOS
- LOS E
- LOS F

Westhill District

Columbia St W
Erbsville Rd
Keats Way
Wilmot Line
Erb St W
Mark's
16
The Boardwalk
WESTVALE
Google

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Existing PM Peak Hour Traffic Operations

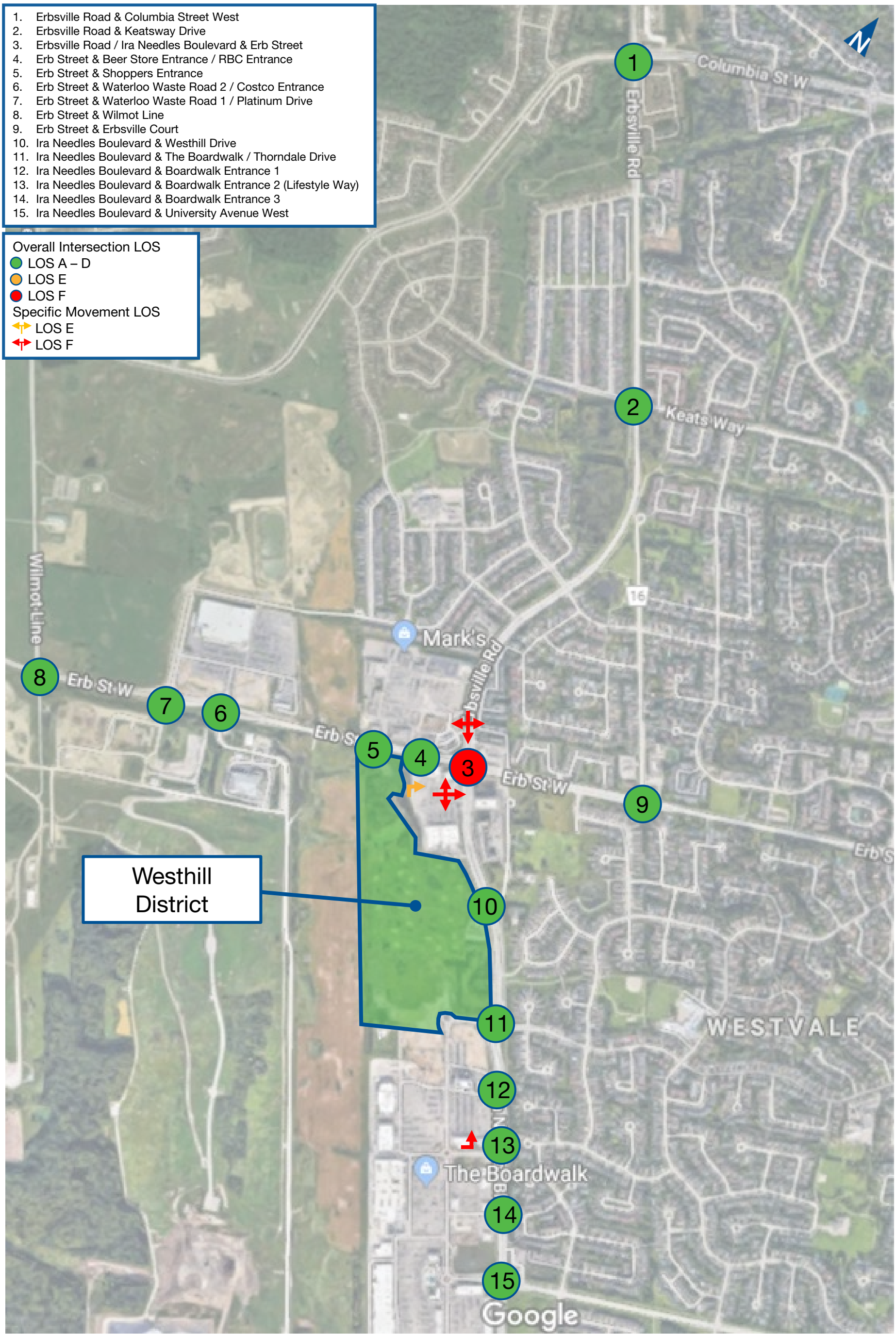
Westhill District TNS
180136

Figure 3.8

1. Erbsville Road & Columbia Street West
2. Erbsville Road & Keatsway Drive
3. Erbsville Road / Ira Needles Boulevard & Erb Street
4. Erb Street & Beer Store Entrance / RBC Entrance
5. Erb Street & Shoppers Entrance
6. Erb Street & Waterloo Waste Road 2 / Costco Entrance
7. Erb Street & Waterloo Waste Road 1 / Platinum Drive
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13. Ira Needles Boulevard & Boardwalk Entrance 2 (Lifestyle Way)
14. Ira Needles Boulevard & Boardwalk Entrance 3
15. Ira Needles Boulevard & University Avenue West

Overall Intersection LOS
- LOS A – D
- LOS E
- LOS F

Specific Movement LOS
- LOS E
- LOS F



Existing Saturday Peak Hour Traffic Operations

Westhill District TNS
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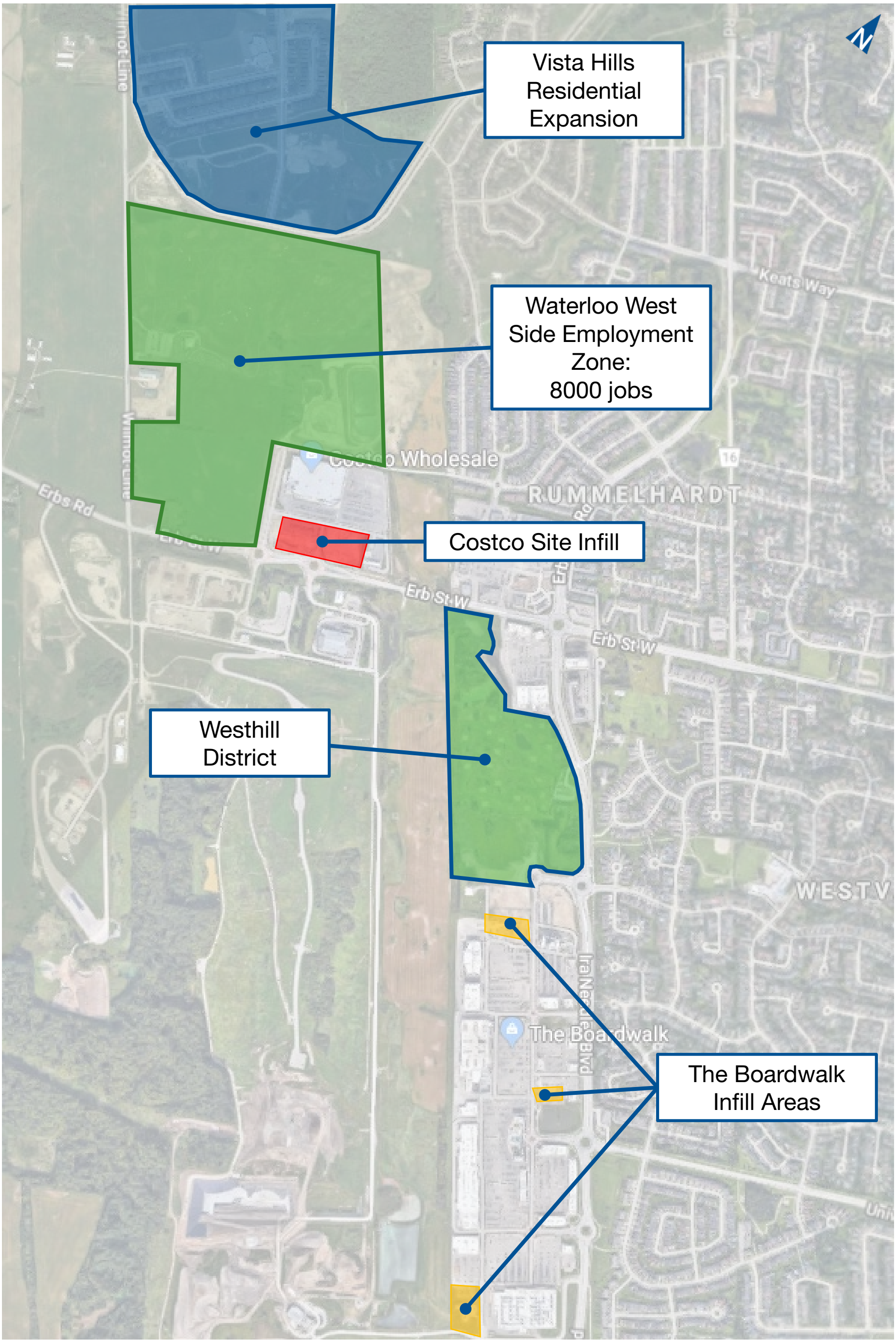
Figure 3.9

4 Future Development and Growth

4.1 Study Area Growth

Future traffic forecasts are based on growth within the study area and outside the Westhill District, as well as growth within the plan. Outside the plan but within the study area the completion of the Boardwalk site and the Costco site are forecast to be complete within the next few years. In addition, the City of Waterloo is planning to service and occupy lands along the extension of Platinum Way where about 8,000 jobs will exist.

Figure 4.1 illustrates the growth areas within the study area, including the Westhill District.



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Future Growth Areas

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Figure 4.1

4.2 Existing Boardwalk Site

4.2.1 Land Use

Completion of the existing Boardwalk site will entail the currently under construction 111,300 ft^2 office building and two other commercial buildings totalling 51,700 ft^2.

4.2.2 Trip Generation

These uses are forecast to generate 143, 170 and 192 trips in the study area during the AM, PM and Saturday peak hours, respectively. **Table 4.1** summarizes the estimated trip generation for The Boardwalk Infill.

TABLE 4.1: THE BOARDWALK TRIP GENERATION INCREASES

Land Use Code	Units	AM Peak Hour				PM Peak Hour				Saturday Peak Hour			
		Rate	In	Out	Total	Rate	In	Out	Total	Rate	In	Out	Total
The Boardwalk													
710: General Office Building	111.3 1000 Sq. ft.	-	113	18	131	-	20	106	126	0.53	32	27	59
820: Shopping Center	51.7 1000 Sq. ft.	0.94	30	18	48	3.81	95	102	197	4.50	121	112	233
Total Generalized Trips			**143**	**36**	**179**		**115**	**208**	**323**		**153**	**139**	**292**
Internal Capture			*10*	*10*	*20*		*33*	*33*	*66*		*9*	*9*	*18*
Transit Reduction		*10%*	*13*	*3*	*16*	*10%*	*5*	*14*	*19*	*10%*	*11*	*10*	*21*
Pass-by (820)		*n/a*	*0*	*0*	*0*	*34%*	*34*	*34*	*68*	*26%*	*31*	*31*	*61*
Total Net Trips			***120***	***23***	***143***		***43***	***127***	***170***		***103***	***90***	***192***

The trip distribution and assignment will be completed using the same methodology as the Westhill Development, discussed further in **Section 4.5**.

Appendix C contains the figures related to the proposed development areas and trip assignment.

4.3 Costco Site Infill

4.3.1 Land Use

The Costco site remains less than fully developed. The completion of the store in 2017 has been captured in the existing traffic counts. Two large pad sites that are zoned commercial remain available for development. Preliminary estimates suggest that these sites would yield another 40,000 ft^2 commercial retail.

4.3.2 Trip Generation

Traffic volumes at the Costco site entrance were increased to accommodate this infill. The trip assignments were taken from the existing West Waterloo Commercial Phase 2 and Costco Parking Expansion[11]. As this report did not analyze trip assignment for the AM peak hour, trip assignment values from the PM peak hour were altered. Using the ITE trip generation rate, trips for the PM peak hour were modified to match the AM peak hour. These uses are

[11] West Waterloo Commercial Phase 2 and Costco Parking Expansion, BA Consulting Group Ltd., 2017

forecast to generate 124, 380 and 490 trips in the study area during the AM, PM and Saturday peak hours, respectively. **Table 4.2** summarizes the estimated trip generation for the Costco Site Infill.

Appendix D contains the figures illustrating the trip assignments.

TABLE 4.2: COSTCO SITE INFILL – TRIP GENERATION ESTIMATE

Land Use Code	Units	AM Peak Hour				PM Peak Hour				Saturday Peak Hour			
		Rate	In	Out	Total	Rate	In	Out	Total	Rate	In	Out	Total
WWC Phase II Retail	70.4 1000 Sq. ft.	1.75	62	62	124	7.10	250	250	500	9.23	325	325	650
Total Generalized Trips			**62**	**62**	**124**		**250**	**250**	**500**		**325**	**325**	**650**
Pass-by (820)		*n/a*	*0*	*0*	*0*	*25%*	*60*	*60*	*120*	*25%*	*80*	*80*	*160*
Total Net Trips			***62***	***62***	***124***		***190***	***190***	***380***		***245***	***245***	***490***

4.4 Waterloo Employment Lands

4.4.1 Land Use

The City of Waterloo intends to develop a west-side employment area. It will be located north and west of the Costco site and centred on a platinum Drive extension northerly to Columbia Street.

Based on the preferred zoning, this development area is forecasts to contain 8000 new jobs[12]. These uses are forecast to generate 1525, 1764 and 814 trips in the study area during the AM, PM and Saturday peak hours, respectively. **Table 4.3** summarizes the total trips in and out of the expected employment area. There is also a large population increase within the area related to the future build out of the subdivision to the north of Columbia Street.

4.4.2 Trip Generation

To determine the increase in trips on the network to act as background growth, the difference between the IMMTS 2031 forecasts and the existing trips was taken.

TABLE 4.3: WATERLOO EMPLOYMENT LANDS – TRIP GENERATION ESTIMATE

Zone	Number of Jobs	AM Peak Hour			PM Peak Hour			Saturday Peak Hour		
		In	Out	Total	In	Out	Total	In	Out	Total
141	8000	1339	186	1525	355	1409	1764	419	395	814

The trip assignments detailed in the WSP Transportation Study did not cover trips generated on Saturdays, so an approximation of Saturday trips was completed. This was done by observing the number of trips generated during the AM and PM peak hours, comparing them to the number of trips generated on a Saturday by a work specific ITE rate, LUC 710 (General Office), and proportioning the number of trips in and out of the site accordingly.

[12] Waterloo West Side Integrated Multi Modal Transportation Study, WSP, 2018

Appendix E contains the figures illustrating the trip assignments.

4.5 Westhill District

4.5.1 Land Use

The subject lands are currently designated Employment, Commercial and Open Space in the City of Waterloo Official Plan with the Zoning By-Law designating them Future Determination (FD). Based on the planning applications that reflect SPA 40 and SPA41, the lands will develop largely as prestige office with a mixed-use commercial component. Given the nature and scale of the proposed development, it was agreed to by agency staff that the ITE trip generation methods would be applicable and that no additional data collection would be required at other similar developments. In addition, trip mode share and distribution data available in the 2016 TTS (Transportation Tomorrow Survey) from samples taken from the existing residential development directly to the north would provide a reliable source for determining logical trip routing to/from the area. The following sections provide a suggested method for Trip Generation, Mode Share and Trip Distribution to be used in this study.

The 15.68 Westhill District is planned to be developed with about 1.17 million ft^2 of gross floor area (GFA) for prestige office space and 123,000 ft^2 of GFA for commercial space. It is expected to be fully developed and occupied by 2031. The proposed development is to be split between four properties; 1180413 Ontario Inc. (5.13 ha), Home Hardware (7.99 ha), INCC Corp (0.4 ha) and Waterloo Commons JV Inc (2.16 ha).

Figure 4.2 details the location of all development lands within the Westhill District plan.

4.5.2 Trip Generation

In *Trip Generation*[13], the independent variable identified for use to estimate the number of trips that would be produced by the Westhill development was the gross floor area (GFA) of the commercial and office spaces to be developed.

Based on the land uses detailed in the previous sections, Land Use Codes 710 (General Office Building), 812 (Building Materials and Lumber Store), and 820 (Shopping Center), are a reasonable representation of the activity in the proposed Westhill District development. The development is projected to take place incrementally over time with full build-out expected to occur by 2031.

Table 4.4 summarizes the trip generation of the Westhill District. It is estimated that about 1103, 1267 and 1113 trips will be generated during the AM, PM and Saturday peak hours, respectively. Trip reductions were

[13] Trip Generation 10th Edition, Institute of Transportation Engineers, Washington D.C., 2017.

considered with respect to the land uses, based on pass-by trips, internal capture and mode share.

Pass-by reductions followed the processed detailed in the ITE Trip Generation Handbook[14], were applied to the commercial and service land uses. Reductions were based on the LUC as well as the peak hour, resulting in a total pass-by trip reduction of 140 trips and 123 trips during the PM and Saturday peak hours, respectively.

Internal capture calculations reflect trips between land uses that do not enter the external road network. Using the methods recommended by ITE in a total internal capture trip reduction of 112 trips, 110 trips and 202 trips during the AM, PM and Saturday peak hours, respectively.

Appendix F contains the internal capture calculations**.**

TABLE 4.4: WESTHILL DISTRICT AREA – ESTIMATED TRIP GENERATION

Land Use Code	Units	AM Peak Hour				PM Peak Hour				Saturday Peak Hour			
		Rate	In	Out	Total	Rate	In	Out	Total	Rate	In	Out	Total
1180413 Ontario Inc.													
710: General Office Building	552.0 1000 Sq. ft.	-	469	76	545	-	92	485	577	0.53	158	135	293
Home Hardware													
710: General Office Building	490.0 1000 Sq. ft.	-	419	68	487	-	82	433	515	0.53	140	119	259
812: Building Materials and Lumber Store	65.0 1000 Sq. ft.	1.57	64	38	102	2.06	63	71	134	9.58	318	305	623
Total Parcel Trips			**483**	**106**	**589**		**145**	**504**	**649**		**458**	**424**	**882**
INCC Corp													
710: General Office Building	130.4 1000 Sq. ft.	-	128	21	149	-	23	123	146	0.53	37	32	69
Waterloo Commons JV Inc.													
820: Shopping Center	58.1 1000 Sq. ft.	0.94	34	21	55	3.81	106	115	221	4.50	136	126	262
Total Generalized Trips			**1114**	**224**	**1338**		**366**	**1227**	**1593**		**789**	**717**	**1506**
Internal Capture			*56*	*56*	*112*		*55*	*55*	*110*		*101*	*101*	*202*
Transit Reduction		*10%*	*106*	*17*	*123*	*10%*	*27*	*113*	*140*	*10%*	*65*	*58*	*123*
Pass-by (820)		*n/a*	*0*	*0*	*0*	*34%*	*38*	*38*	*76*	*26%*	*34*	*34*	*68*
Total Net Trips			***952***	***151***	***1103***		***246***	***1021***	***1267***		***589***	***524***	***1113***

4.5.3 Mode Share

From the Region of Waterloo TMP, existing transit usage for the Region was determined to be 3.8% in 2006, with a target of 14.8% by the 2031 horizon. **Table 4.5** summarizes the mode share of the existing residents and the targets for the 2031 horizon. In discussions with Regional staff at the pre-study consultation, it was agreed that this mode-share percentage was considered too ambitious, as these future targets specified include the use of the ION as a component of the mode share increase. Accordingly, since this development is not directly served by the ION, a future mode share to transit of 10% was agreed to.

[14] Trip Generation Handbook; 3rd Edition, Institute ff Transportation Engineers, 2017

TABLE 4.5: EXISTING AND TARGETED MODE SHARES FOR WESTERN WATERLOO[15]

Mode	Share Percentage	
	2006	2031
Auto Driver	69.60%	58.00%
Auto Passenger	15.60%	12.00%
Local Transit	3.80%	14.8%2
School Bus	2.70%	2.70%
Cycle	0.70%	3.00%
Walk	7.10%	9.00%
Other	0.40%	0.50%

4.5.4 Trip Distribution

The Transportation Tomorrow Survey polled the residents of the Greater Golden Horseshoe and Waterloo Region in 2016 to determine the location of their homes, work, market areas and their generalized travel characteristics. These data were used to provide objective information on the distribution of trip origins and destinations.

Table 4.6 summarizes the trip distribution for the development.

TABLE 4.6: TRIP DISTRIBUTION SUMMARY

Direction	Commercial		Office	
	IN	OUT	IN	OUT
North via Erbsville Road	11%	8%	6%	1%
East via Columbia Street W	11%	18%	23%	25%
East via Keats Way	8%	12%	5%	4%
East via Erb Street W	8%	9%	16%	18%
East via Thorndale Drive	4%	2%	4%	3%
East Via University Avenue W	5%	9%	15%	12%
South via Ira-Needles Boulevard	52%	40%	31%	35%
West via Erb Street W	0%	0%	0%	1%
North via Wilmot Line	1%	2%	0%	0%
Total	***100%***	***100%***	***100%***	***100%***

4.5.5 Trip Attraction from Waterloo Employment Lands

The proximity of 8000 new employees on the Waterloo West Employment Lands to the subject development is likely to result a degree of interaction between the areas. The presence of the Boardwalk extension as a collector road would attract some of these trips from the arterial grid.

Using a calculation like the internal capture calculation methodology, based on the number of trips in and out of Platinum Drive and the estimated trip

[15] Regional Transportation Master Plan: Exhibit 7-2, Regional Municipality of Waterloo and AECOM, 2011

generation of the commercial portion of the Westhill District development, was completed to estimate the number of trips travelling between the two sites. **Table 4.7** summarizes the number of diverted trips in and out of the proposed development, related to the Waterloo Employment development. This methodology was used to estimate the attractiveness between the future employment uses and the retail uses of the Westhill District.

TABLE 4.7: TRIP DIVERSION

Number of Trips					
AM Peak		PM Peak		Saturday Peak	
In	Out	In	Out	In	Out
72	40	94	30	240	36

4.5.6 Trip Assignment

Using the trip estimates in **Table 4.4** and the trip distribution proportions in **Table 4.6,** the site generated traffic was assigned to the road network.

Figure 4.3, Figure 4.4 and **Figure 4.5** illustrate the trip assignment for the site trips generated, with the existing network configuration, for the AM, PM and Saturday peak hours, respectively.

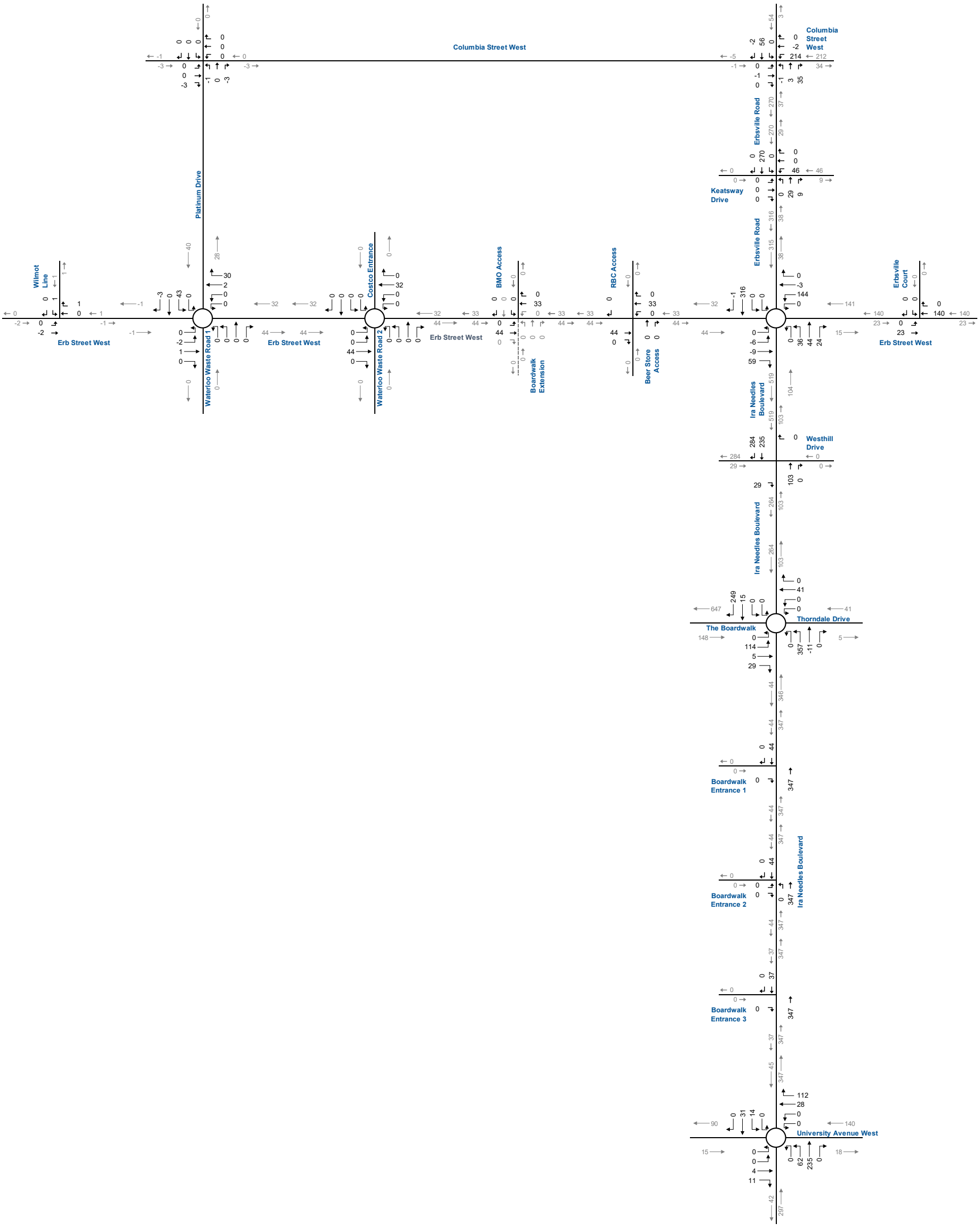


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Westhill District Ownership

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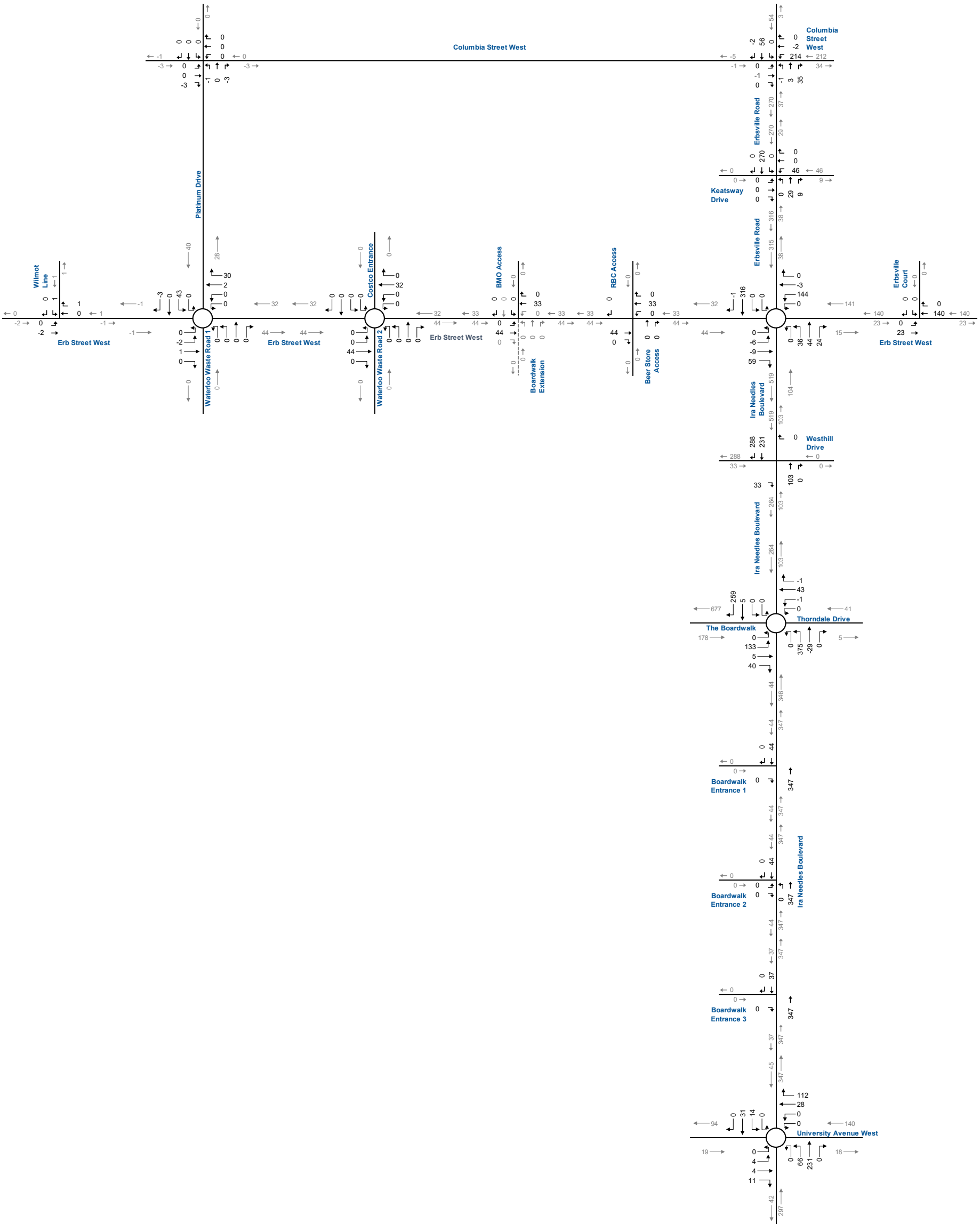
Figure 4.2



Westhill District Site Generated Traffic – AM Peak Hour – Do-Nothing Case

Westhill District TNS
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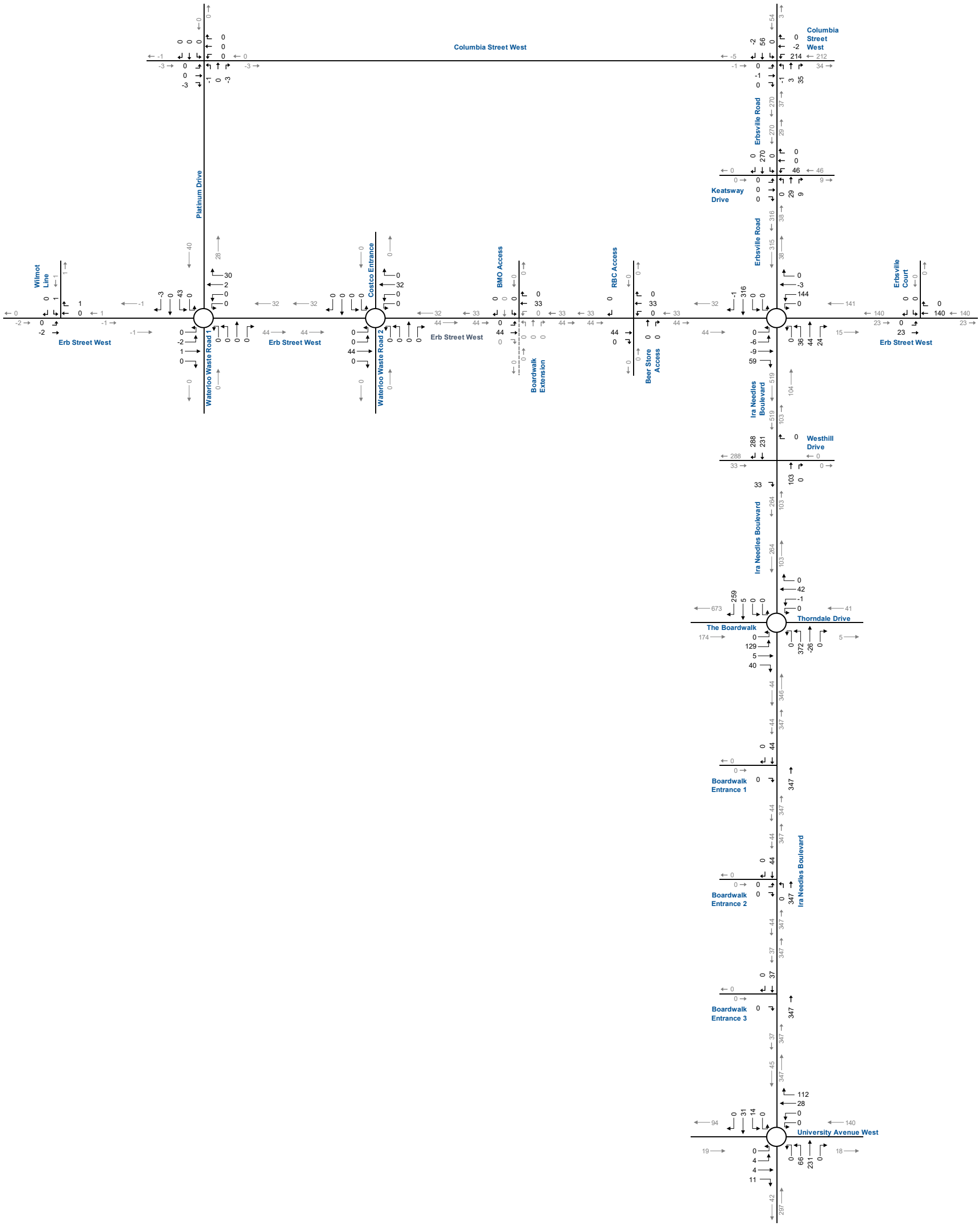
Figure 4.3



Westhill District Site Generated Traffic – PM Peak Hour – Do-Nothing Case

Westhill District TNS
180136

Figure 4.4



Westhill District Site Generated Traffic – Saturday Peak Hour – Do-Nothing Case

Westhill District TNS
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Figure 4.5

5 Need and Justification

5.1 Planned, Committed and Future Roadway Projects

5.1.1 10-Year Capital Works Programs

As identified in **Chapter 2**, the current Region of Waterloo Capital Works program contains the transportation capacity and operational improvement for Erb Street West within the study area. It is expected to be widened to 4-lanes from Fisher-Hallman Road to Wilmot Line in the next year. Erbsville Road is also expected to be widened to 4-lanes from Erb Street West to Columbia Street West by 2031. Included in this project is change in intersection control at Erbsville Road and Keats Way to a mode roundabout.

5.1.2 Additional Network Changes Identified in the IMMTS

As identified in **Chapter 2**, the IMMTS contains future network additions for the Waterloo Employment Lands including the extension of Platinum Drive. With this extension there is an assumed roundabout for the intersection of Platinum Drive and Columbia Street West. Further, the IIMTS recommended a collector road extension of the Boardwalk to Erb Street West.

5.1.3 Development Charges By-Law

Council approved a new Development Charges By-law that took effect January 1, 2018. To inform the development of this By-law, a Background Study was prepared by Watson and Associates Economics Ltd. in September 2017.[16]

The Development Charges (DC) Background Study reviewed the anticipated growth and development in terms of both population and employment, for which the City of Waterloo is required to provide services over a 10 to 15-year time horizon. Capital projects were included for infrastructure, including road improvements and expansions.

The DC Background Study included the Ira Needles Boulevard By-Pass in its 2018 Capital Budget Project Sheets. The project includes new services, including sanitary sewers, watermain and storm sewers, a new collector road to include sidewalks, bike lanes, culvert crossings, pond restoration/ relocations and a roundabout at Erb Street West.

The project sheet identifies that the funding source for the project is intended to be 50% development charges and 50% developer funded. Including this project in the Development Charge Background Study indicates a financial commitment to the collector road network.

[16] City of Waterloo Development Charge Background Study, Watson and Associates, 2017.

5.2 2031 Do-Nothing Assessment

The **Do-Nothing Assessment** forecasts the traffic operations for the total 2031 traffic, with the planned network improvements listed in **Section 5.1.1** and **Section 5.1.2**. **Figure 5.1** illustrates the planned and committed future 2031 "Do-Nothing" roadway network.

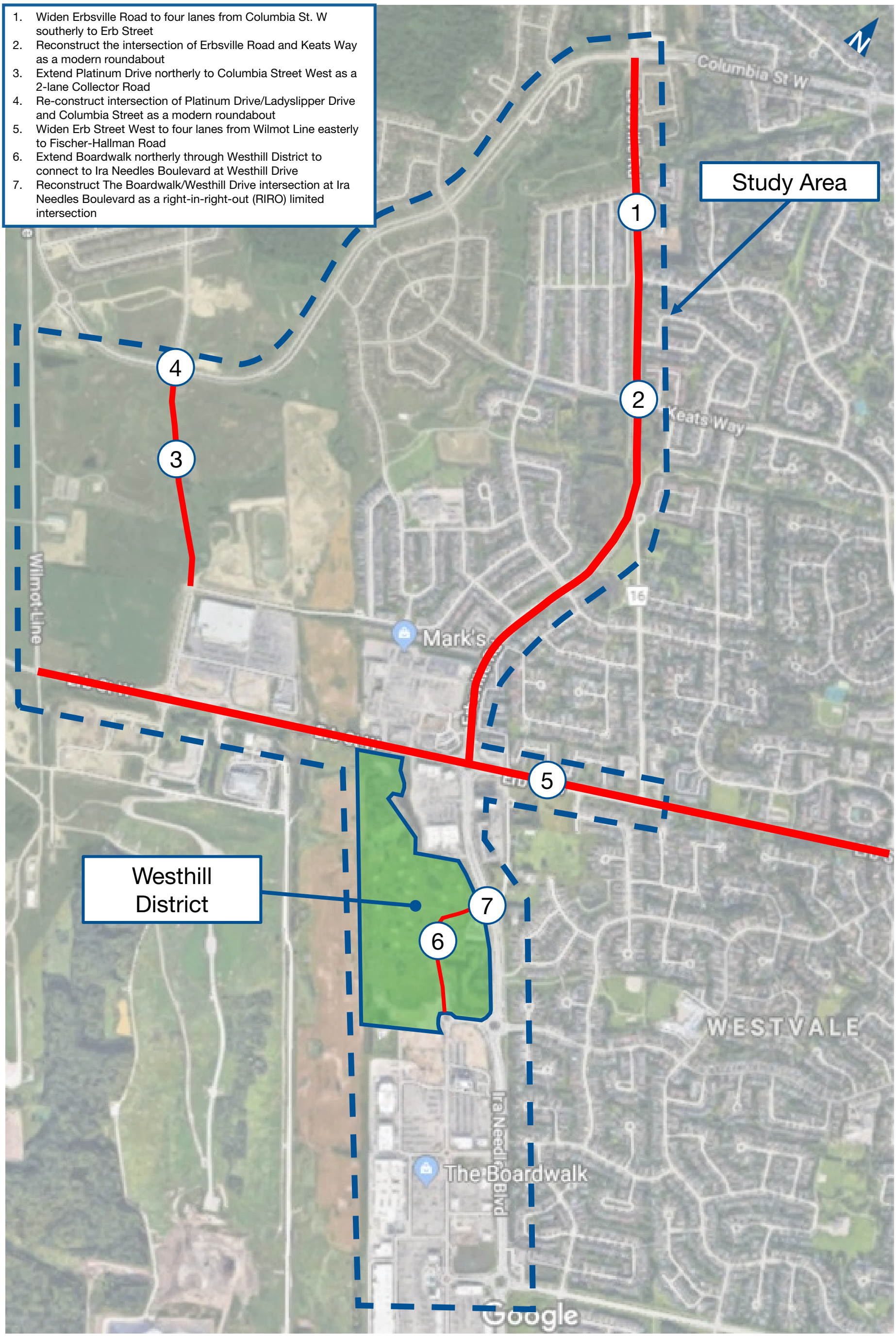
5.2.1 Total Traffic Operations

The forecast 2031 total traffic volumes, including both background traffic and development traffic, are shown in **Figure 5.2**, **Figure 5.3**, and **Figure 5.4** for the AM, PM and Saturday peak hours, respectively.

Figure 5.5, **Figure 5.6**, and **Figure 5.7** depict the baseline operational analyses under the 2031 Do-Nothing conditions. The figure identify that several key intersections operate at undesirable levels with the following critical movements:

- **Erbsville Road and Columbia St West** eastbound shared through-right movement is forecast to operate at a LOS F with a v/c > 1.0 during both the AM and PM peak hours. The westbound left-turn movement is forecast to operate at a LOS F with a v/c > 1.0 during all peak hours. The northbound left-turn movement is forecast to operate at LOS F with a v/c > 1.0 during the AM peak hour. The southbound left-turn movement is forecast to operate at LOS F with a v/c > 1.0 during the AM Peak hour, and the shared through-right-turn movement is forecast to operate at LOS F with a v/c > 1.0 during the PM Peak Hour. Overall, the intersection is forecast to operate at a LOS E during the AM peak hour and LOS F during the PM peak hour, respectively;
- **Ira Needles Boulevard/Erbsville Road and Erb St West** eastbound approach is forecast to operate at LOS F with a v/c > 1.0 during all peak hours. The westbound approach is forecast to operate at LOS F with a v/c > 1.0 during all peak hours. The northbound approach is forecast to operate at LOS F with a v/c > 1.0 during all peak hours. The southbound approach is forecast to operate at LOS F with a v/c > 1.0 during all peak hours. Overall the intersection is forecast to operate at LOS F during all peak hours;
- **Ira Needles Boulevard and Westhill Drive** eastbound right-turn movement is forecast to operate at LOS F with a v/c > 1.0 during the PM peak hour;

1. Widen Erbsville Road to four lanes from Columbia St. W southerly to Erb Street
2. Reconstruct the intersection of Erbsville Road and Keats Way as a modern roundabout
3. Extend Platinum Drive northerly to Columbia Street West as a 2-lane Collector Road
4. Re-construct intersection of Platinum Drive/Ladyslipper Drive and Columbia Street as a modern roundabout
5. Widen Erb Street West to four lanes from Wilmot Line easterly to Fischer-Hallman Road
6. Extend Boardwalk northerly through Westhill District to connect to Ira Needles Boulevard at Westhill Drive
7. Reconstruct The Boardwalk/Westhill Drive intersection at Ira Needles Boulevard as a right-in-right-out (RIRO) limited intersection

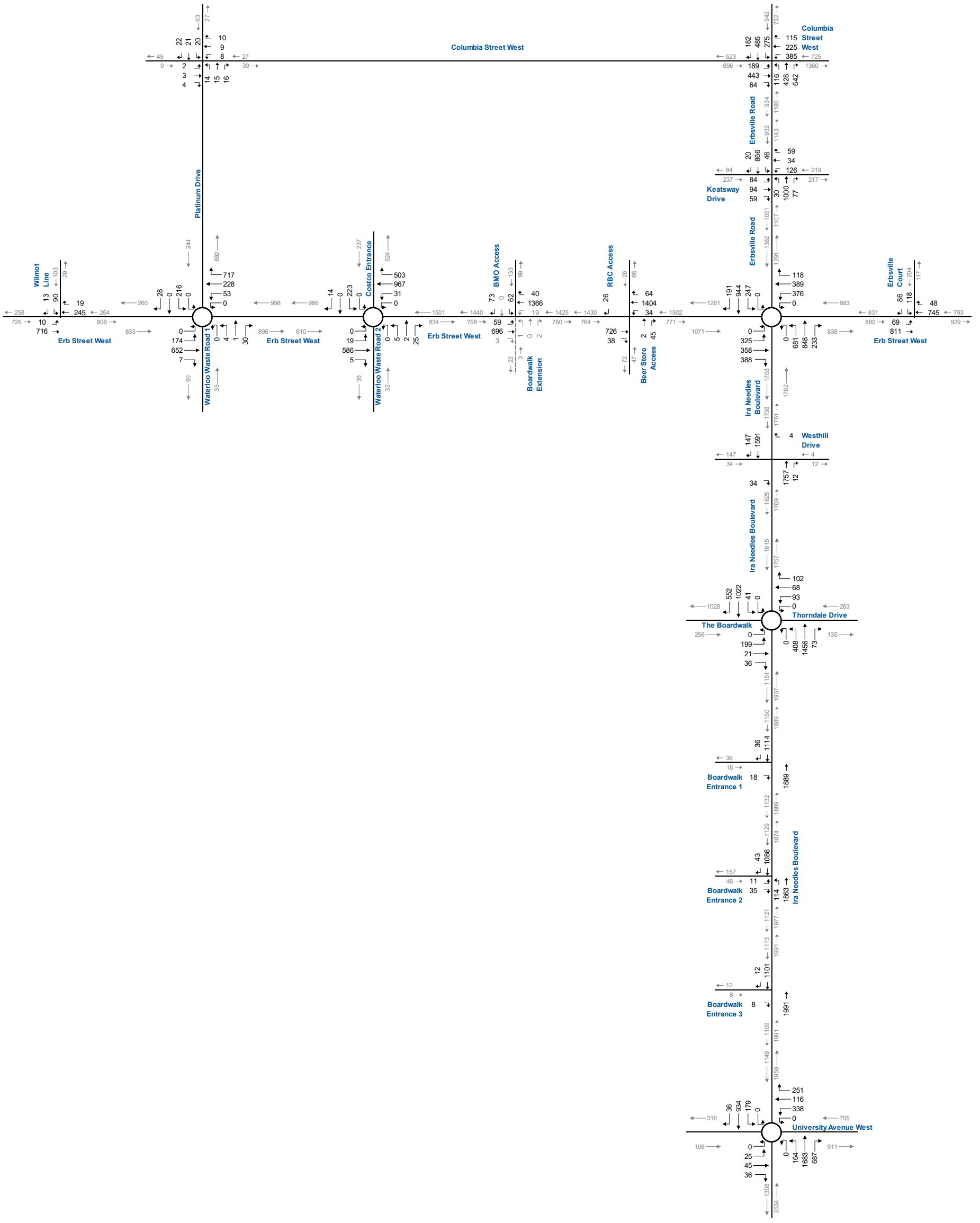


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2031 Do-Nothing Transportation Network with Baseline Improvements

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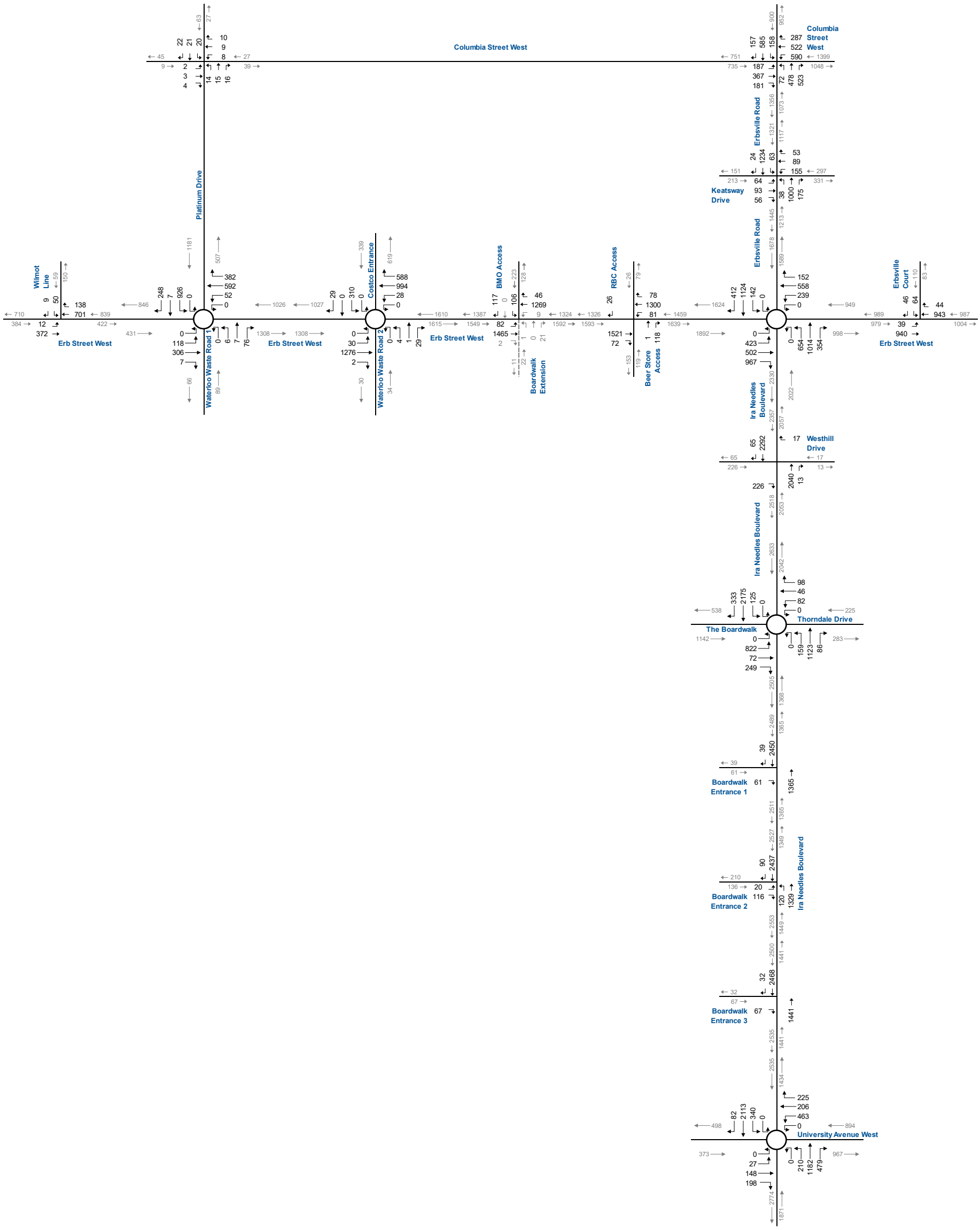
Figure 5.1



2031 Total Traffic Forecasts – AM Peak Hour – Do-Nothing Case

Figure 5.2

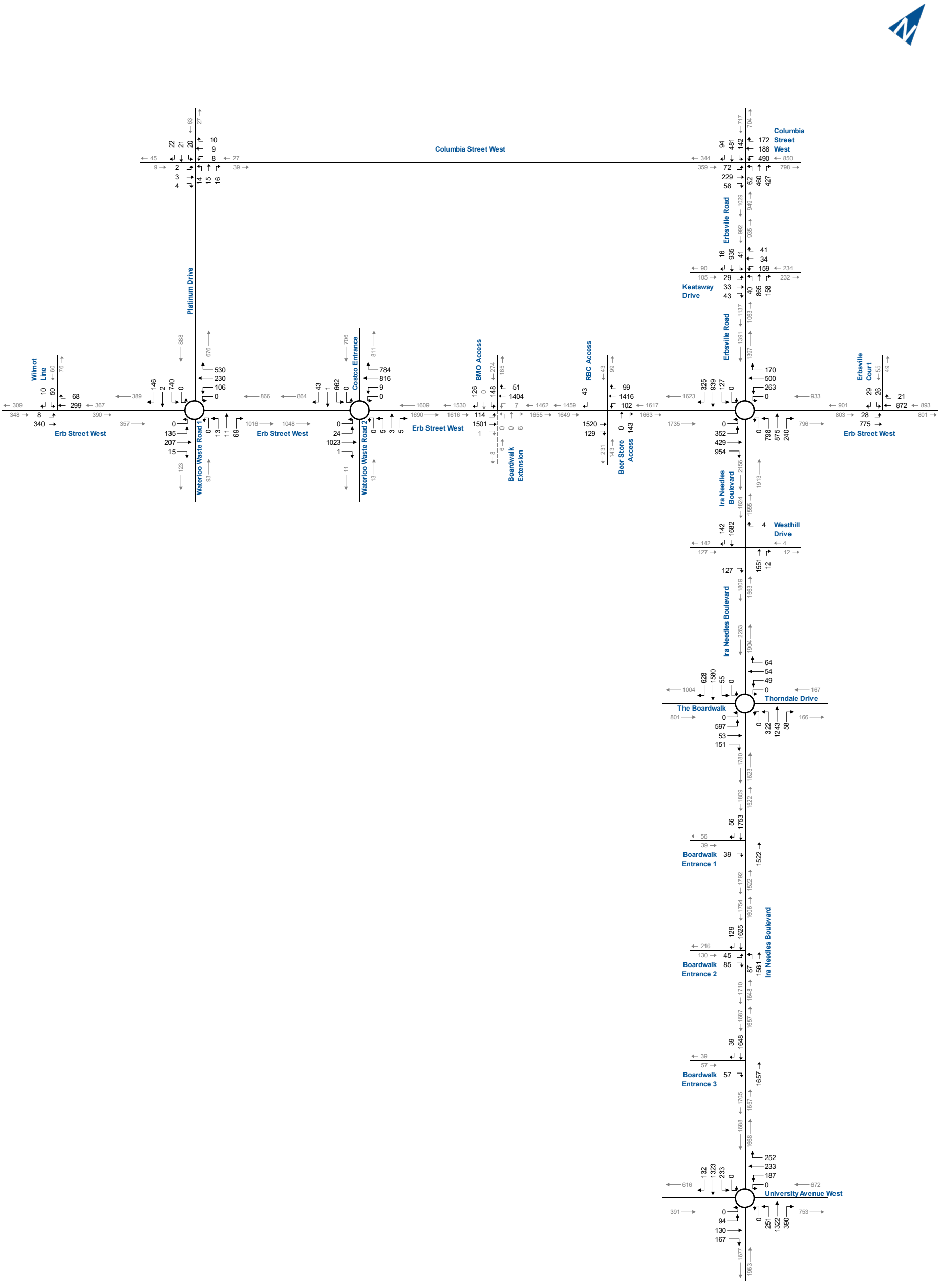
Westhill District TNS
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2031 Total Traffic Forecasts – PM Peak Hour – Do-Nothing Case

Figure 5.3

Westhill District TNS
180136



2031 Total Traffic Forecasts – Saturday Peak Hour – Do-Nothing Case

Westhill District TNS
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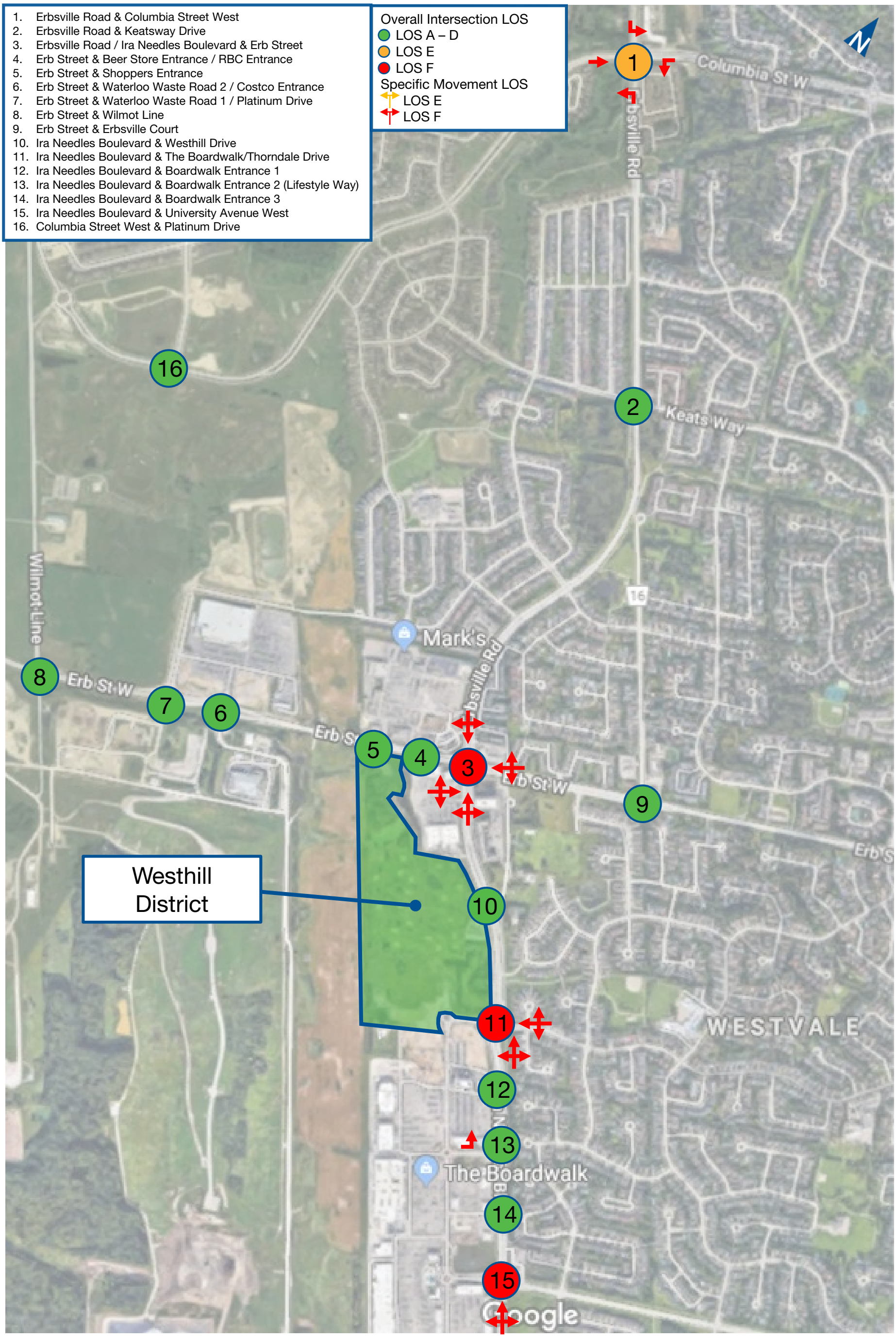
Figure 5.4

1. Erbsville Road & Columbia Street West
2. Erbsville Road & Keatsway Drive
3. Erbsville Road / Ira Needles Boulevard & Erb Street
4. Erb Street & Beer Store Entrance / RBC Entrance
5. Erb Street & Shoppers Entrance
6. Erb Street & Waterloo Waste Road 2 / Costco Entrance
7. Erb Street & Waterloo Waste Road 1 / Platinum Drive
8. Erb Street & Wilmot Line
9. Erb Street & Erbsville Court
10. Ira Needles Boulevard & Westhill Drive
11. Ira Needles Boulevard & The Boardwalk/Thorndale Drive
12. Ira Needles Boulevard & Boardwalk Entrance 1
13. Ira Needles Boulevard & Boardwalk Entrance 2 (Lifestyle Way)
14. Ira Needles Boulevard & Boardwalk Entrance 3
15. Ira Needles Boulevard & University Avenue West
16. Columbia Street West & Platinum Drive

Overall Intersection LOS
- LOS A – D
- LOS E
- LOS F

Specific Movement LOS
- LOS E
- LOS F

Westhill District



2031 Total AM Peak Hour Traffic Operations – Do-Nothing Case

Westhill District TNS
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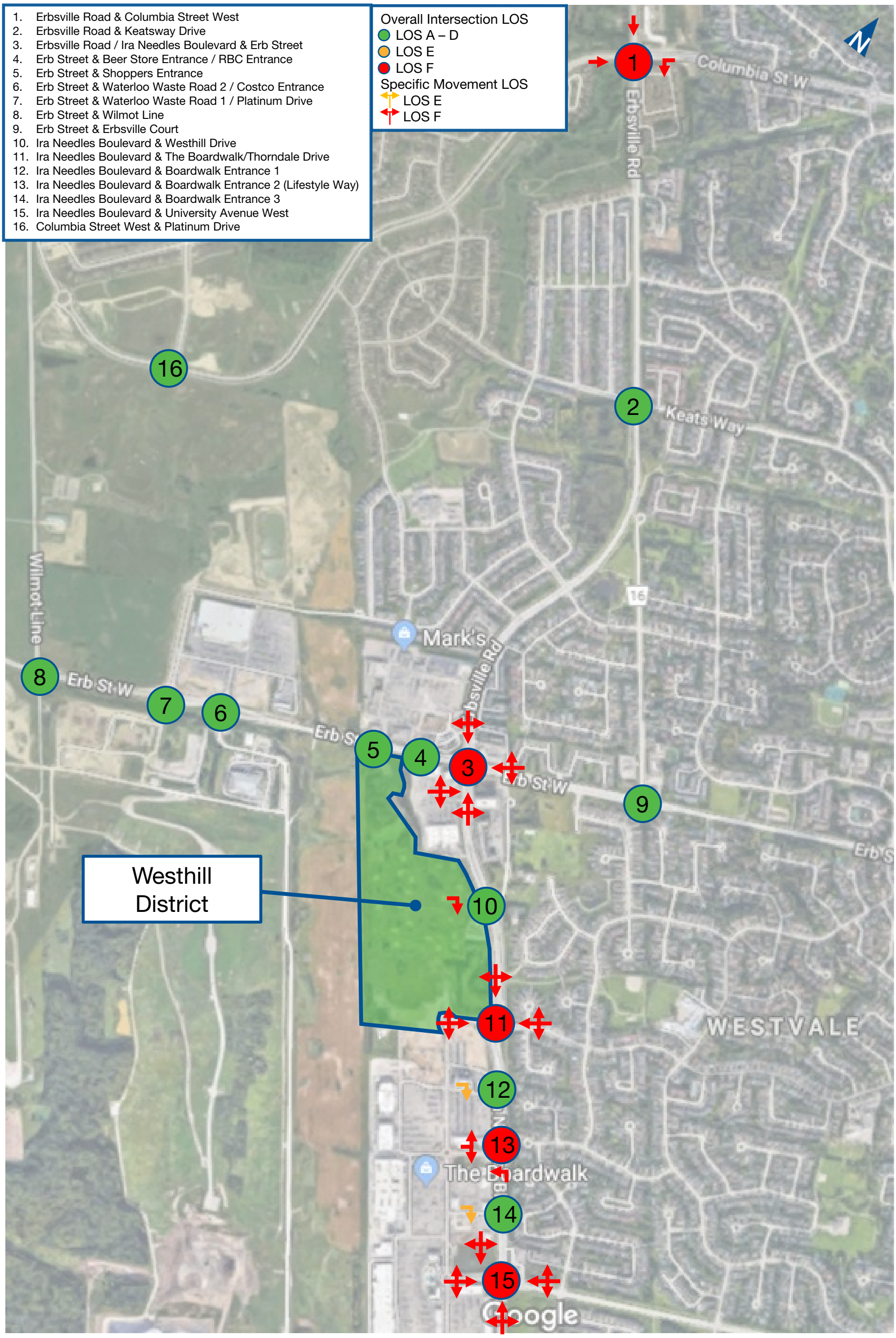
Figure 5.5

1. Erbsville Road & Columbia Street West
2. Erbsville Road & Keatsway Drive
3. Erbsville Road / Ira Needles Boulevard & Erb Street
4. Erb Street & Beer Store Entrance / RBC Entrance
5. Erb Street & Shoppers Entrance
6. Erb Street & Waterloo Waste Road 2 / Costco Entrance
7. Erb Street & Waterloo Waste Road 1 / Platinum Drive
8. Erb Street & Wilmot Line
9. Erb Street & Erbsville Court
10. Ira Needles Boulevard & Westhill Drive
11. Ira Needles Boulevard & The Boardwalk/Thorndale Drive
12. Ira Needles Boulevard & Boardwalk Entrance 1
13. Ira Needles Boulevard & Boardwalk Entrance 2 (Lifestyle Way)
14. Ira Needles Boulevard & Boardwalk Entrance 3
15. Ira Needles Boulevard & University Avenue West
16. Columbia Street West & Platinum Drive

Overall Intersection LOS
- LOS A – D
- LOS E
- LOS F

Specific Movement LOS
- LOS E
- LOS F

Westhill District



2031 Total PM Peak Hour Traffic Operations – Do-Nothing Case

Westhill District TNS
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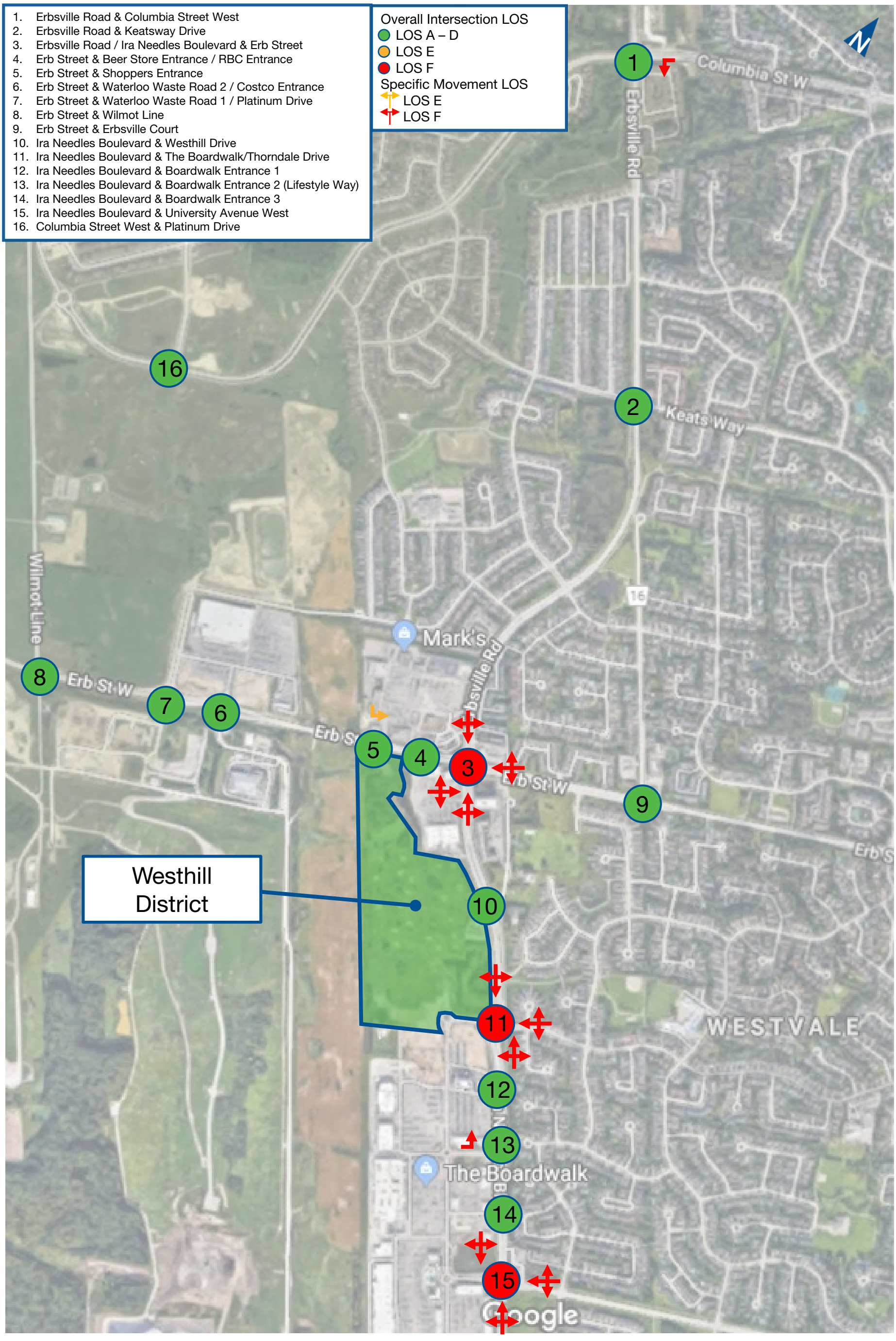
Figure 5.6

1. Erbsville Road & Columbia Street West
2. Erbsville Road & Keatsway Drive
3. Erbsville Road / Ira Needles Boulevard & Erb Street
4. Erb Street & Beer Store Entrance / RBC Entrance
5. Erb Street & Shoppers Entrance
6. Erb Street & Waterloo Waste Road 2 / Costco Entrance
7. Erb Street & Waterloo Waste Road 1 / Platinum Drive
8. Erb Street & Wilmot Line
9. Erb Street & Erbsville Court
10. Ira Needles Boulevard & Westhill Drive
11. Ira Needles Boulevard & The Boardwalk/Thorndale Drive
12. Ira Needles Boulevard & Boardwalk Entrance 1
13. Ira Needles Boulevard & Boardwalk Entrance 2 (Lifestyle Way)
14. Ira Needles Boulevard & Boardwalk Entrance 3
15. Ira Needles Boulevard & University Avenue West
16. Columbia Street West & Platinum Drive

Overall Intersection LOS
- LOS A – D
- LOS E
- LOS F

Specific Movement LOS
- LOS E
- LOS F

Westhill District



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2031 Total Saturday Peak Hour Traffic Operations – Do-Nothing Case

Westhill District TNS
180136

Figure 5.7

- **Ira Needles Boulevard and The Boardwalk/Thorndale Drive** eastbound approach is forecast to operate at LOS F with a v/c > 1.0 during the PM peak hour. The westbound approach is forecast to operate at LOS F with a v/c > 1.0 during all peak hours. The northbound approach is forecast to operate at LOS F with a v/c > 1.0 during the AM and Saturday peak hours. The southbound approach is forecast to operate at LOS F with a v/c > 1.0 during the PM and Saturday peak hours. Overall the intersection is forecast to operate at LOS F during all peak hours;
- **Ira Needles Boulevard and Boardwalk Entrance 1** eastbound right-turn movement is forecast to operate at LOS E during the PM peak hour; and
- **Ira Needles Boulevard and Boardwalk Entrance 2 (Lifestyle Way)** eastbound left-turn movement is forecast to operate with a LOS F during all peak hours and a v/c > 1.0 during the PM and Saturday peak hours. The eastbound right-turn movement is forecast to operate with a LOS F during the PM peak hour. The northbound left-turn movement is forecast to operate with a LOS F during the PM peak hour. Overall the intersection is forecast to operate at a LOS F during the PM hour; and
- **University Ave W and Ira-Needles Boulevard** eastbound approach is forecast to operate at LOS F with a v/c > 1.0 during the PM peak hour. The westbound approach is forecast to operate at LOS F with a v/c > 1.0 the PM and Saturday peak hours. The northbound approach is forecast to operate at LOS F with a v/c > 1.0 during the all peak hours. The southbound approach is forecast to operate at LOS F with a v/c > 1.0 during the PM and Saturday peak hours. Overall, the intersection is forecast to operate at a LOS F during all peak hours.

Appendix G includes the supporting detailed Synchro 9 and Arcady reports.

5.3 Problem Statement

With the 2031 “Do-Nothing” transportation network and intersection configurations and with the forecast additional traffic arising from the developments discussed in **Chapter 4**, some study area intersections are forecast to operate with delays above desired levels. To mitigate the network and intersection deficiencies, consideration is given to the RTMP and IMMTS transportation improvements, including the northerly extension of the Boardwalk as a new collector road.



6 Collector Network Alternatives

The IMMTS has proposed a solution to this issue by constructing an extension to The Boardwalk and connecting with Erb Street West. This study found that this was a viable option to help mitigate the large increase of traffic on Ira Needles Boulevard and allowed for improved network operations.

6.1 Guiding Principles

Overall the plan is being developed with the following guiding principles in mind:

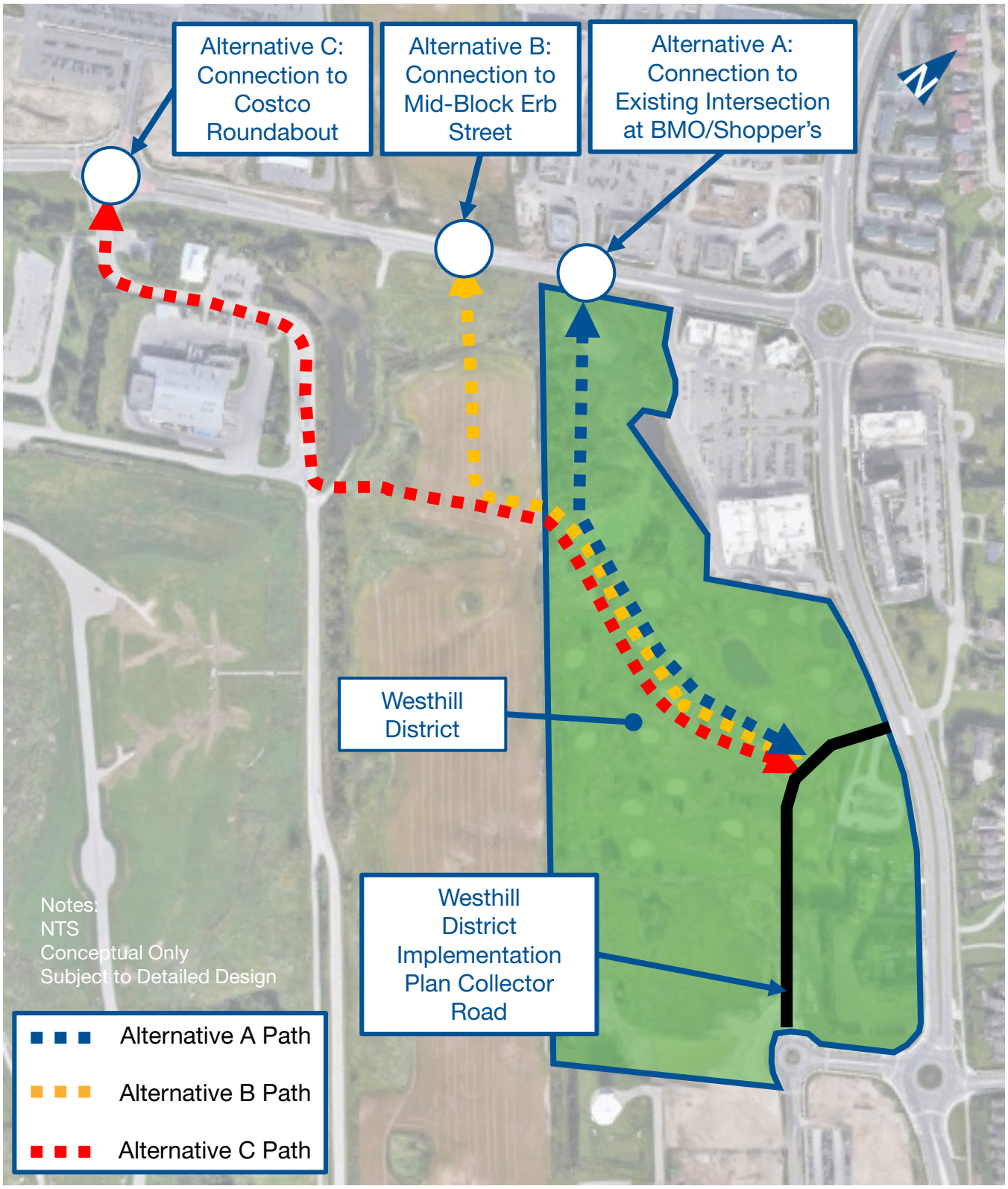
- **Integration with the Existing Development**: The land use plan and supporting transportation infrastructure should integrate the development with the existing neighbourhood fabric to the east. The transportation infrastructure developed will support appropriate road connections and facilitate pedestrian, cycling and transit trips.
- **Transportation Network Efficiency**: The role of the potential road extension within the development lands must also be considered as it relates to the overall broader transportation network in West Waterloo. Important aspects of this discussion will be the potential advantages and disadvantages of providing an extension to an existing arterial road as it relates to the general travel patterns and demands of the existing and future traffic in West Waterloo. To provide a connection to Erb Street West**,** The Boardwalk extension has been considered to allow additional access to the site as well as to divert traffic away from the existing intersections.
- **Development Intensity and Distribution**: Based on the sensitivity of the adjacent land uses and the desire to minimize impacts, the concentration of the development density has been assumed to be located towards Thorndale Drive and Ira Needles Boulevard.

6.2 Collector Road Alternatives

Based on the above principles, an assessment of providing a collector road connection to the various surrounding arterial roads was undertaken. The Planning & Existing Conditions Report[17] (PECR) identified three alternatives. **Figure 6.1** depicts the alternatives considered:

- **Alternative A:** Extension Northwesterly to the BMO Access Signalized Intersection;
- **Alternative B:** Extension Northwesterly to New Intersection on Hydro One lands; and
- **Alternative C:** Extension Northwesterly to Costco Roundabout via the Waterloo Waste Road.

[17] Planning & Existing Conditions Report: Westhill District, MHBC, 2018



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Collector Road Alternatives

West Hills Commercial
180136

Figure 6.1

6.2.1 Alternative A

Figure 6.1 illustrates Alternative A. The option extends The Boardwalk from the Westhill Drive connection to Erb Street West at the existing traffic signal (BMO Access) west of the Ira Needles roundabout. This route is close to Ira Needles Boulevard (approximately 200 metres) and is therefore expected to be effective at attracting trips generated by the Westhill District that would otherwise be forced to use the Ira Needles Boulevard corridor.

Figure 6.2 depicts the site generated trip assignment for the affected study area intersections under Alternative A.

6.2.2 Alternative B

Figure 6.1 illustrates Alternative B. The option extends The Boardwalk from the Westhill Drive connection to Erb Street West about 400 metres west of Ira Needles Boulevard within the Hyrdo One lands. This route requires additional "out of the way" travel for Ira Needles Boulevard corridor travel. Accordingly, it is forecast to be less effective at attracting trips generated by the Westhill District that would otherwise be forced to use the Ira Needles Boulevard corridor.

Given that its connection to Erb Street west would be a T-intersection, and the forecast volumes, the intersection would not justify signalization. Without a signal or roundabout at this intersection, left-turn movements would experience high delays given the eastbound and westbound approach volumes.

Figure 6.3 depicts the site generated trip assignment for the affected study area intersections under Alternative B.

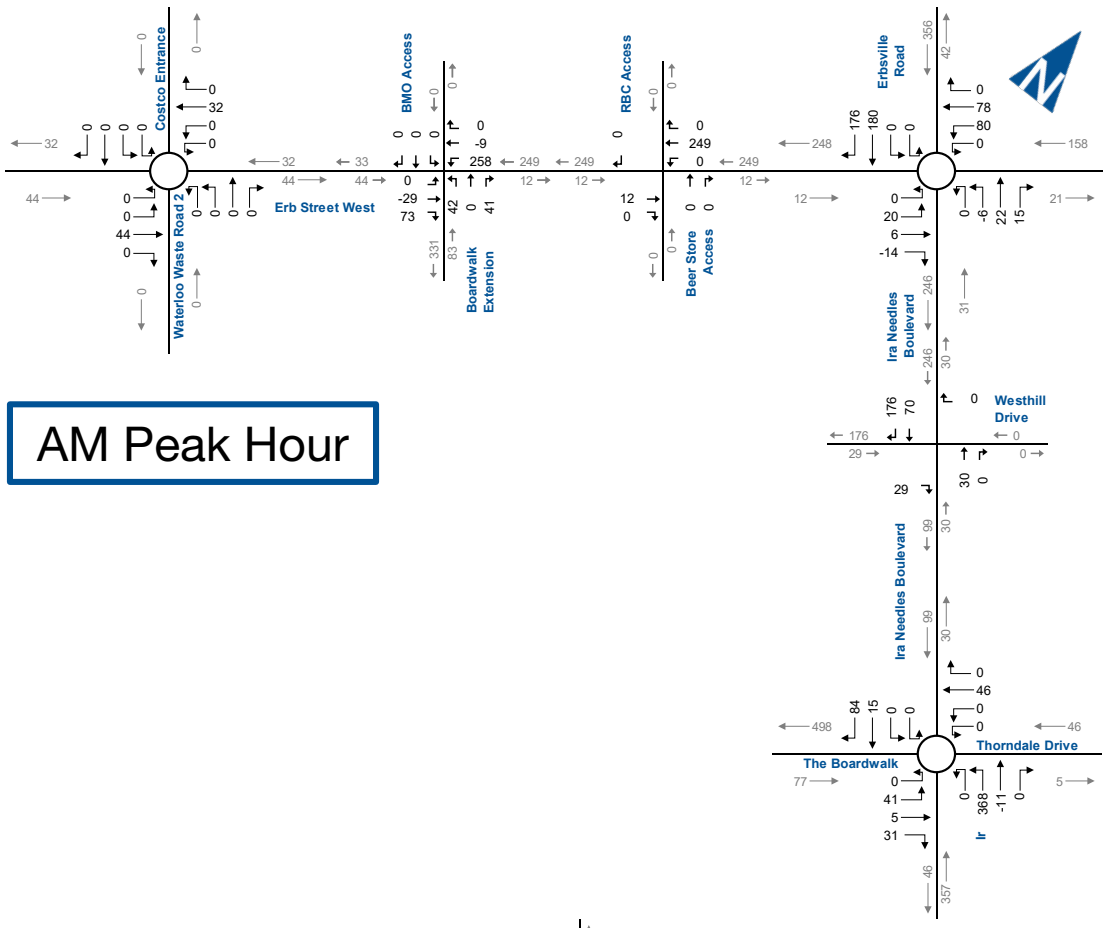
6.2.3 Alternative C

Figure 6.1 illustrates Alternative C. This option extends The Boardwalk from the Westhill Drive connection westerly to Waterloo Waste Road, intersecting with Erb Street at the Costco roundabout. This connection is the furthest from Ira Needles Boulevard (approximately 650 metres) and would require drivers to significantly deviate from the shortest path with its use, it is expected that this connection will attract the least trips generated by the Westhill District development from the Ira Needles Boulevard. Further, as the alignment would not connect directly into Platinum drive two additional turning movements and "out of the way" travel would be required to use Platinum/Columbia as an alternative route.

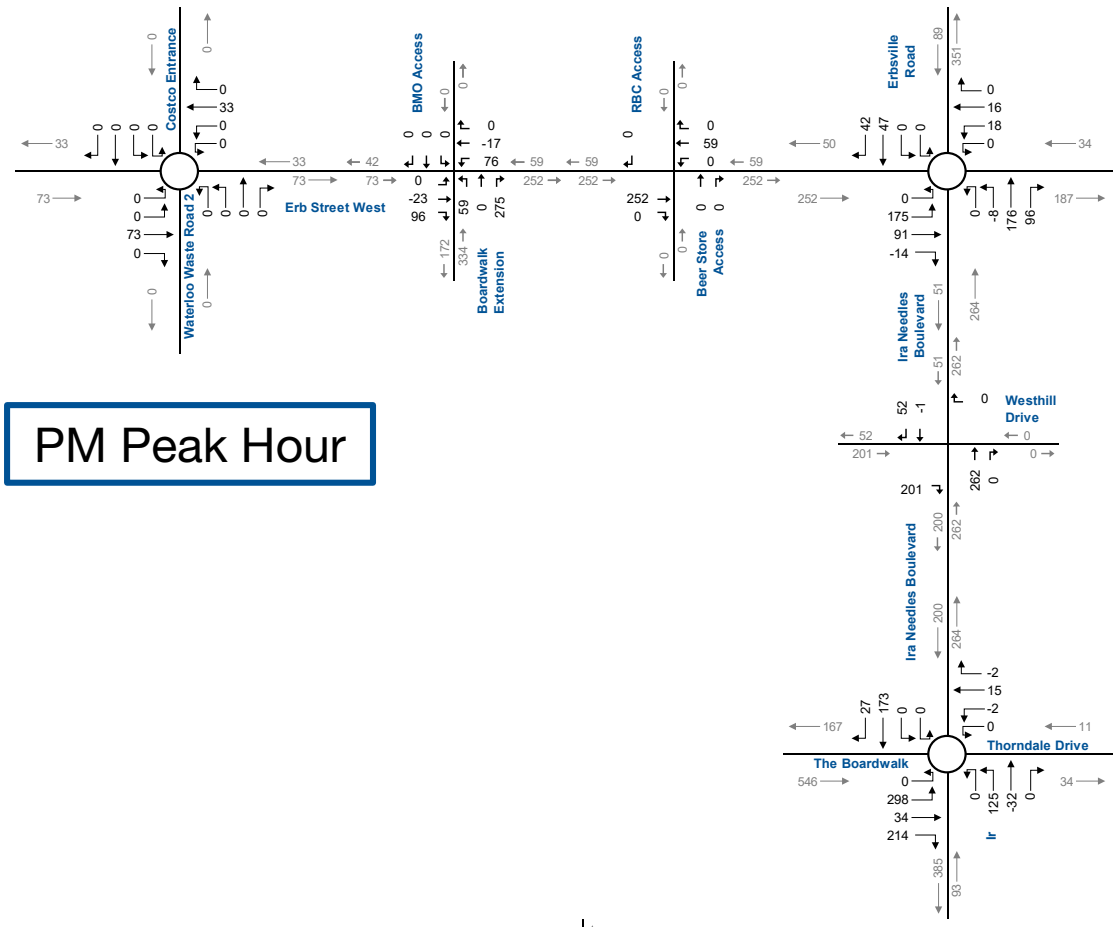
Figure 6.4 illustrates the site generated trip assignment for Alternative C for the affected intersections.

6.3 Alternative Assessments

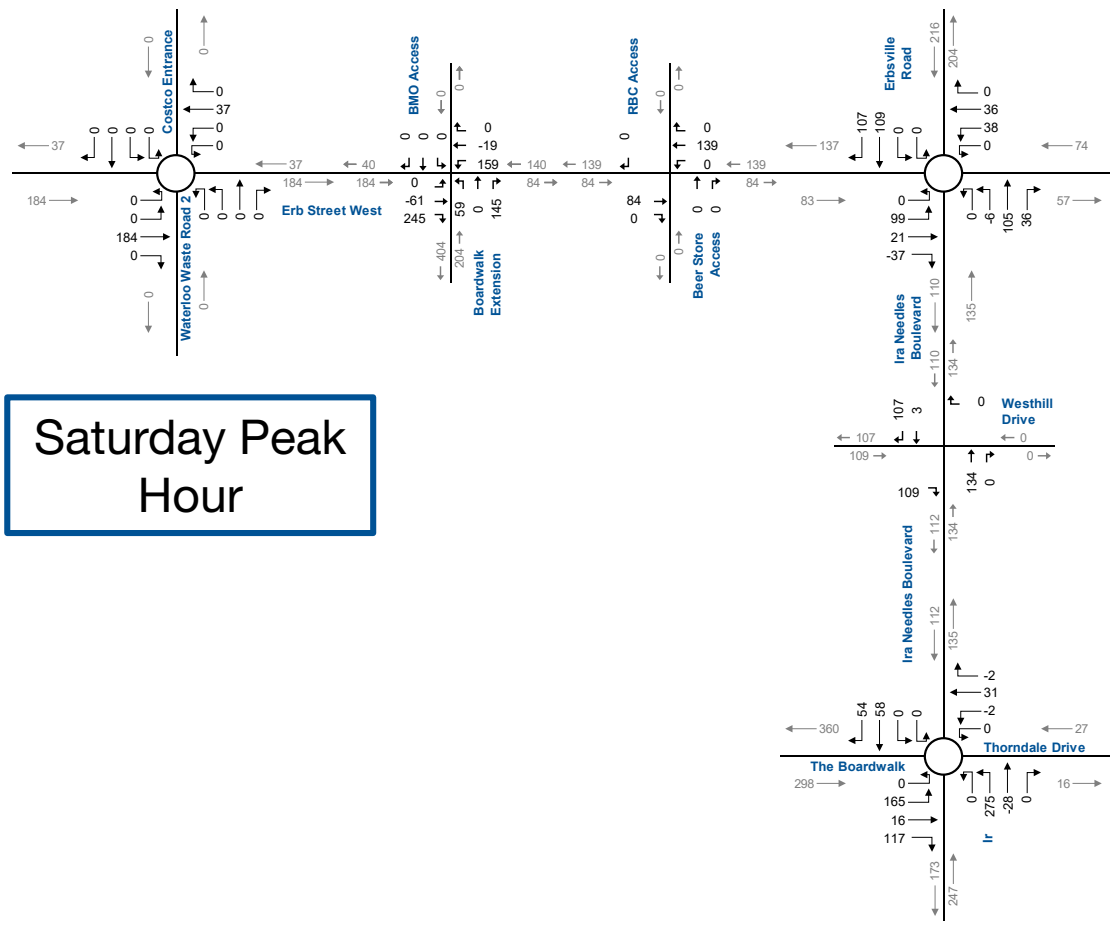
Alternative A will have the highest usage and divert the highest volumes from Ira Needles Boulevard resulting in the greatest benefit to the corridor. Microsimulation results indicate that compared to the “Do-Nothing” network, Alternative A reduces the forecast overall network travel time by as much as 7.4% (Saturday Peak hour), overall travel delay by 7.8% (Saturday Peak hour) and the fuel consumption by 7.3% (AM Peak hour). Therefore, from a transportation planning perspective, Alternative A is the preferred option.



AM Peak Hour



PM Peak Hour

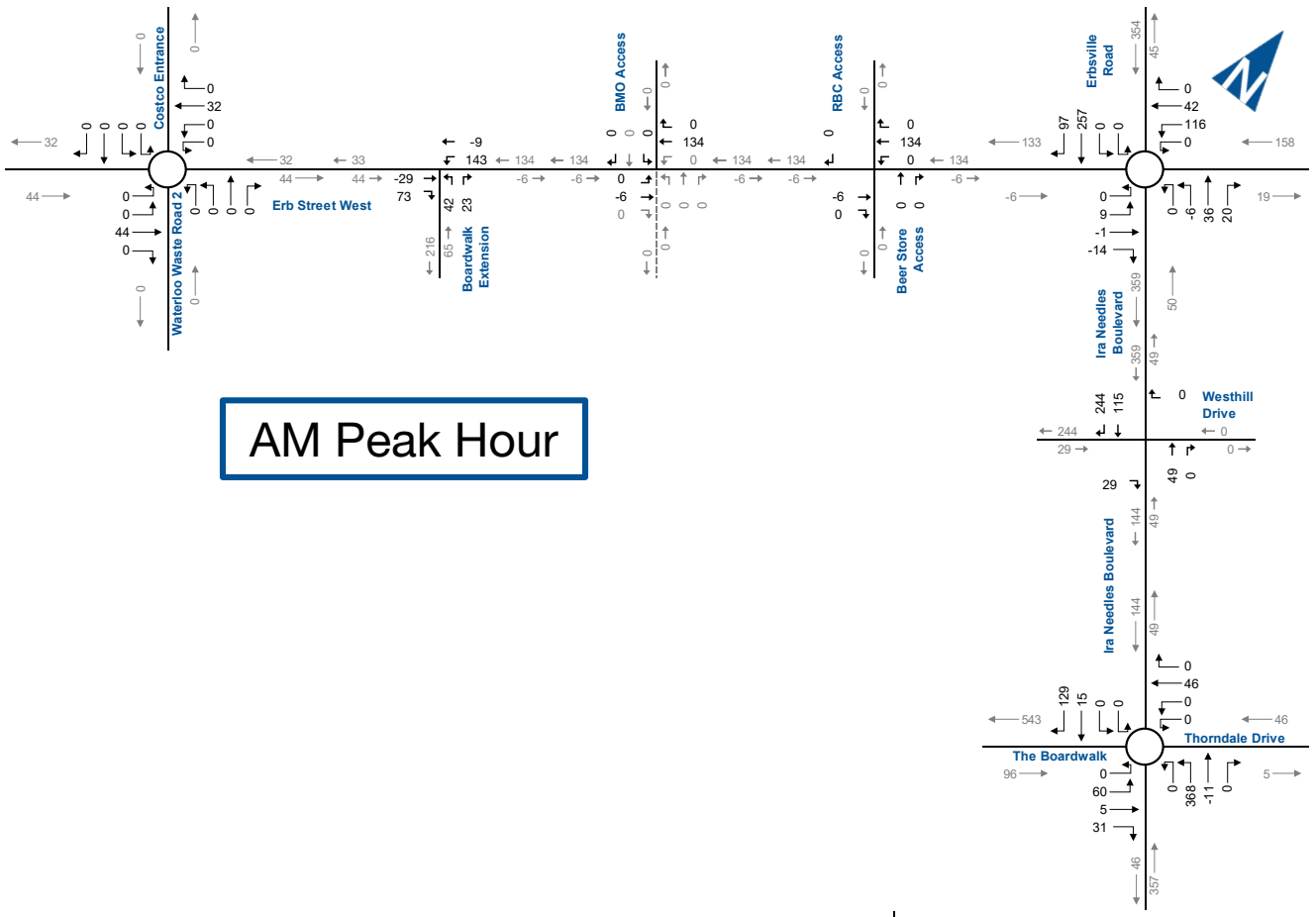


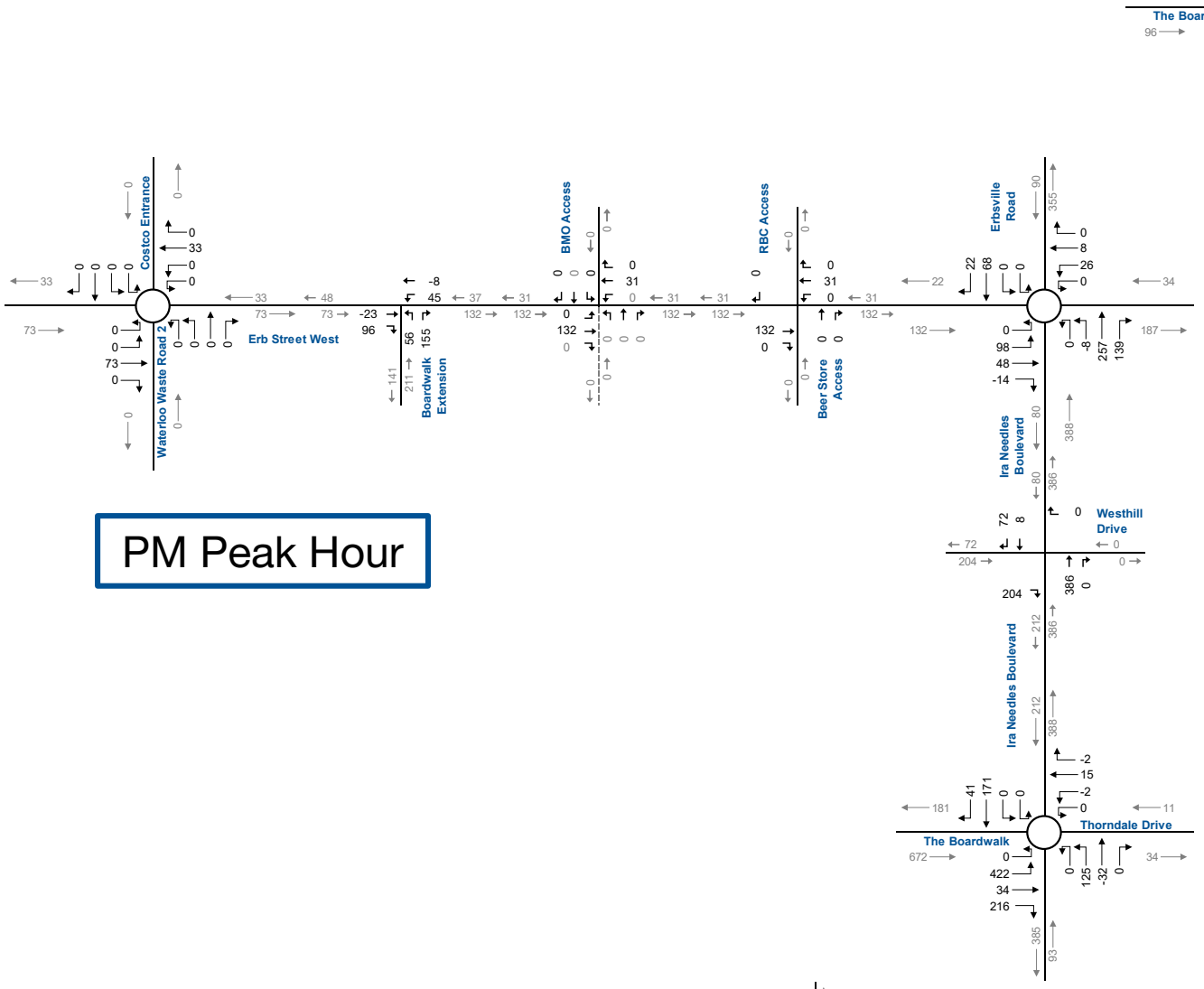
Saturday Peak Hour

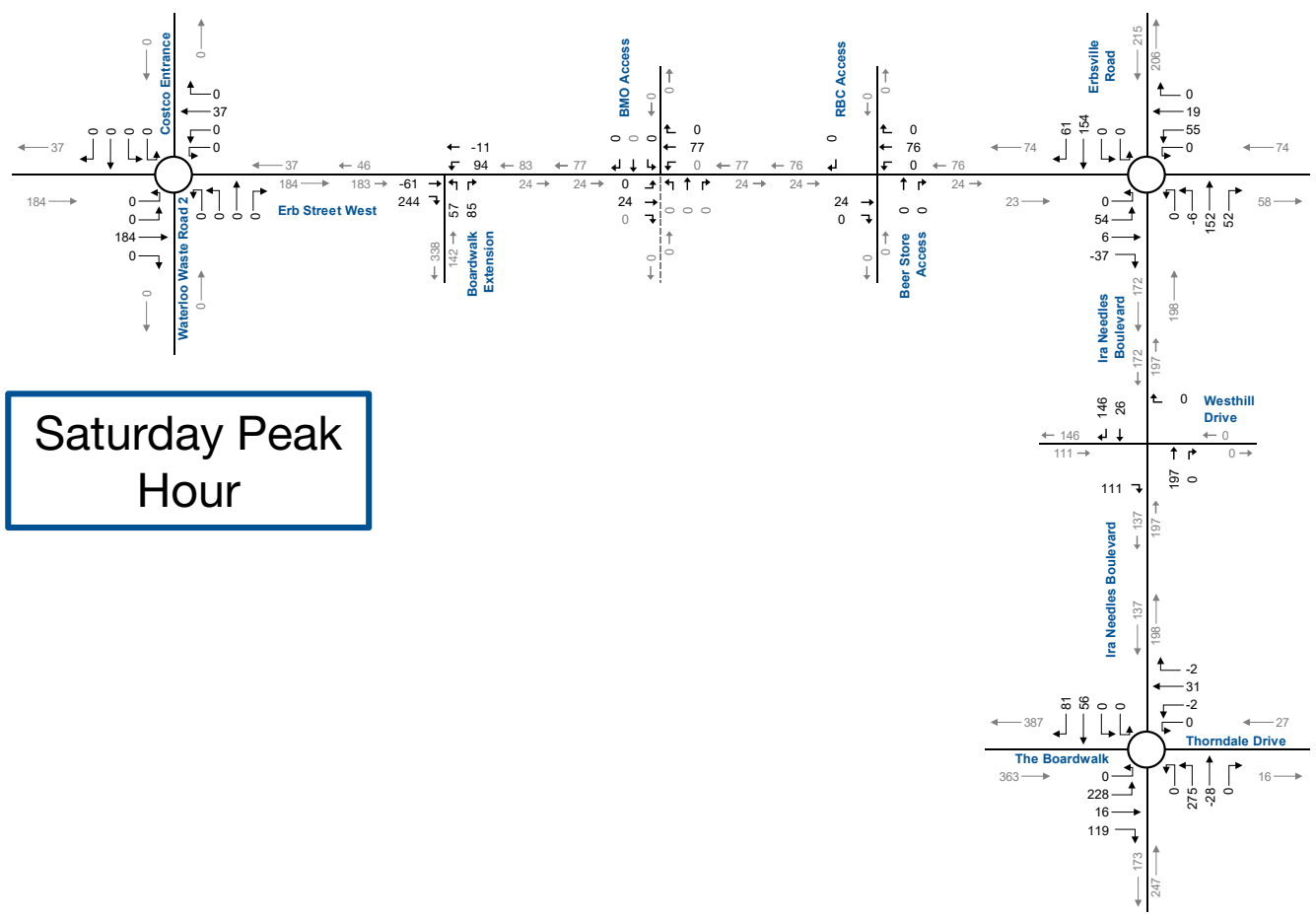
Site Generated Traffic – Alternative A Extension

Westhill District TNS
180136

Figure 6.2

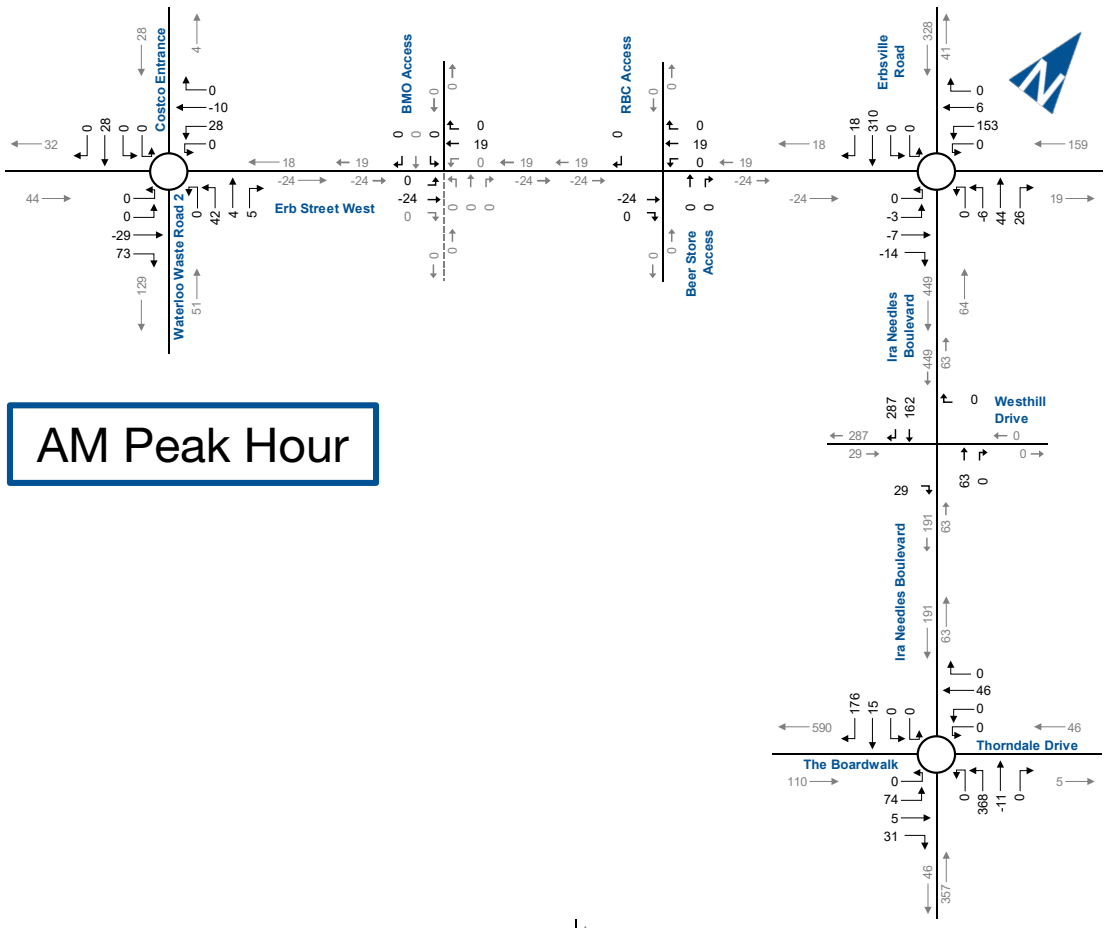




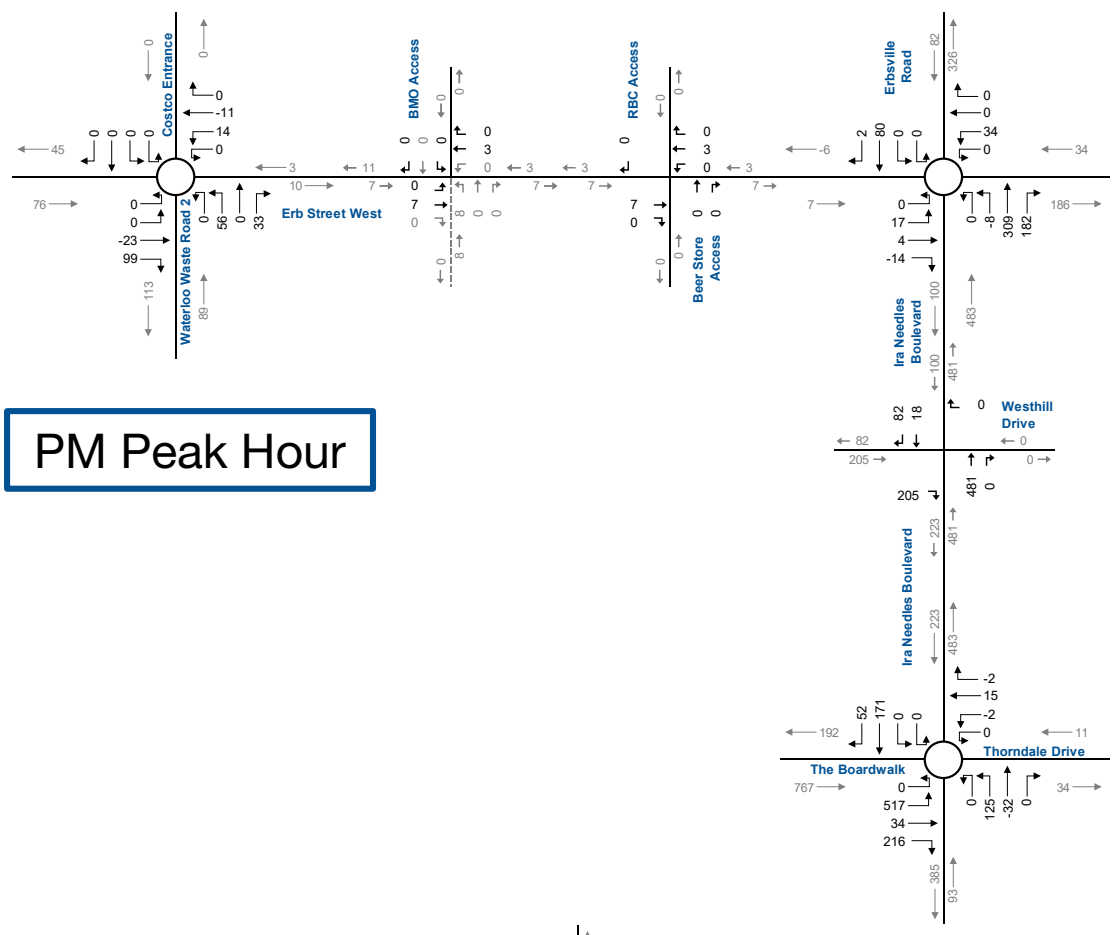


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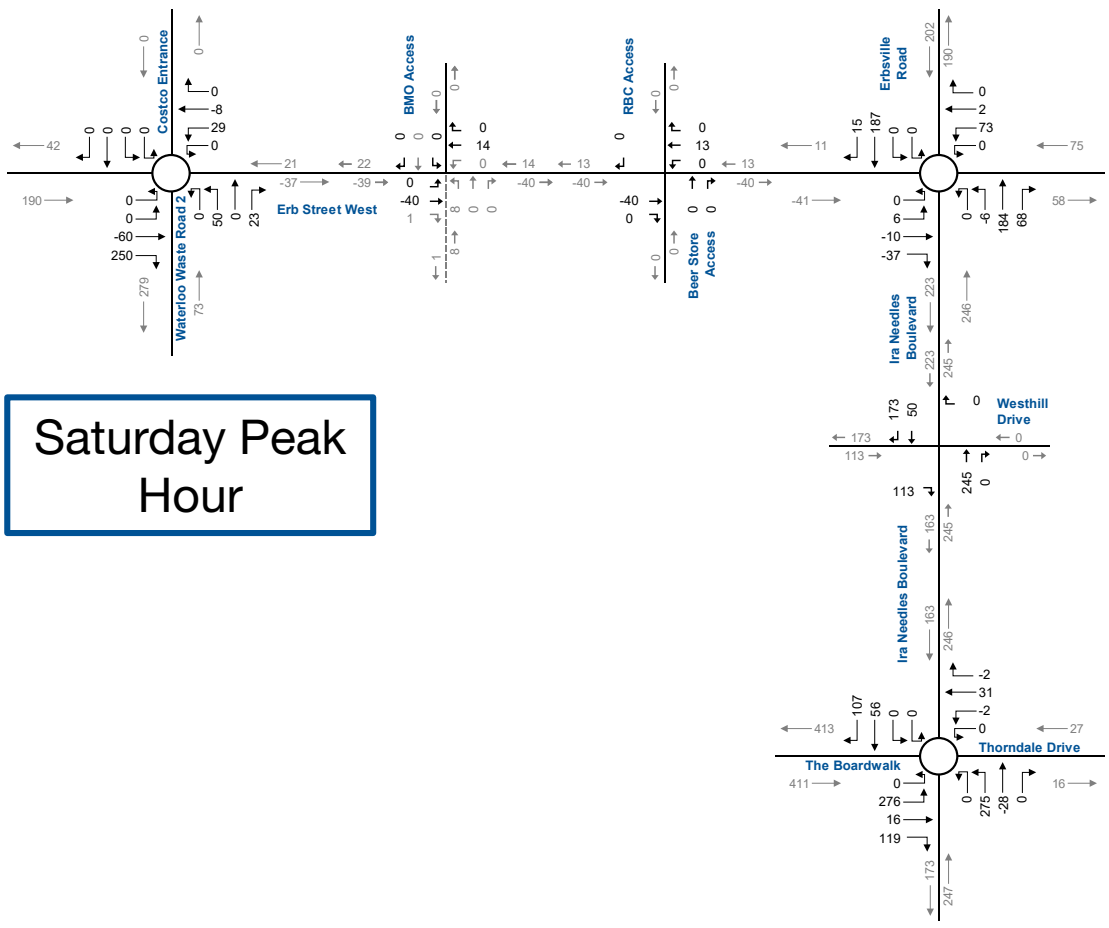
Site Generated Traffic – Alternative B Extension



AM Peak Hour



PM Peak Hour



Saturday Peak Hour

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Site Generated Traffic – Alternative C Extension

Westhill District TNS
180136

Figure 6.4

7 Future Traffic Conditions

The following sections provide an overall assessment of the area network performance under the preferred route (Alternative A) for the northerly extension of The Boardwalk.

7.1 Preferred Collector Route Operational Review

As discussed in **Chapter 5**, the 2031 Do-Nothing baseline network results in operational deficiencies at several intersections in the study area. Most notably along the Ira Needles Boulevard corridor. The assessments in **Chapter 6** support the conclusions of the IMMTS that these deficiencies are addressed to some degree by a northerly extension of The Boardwalk. Of the alternatives considered for the Boardwalk extension, the under a transportation planning perspective, the preferred collector route was **Alternative A** as it resulted in the greatest benefit to the congested intersections along Ira Needles Boulevard, most notably the roundabout at Erb Street.

Figure 7.1, **Figure 7.2**, and **Figure 7.3** illustrate the trip assignment under **Alternative A**. These graphics indicate that:

- The extension of The Boardwalk northerly reduces the amount of left-turning traffic entering the Ira Needles corridor from the Westhill District, reducing northbound left-turns at Erb Street;
- The extension of The Boardwalk northerly reduces the amount of right-turning traffic entering the Ira Needles/Erb Street intersection from the west, by providing an alternate route to the Westhill District and the existing Boardwalks to the south;
- The extension of The Boardwalk northerly reduces traffic at The Boardwalk/Thorndale roundabout with Ira Needles boulevard.

7.1.1 Total Traffic Operations under Preferred Alternative A

The 2031 total traffic volumes estimated under Network Alternative A, including both background traffic and development traffic, are shown in **Figure 7.4**, **Figure 7.5**, and **Figure 7.6** for the AM, PM and Saturday peak hours, respectively.

LOS analyses are summarized in **Figure 7.7**, **Figure 7.8**, and **Figure 7.9**. Similar to the Do-Nothing total 2031 traffic conditions, numerous intersections were found to operate with operational issues and critical movements:

- **Erbsville Road and Columbia St West** intersection is forecast to operate at overall a LOS E and LOS F during the AM and PM peak hour, respectively. The eastbound shared through/right-turn movement is forecast to operate at a LOS F with a v/c > 1.0 during both the AM and PM peak hours. The westbound left-turn movement is forecast to operate at a LOS F with a v/c > 1.0 during all peak

hours. The northbound left-turn movement is forecast to operate at LOS F with a v/c > 1.0 during the AM peak hour. The southbound left-turn movement is forecast to operate at LOS F with a v/c > 1.0 during the AM Peak hour, and the shared through/right-turn movement is forecast to operate at LOS F and a v/c > 1.0 during the PM peak hour;

- **Ira Needles Boulevard/Erbsville Road and Erb St West** intersection is forecast to operate overall at a LOS F during all peak hours. The eastbound approach is forecast to operate at LOS F with a v/c > 1.0 during all peak hours. The westbound approach is forecast to operate at LOS F with a v/c > 1.0 during all peak hours. The northbound approach is forecast to operate at LOS F with a v/c > 1.0 during the AM and Saturday peak hours, and at LOS E with v/c > 0.85 during the PM peak hour. The southbound approach is forecast to operate at LOS F with a v/c > 1.0 during the PM and Saturday peak hours.;
- **Ira Needles Boulevard and Westhill Drive** eastbound right-turn movement is forecast to operate at LOS F with a v/c > 0.85 during the PM peak hour;
- **Ira Needles Boulevard and The Boardwalk/Thorndale Drive** intersection is forecast to operate overall at a LOS F during all peak hours. The eastbound approach is forecast to operate at LOS F with a v/c > 1.0 during the PM peak hour. The westbound approach is forecast to operate at LOS F with a v/c > 1.0 during all peak hours. The northbound approach is forecast to operate at LOS F with a v/c > 1.0 during the AM hour, and at LOS E with a v/c > 0.85 during the Saturday peak hour. The southbound approach is forecast to operate at LOS F with a v/c > 1.0 during the PM and Saturday peak hours;
- **Ira Needles Boulevard and Boardwalk Entrance 1** eastbound right-turn movement is forecast to operate at LOS E during the PM peak hour; and
- **Ira Needles Boulevard and Boardwalk Entrance 2 (Lifestyle Way)** intersection is forecast to operate overall at a LOS F during the PM hour. The eastbound left-turn movement is forecast to operate at LOS F during all peak hours with a v/c > 1.0 during the PM and Saturday peak hours. The eastbound right-turn movement is forecast to operate at LOS F during the PM peak hour. The northbound left-turn movement is forecast to operate at LOS F during the PM peak hour;
- **University Ave W and Ira-Needles Boulevard** intersection is forecast to operate at a LOS F during all peak hours. The eastbound approach is forecast to operate at LOS F with a v/c > 1.0 during the PM peak hour. The westbound approach is forecast to operate at LOS F with a v/c > 1.0 the PM and Saturday peak hours. The northbound approach is forecast to operate at LOS F with a v/c > 1.0 during all peak hours. The southbound approach is forecast to operate at LOS F with a v/c > 1.0 during the PM and Saturday peak hours.

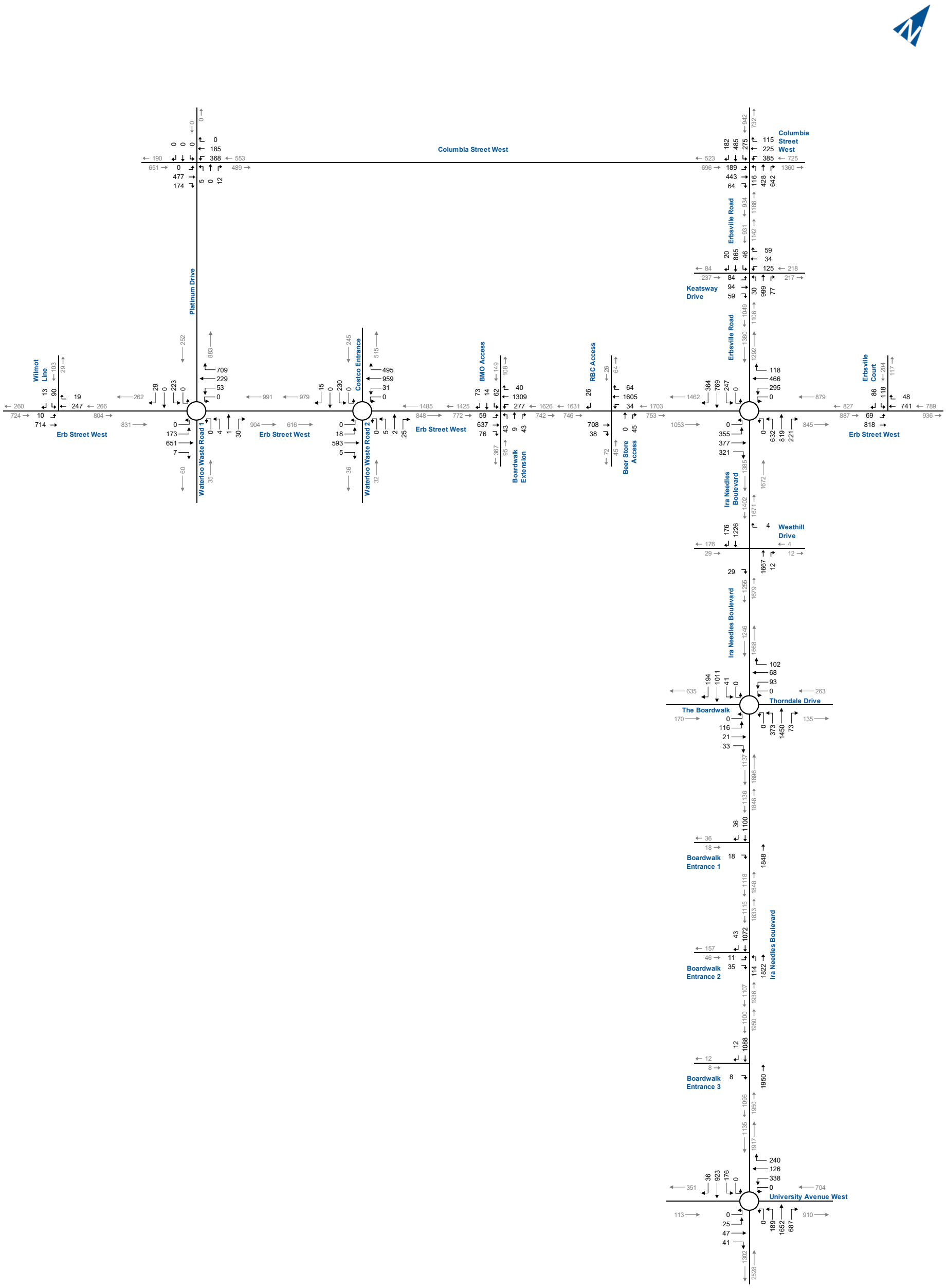


Appendix H includes the detailed Synchro 9 and Arcady reports.

7.2 Intersection Control at Erb Street

A screening tool was completed for the intersection of Erb Street West and the potential Boardwalk extension. The results show that a roundabout is a feasible method of traffic control at this intersection and an Intersection Control Study should be completed. The Roundabout Screening Tool is included in **Appendix I**.

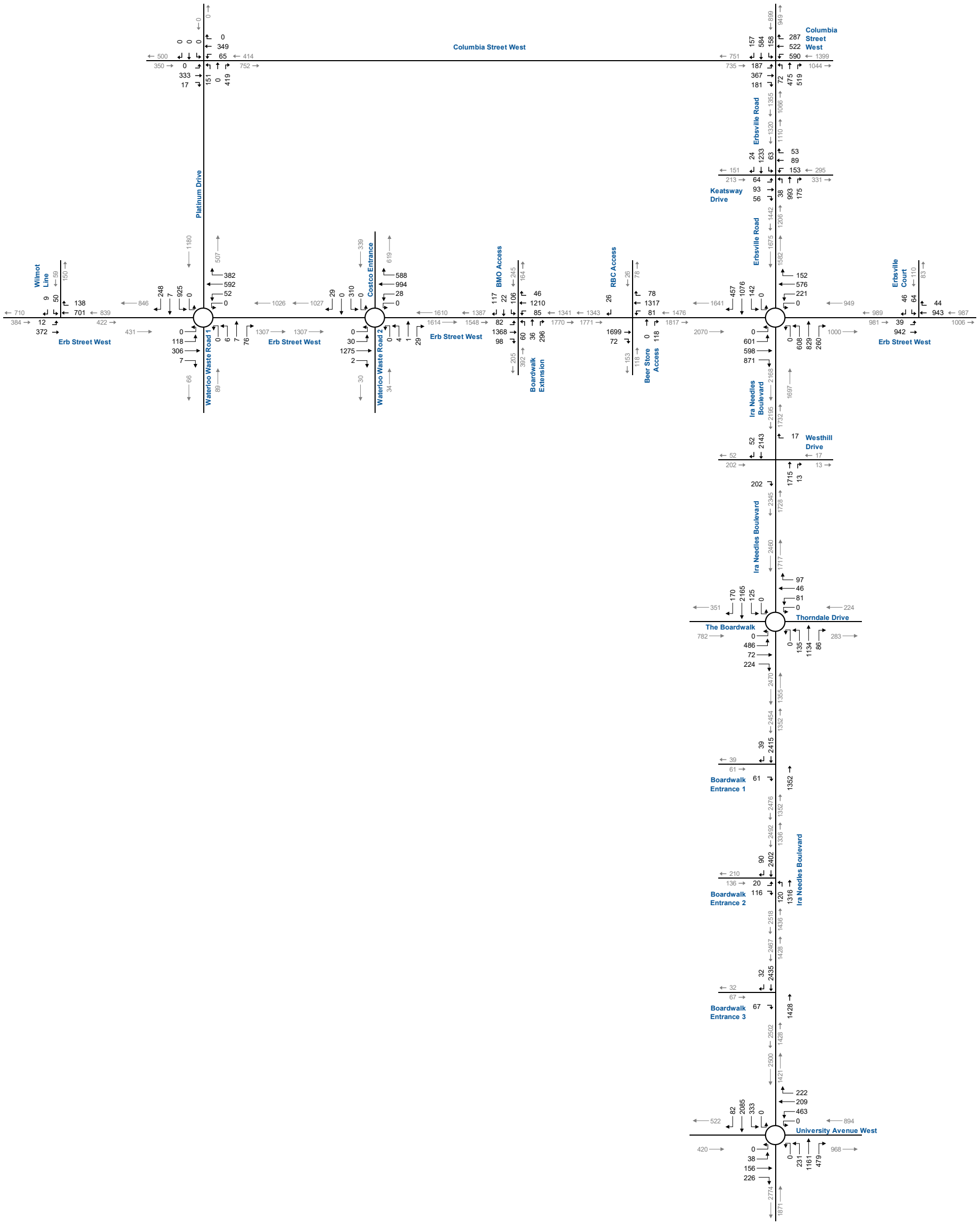




2031 Total Traffic Forecasts – AM Peak Hour – Alternative A Extension

Westhill District TNS
180136

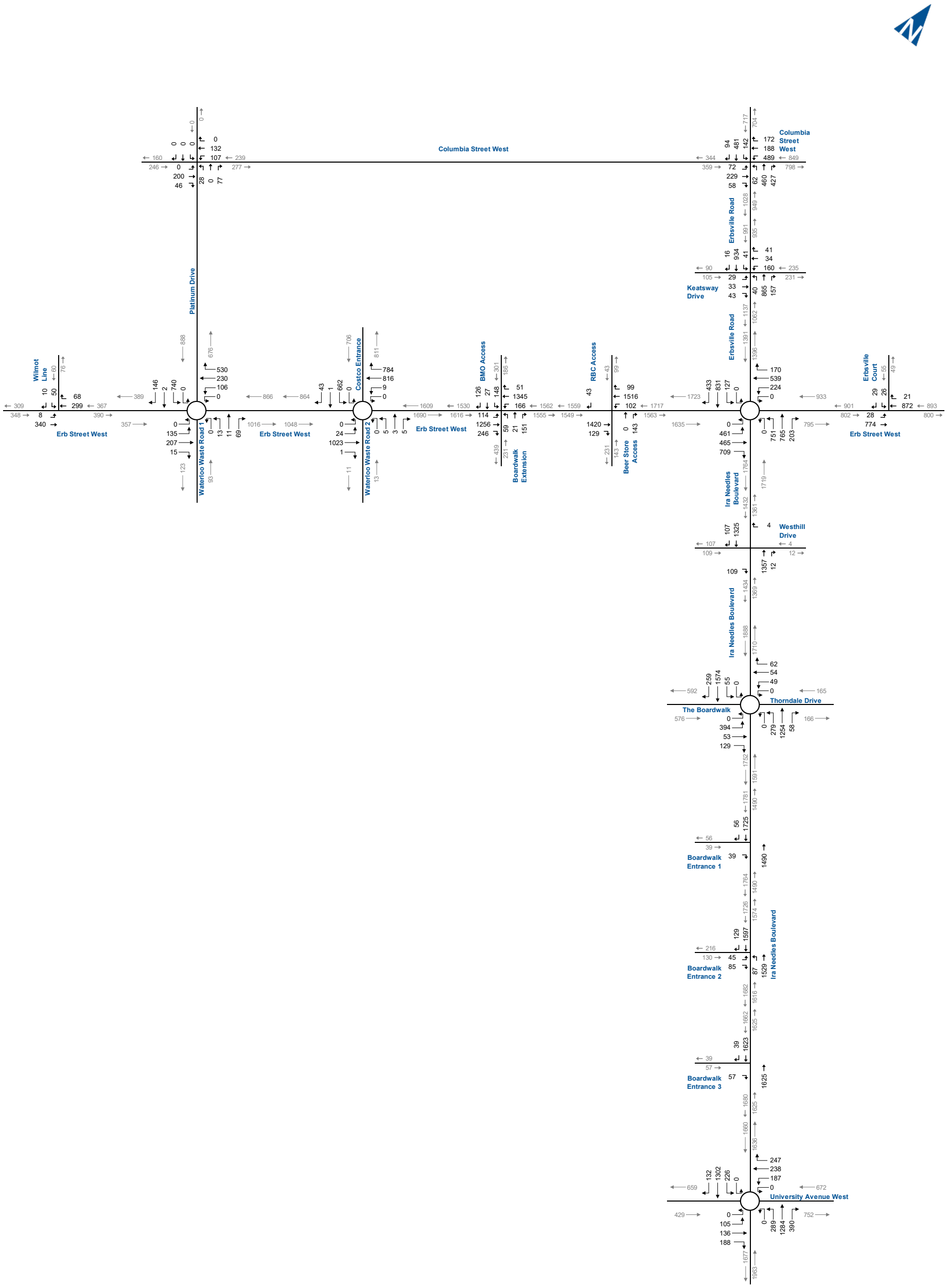
Figure 7.1



2031 Total Traffic Forecasts – PM Peak Hour – Alternative A Extension

Westhill District TNS
180136

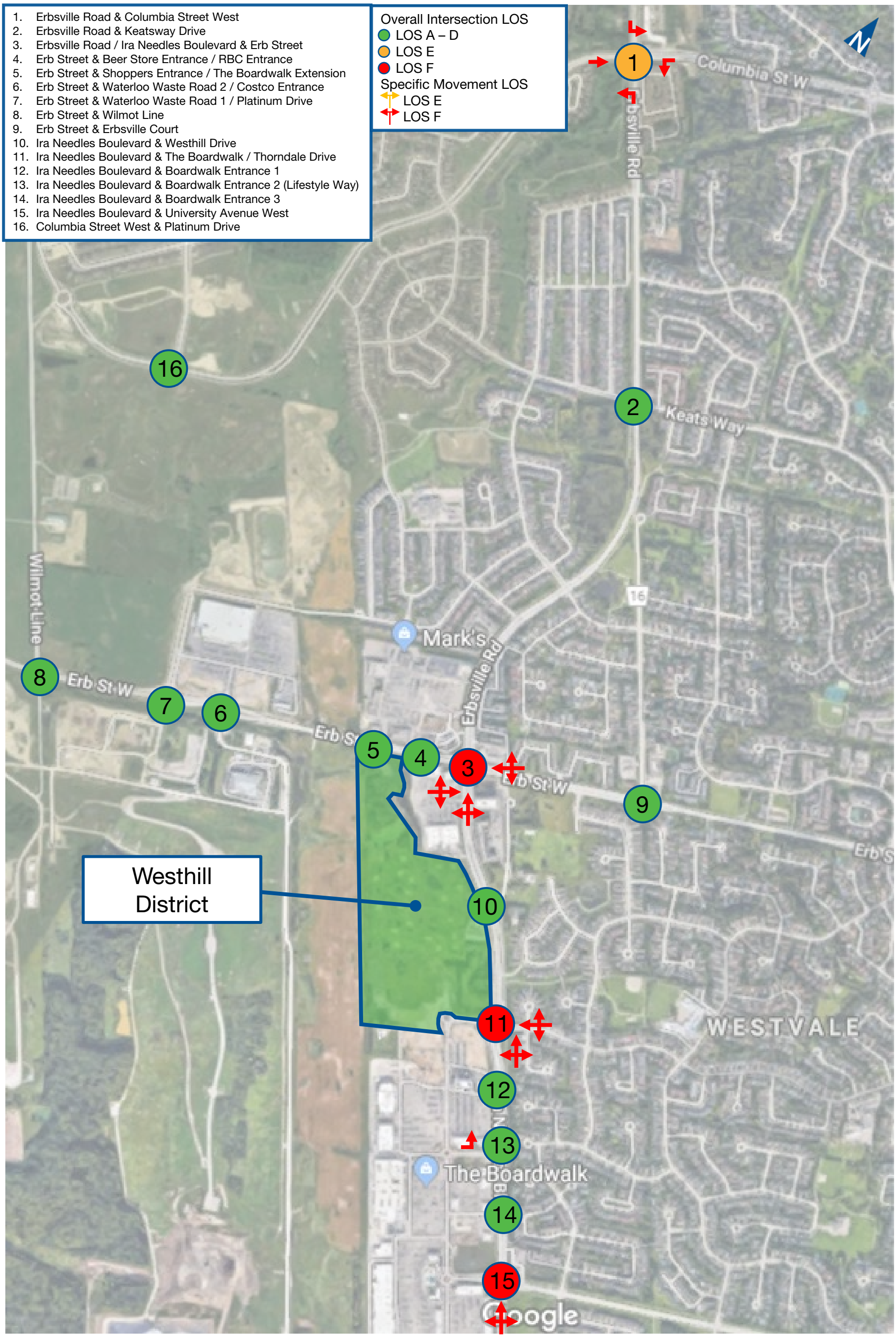
Figure 7.2



2031 Total Traffic Forecasts – Sat Peak Hour – Alternative A Extension

Westhill District TNS
180136

Figure 7.3



2031 Total AM Peak Hour Traffic Operations – Alternative A

Westhill District TNS
180136

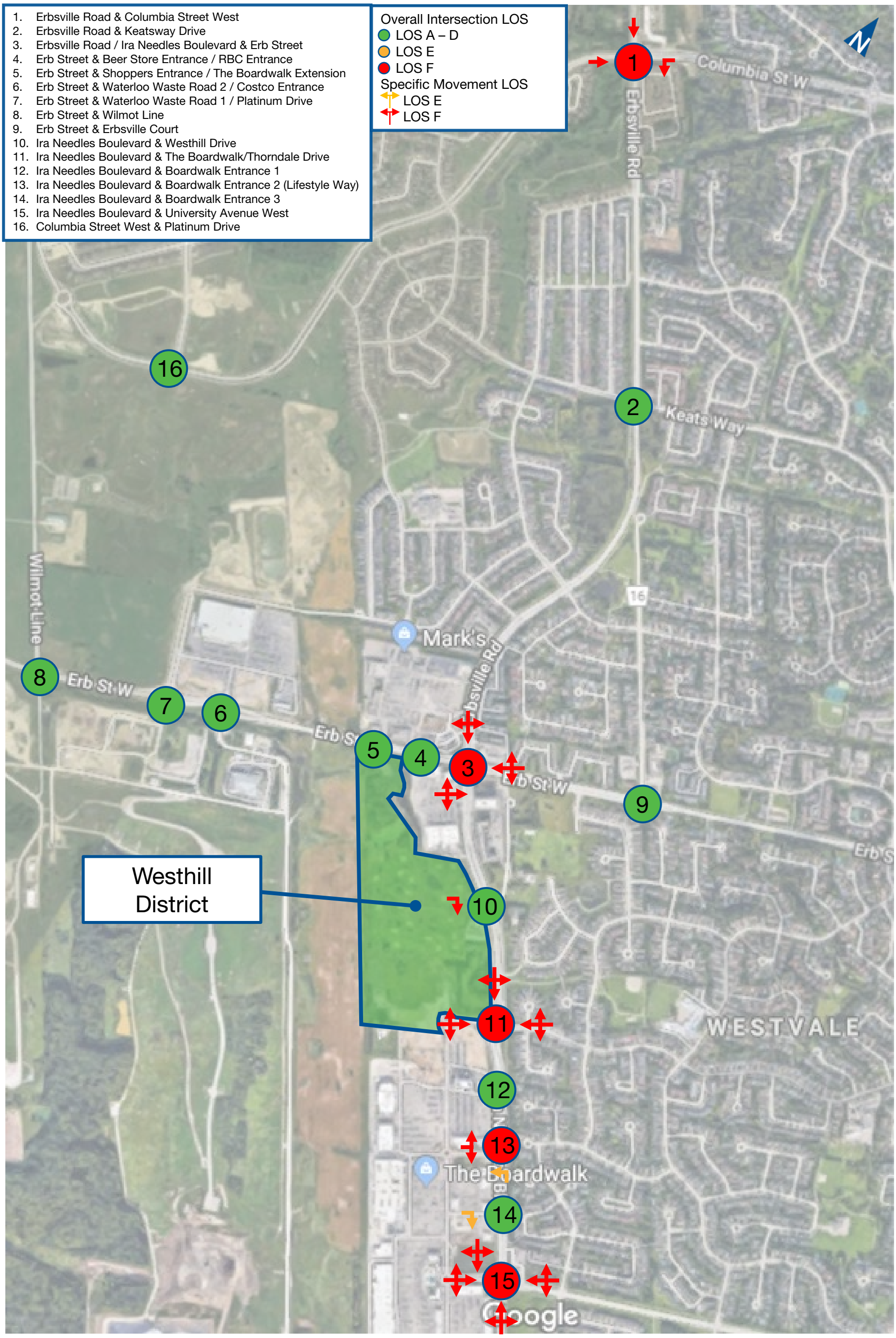
Figure 7.4

1. Erbsville Road & Columbia Street West
2. Erbsville Road & Keatsway Drive
3. Erbsville Road / Ira Needles Boulevard & Erb Street
4. Erb Street & Beer Store Entrance / RBC Entrance
5. Erb Street & Shoppers Entrance / The Boardwalk Extension
6. Erb Street & Waterloo Waste Road 2 / Costco Entrance
7. Erb Street & Waterloo Waste Road 1 / Platinum Drive
8. Erb Street & Wilmot Line
9. Erb Street & Erbsville Court
10. Ira Needles Boulevard & Westhill Drive
11. Ira Needles Boulevard & The Boardwalk/Thorndale Drive
12. Ira Needles Boulevard & Boardwalk Entrance 1
13. Ira Needles Boulevard & Boardwalk Entrance 2 (Lifestyle Way)
14. Ira Needles Boulevard & Boardwalk Entrance 3
15. Ira Needles Boulevard & University Avenue West
16. Columbia Street West & Platinum Drive

Overall Intersection LOS
- LOS A – D
- LOS E
- LOS F

Specific Movement LOS
- LOS E
- LOS F

Westhill District



2031 Total PM Peak Hour Traffic Operations – Alternative A

Westhill District TNS
180136

Figure 7.5

1. Erbsville Road & Columbia Street West
2. Erbsville Road & Keatsway Drive
3. Erbsville Road / Ira Needles Boulevard & Erb Street
4. Erb Street & Beer Store Entrance / RBC Entrance
5. Erb Street & Shoppers Entrance / The Boardwalk Extension
6. Erb Street & Waterloo Waste Road 2 / Costco Entrance
7. Erb Street & Waterloo Waste Road 1 / Platinum Drive
8. Erb Street & Wilmot Line
9. Erb Street & Erbsville Court
10. Ira Needles Boulevard & Westhill Drive
11. Ira Needles Boulevard & The Boardwalk/Thorndale Drive
12. Ira Needles Boulevard & Boardwalk Entrance 1
13. Ira Needles Boulevard & Boardwalk Entrance 2 (Lifestyle Way)
14. Ira Needles Boulevard & Boardwalk Entrance 3
15. Ira Needles Boulevard & University Avenue West
16. Columbia Street West & Platinum Drive

Overall Intersection LOS
- LOS A – D
- LOS E
- LOS F

Specific Movement LOS
- LOS E
- LOS F

Westhill District

2031 Total Saturday Peak Hour Traffic Operations – Alternative A

Westhill District TNS
180136

Figure 7.6

8 Area Benefits

The objectives of the extension of The Boardwalk collector road are to:

- reduce traffic volumes at the Erb Street/ Ira Needles Blvd roundabout;
- improve traffic flow and connections;
- provide improved vehicular circulation and accessibility to the lands in Westhill, with independent access via the collector to Erb Street;
- provide a secondary vehicle connection to southbound traffic, for emergency response vehicles and access to/from the Regional landfill;
- provide improved vehicular access to Waterloo Commons;
- provide improved cycling and pedestrian connections; and
- provide an opportunity to extend transit service, improve accessibility to the timed-transfer station and increase the number of people, jobs and public places served by public transit.

The final alignment of the collector road will be determined through the processing of this application and the final Official Plan Amendment.

8.1 Alternative A Benefits

Of the benefits listed above, Alternative A achieves all of them in the following ways:

- **Reduce traffic volumes at the Erb Street/ Ira Needles Blvd roundabout:** Traffic has been reduced at this intersection since the traffic expected to travel between Costco, the Waterloo Employment lands and the Westhill District development will be taken by this road, removing them from this intersection;
- **Improve traffic flow and connections:** As this alternative attracts a significant number of trips forecast to be generated by the Westhill District from Ira Needles Boulevard, the Ira Needles corridor is forecast to improve. Additionally, with more options of travel in the area, eventually more people will move from their traditional route to save time by using this road, again improving the network operations.
- Alternative A will divert the highest volumes from Ira Needles Boulevard resulting in the greatest benefit to the corridor. Microsimulation results indicate that compared to the “Do-Nothing” network, Alternative A reduces the forecast overall network travel time by as much as 7.4% (Saturday Peak hour), overall travel delay by 7.8% (Saturday Peak hour) and the fuel consumption by 7.3% (AM Peak hour);
- **Provide improved vehicular circulation and accessibility to the lands in Westhill, with independent access via the collector to**



Erb Street: This road will connect to the commercial area to the north of Erb Street West, as well as the southern Boardwalk commercial area, so it will provide greater internal vehicular circulation between the two developments as well as for the proposed Westhill District development;

- **Provide a secondary vehicle connection to southbound traffic, for emergency response vehicles and access to/from the Regional landfill:** This road would allow for emergency responders to more easily access the lands in the Westhill District as well as The Boardwalk due to its proximity to Ira Needles Boulevard;
- **Provide improved vehicular access to Waterloo Commons:** This new connection will have access to the Waterloo Commons, allowing those using this commercial area to travel to and from Erb Street to use an all-moves access, instead of the two right-in / right-out access;
- **Provide improved cycling and pedestrian connections:** This new road would provide additional active transportation means through either multi-use paths or cycling facilities, keeping with the vision of both the Region and City of Waterloo TMP's; and
- **Provide an opportunity to increase the number of people, jobs and public places served by public transit:** As The Boardwalk is currently a major public transit hub, increasing its connectivity to the road network will only serve to improve the transit capacity.

9 Intersection Control Study

An Intersection Control Study (ICS) was undertaken for the intersection of Erb Street West and The Boardwalk Extension by MTE Consultants. The purpose of the ICS is to evaluate both signal and roundabout control alternative using various criteria including construction costs, societal costs, traffic operations, property impacts, pedestrian and cyclist effects, speed control, fuel consumption and emissions, area land uses, construction staging, maintenance and aesthetics.

The conclusion of the ICS was that considering all above criteria, a roundabout is the preferred method of traffic control at this intersection.

The ICS is included in **Appendix J**.

10 Conclusions and Recommendations

10.1 Conclusions

Based on the investigations carried out, it is concluded that:

10.1.1 Existing Conditions

The analyses indicate that most intersections and individual movements within the study area are currently operating overall at acceptable levels of services with the following critical movements:

- **Ira Needles Boulevard/Erbsville Road and Erb St West** the intersection operates overall at a LOS F during the PM and Saturday peak hours. The eastbound approach operates at LOS F with a v/c > 1.0 during all peak hours. The westbound movements are estimated to operate at LOS F and v/c > 1.0 during the PM peak hour. The southbound movements are estimated to operate at LOS F and a v/c of approximately 1.0 during the PM and Saturday peak hours.;
- **Erb Street West and RBC / Beer Store Access** northbound right movements are estimated to operate at LOS E the Saturday peak hour;
- **Ira Needles Boulevard and Boardwalk Entrance 2 (Lifestyle Way)** eastbound left-turn movement is estimated to operate at LOS E during the AM peak hour, and LOS F during the PM and Saturday peak hours; and
- **University Ave W and Ira-Needles Boulevard** northbound movements are estimated to operate at a v/c > 0.85 during the AM and PM peak hours. The southbound movements are estimated to operate at LOS F and a v/c of approximately 1.0 during the PM peak hour.

10.1.2 Trip Generation

Future traffic forecasts are based on growth within the study area and outside the Westhill plan, as well as growth within the plan:

- **Background Developments Traffic:** Outside the plan but within the study area the completion of the Boardwalk site is forecast to generate 143, 170 and 192 additional trips during the AM, PM and Saturday peak hours, respectively. The Costco site are forecast to be generate 124, 380 and 490 additional trips during the AM, PM and Saturday peak hours, respectively. The City of Waterloo's West Side Employment lands along the extension of Platinum Way where about 8,000 jobs will exist, are forecast to generate 1525, 1764 and 814 additional trips during the AM, PM and Saturday peak hours, respectively; and



- **Westhill District Generated Traffic:** It is forecast that about 1103, 1267 and 1113 additional trips will be generated during the AM, PM and Saturday peak hours, respectively.

10.1.3 2031 Do-Nothing Forecast Traffic Operations.

Under the **Do-Nothing Case**, there are multiple operational issues including the following:

- **Erbsville Road and Columbia St West** intersection is forecast to operate at a LOS E during the AM peak hour and LOS F during the PM peak hour. The eastbound shared through/right-turn movement is forecast to operate at a LOS F with a v/c > 1.0 during both the AM and PM peak hours. The westbound left-turn movement is forecast to operate at a LOS F with a v/c > 1.0 during all peak hours. The northbound left-turn movement is forecast to operate at LOS F with a v/c > 1.0 during the AM peak hour. The southbound left-turn movement is forecast to operate at LOS F with a v/c > 1.0 during the AM peak hour, and the shared through/right-turn movement is forecast to operate at LOS F with a v/c > 1.0 during the PM peak hour;
- **Ira Needles Boulevard/Erbsville Road and Erb St West** intersection is forecast to operate overall at LOS F during all peak hours. The eastbound approach is forecast to operate at LOS F with a v/c > 1.0 during all peak hours. The westbound approach is forecast to operate at LOS F with a v/c > 1.0 during all peak hours. The northbound approach is forecast to operate at LOS F with a v/c > 1.0 during all peak hours. The southbound approach is forecast to operate at LOS F with a v/c > 1.0 during all peak hours.;
- **Ira Needles Boulevard and Westhill Drive** eastbound right-turn movement is forecast to operate at LOS F with a v/c > 1.0 during the PM peak hour;
- **Ira Needles Boulevard and The Boardwalk/Thorndale Drive** intersection is forecast to operate overall at LOS F during all peak hours. The eastbound approach is forecast to operate at LOS F with a v/c > 1.0 during the PM peak hour. The westbound approach is forecast to operate at LOS F with a v/c > 1.0 during all peak hours. The northbound approach is forecast to operate at LOS F with a v/c > 1.0 during the AM and Saturday peak hours. The southbound approach is forecast to operate at LOS F with a v/c > 1.0 during the PM and Saturday peak hours.
- **Ira Needles Boulevard and Boardwalk Entrance 1** eastbound right-turn movement is forecast to operate at LOS E during the PM peak hour; and
- **Ira Needles Boulevard and Boardwalk Entrance 2 (Lifestyle Way)** intersection is forecast to operate overall at a LOS F during the PM hour. The eastbound left-turn movement is forecast to operate at LOS F during all peak hours with a v/c > 1.0 during the PM and Saturday peak hours. The eastbound right-turn movement is forecast



to operate at LOS F during the PM peak hour. The northbound left-turn movement is forecast to operate at a LOS F during the PM peak hour; and

- **University Ave W and Ira-Needles Boulevard** intersection is forecast to operate overall at LOS F during all peak hours. The eastbound approach is forecast to operate at LOS F with a v/c > 1.0 during the PM peak hour. The westbound approach is forecast to operate at LOS F with a v/c > 1.0 the PM and Saturday peak hours. The northbound approach is forecast to operate at LOS F with a v/c > 1.0 during the all peak hours. The southbound approach is forecast to operate at LOS F with a v/c > 1.0 during the PM and Saturday peak hours.

10.1.4 Problem Statement

With the 2031 “Do-Nothing” transportation network and intersection configurations and with the forecast additional traffic arising from the developments, some study area intersections are forecast to operate with delays above desired levels. To mitigate the network and intersection deficiencies, consideration is given to the RTMP and IMMTS transportation improvements, including the northerly extension of the Boardwalk as a new collector road.

10.1.5 Collector Road Alternatives

Three Alternatives were considered:

- **Alternative A:** Extension Northwesterly to the BMO Access Signalized Intersection;
- **Alternative B:** Extension Northwesterly to New Intersection on Hydro One lands; and
- **Alternative C:** Extension Northwesterly to Costco Roundabout via the Waterloo Waste Road.

10.1.6 Preferred Alternative

The primary benefit observed from the use of these roads is the diversion of traffic from Ira Needles Boulevard onto the proposed Boardwalk extension between Erb Street West and Thorndale Drive. From this analysis it was found Alternative A would keep most in line with the guiding principles have the greatest diversion from the Ira Needles corridor at about 65% of the site traffic;

Microsimulation results indicate that compared to the “Do-Nothing” network, Alternative A reduces the forecast overall network travel time by as much as 7.4% (Saturday Peak hour), overall travel delay by 7.8% (Saturday Peak hour) and the fuel consumption by 7.3% (AM Peak hour). Therefore, from a transportation planning perspective, Alternative A is the preferred option.



10.1.7 Forecast Traffic Operations under the Preferred Alternative

Under the **Alternative A** Case, some operational issues will continue to occur including the following:

- **Erbsville Road and Columbia St West** eastbound shared through-right movements are forecast to operate at a LOS F and a v/c > 1.0 during both the AM and PM peak hours. The westbound left movements are forecast to operate at a LOS F and a v/c > 1.0 during all peak hours. The northbound left movements are forecast to operate at LOS F and a v/c > 1.0 during the AM peak hour. The southbound left-turn movements are forecast to operate at LOS F and a v/c > 1.0 during the AM Peak hour, and the shared through-right movements are forecast to operate at LOS F and a v/c > 1.0 during the PM Peak Hour. Overall the intersection is forecast to operate at a LOS E and LOS F during the AM and PM peak hour, respectively;
- **Ira Needles Boulevard/Erbsville Road and Erb St West** eastbound movements are forecast to operate at LOS F and a v/c > 1.0 during all peak hours. The westbound movements are forecast to operate at LOS F and a v/c > 1.0 during all peak hours. The northbound movements are forecast to operate at LOS F and a v/c > 1.0 during the AM and Saturday peak hours, and a LOS E and v/c > 0.85 during the PM peak hour. The southbound movements are forecast to operate at LOS F and a v/c > 1.0 during the PM and Saturday peak hours. Overall the intersection is forecast to operate at a LOS F during all peak hours;
- **Ira Needles Boulevard and Westhill Drive** eastbound right movements are forecast to operate at LOS F and a v/c > 0.85 during the PM peak hour;
- **Ira Needles Boulevard and The Boardwalk/Thorndale Drive** eastbound movements are forecast to operate at LOS F and a v/c > 1.0 during the PM peak hour. The westbound movements are forecast to operate at LOS F and a v/c > 1.0 during all peak hours. The northbound movements are forecast to operate at LOS F and a v/c > 1.0 during the AM hour, and LOS E and a v/c > 0.85 during the Saturday peak. The southbound movements are forecast to operate at LOS F and a v/c > 1.0 during the PM and Saturday peak hours. Overall the intersection is forecast to operate at a LOS F during all peak hours;
- **Ira Needles Boulevard and Boardwalk Entrance 1** eastbound right-turn movements are forecast to operate with a LOS E during the PM peak hour; and
- **Ira Needles Boulevard and Boardwalk Entrance 2 (Lifestyle Way)** eastbound left-turn movement is forecast to operate with a LOS F during all peak hours and a v/c > 1.0 during the PM and Saturday peak hours. The eastbound right-turn movement is forecast to operate with a LOS F during the PM peak hour. The northbound left-turn movement is forecast to operate with a LOS F during the PM

peak hour. Overall the intersection is forecast to operate at a LOS F during the PM hour; and

- **University Ave W and Ira-Needles Boulevard** eastbound movements are forecast to operate at LOS F and a v/c > 1.0 during the PM peak hour. The westbound movements are forecast to operate at LOS F and a v/c > 1.0 the PM and Saturday peak hours. The northbound movements are forecast to operate at LOS F and a v/c > 1.0 during the all peak hours. The southbound movements are forecast to operate at LOS F and a v/c > 1.0 during the PM and Saturday peak hours. Overall the intersection is forecast to operate at a LOS F during all peak hours.

10.1.8 Intersection Control

The results of a Roundabout Screening Tool and subsequent Intersection Control Study for the intersection of Erb Street West and The Boardwalk extension concludes that a roundabout is the preferred method of traffic control at this intersection.

10.1.9 Area Benefits

Based on the analyses and assessments provided, Alternative A:

- Reduces traffic volumes at the Erb Street/ Ira Needles Blvd roundabout;
- Improves traffic flow and connections by providing more routing options;
- Diverts the highest volumes from Ira Needles Boulevard resulting in the greatest benefit to the corridor;
- Reduces the forecast overall network travel time by as much as 7.4% (Saturday Peak hour), overall travel delay by 7.8% (Saturday Peak hour) and the fuel consumption by 7.3% (AM Peak hour);
- Provides improved vehicular circulation and accessibility to the lands in Westhill, with independent access via the collector to Erb Street;
- Provides a secondary vehicle connection to southbound traffic, for emergency response vehicles and access to/from the Regional landfill;
- Provides improved vehicular access to Waterloo Commons;
- Provides improved cycling and pedestrian connections keeping with the vision of both the Region and City of Waterloo TMP's; and
- Provides an opportunity to increase the number of people, jobs and public places served by public transit.

10.2 Recommendations

It is recommended that the OPA for the Westhill District Plan provide for the extension of the Boardwalk as a collector road northerly to connect to Erb Street at the existing signalized intersection west of the Erb Street/Ira Needles roundabout and that the intersection be designed as a modern roundabout in accordance with the details contained in the appended Intersection Control Study



Appendix A

Existing Count Data

Erb St W @ Costco East Entrance

Morning Peak Diagram

Specified Period
From: 7:30:00
To: 10:30:00

One Hour Peak
From: 9:30:00
To: 10:30:00

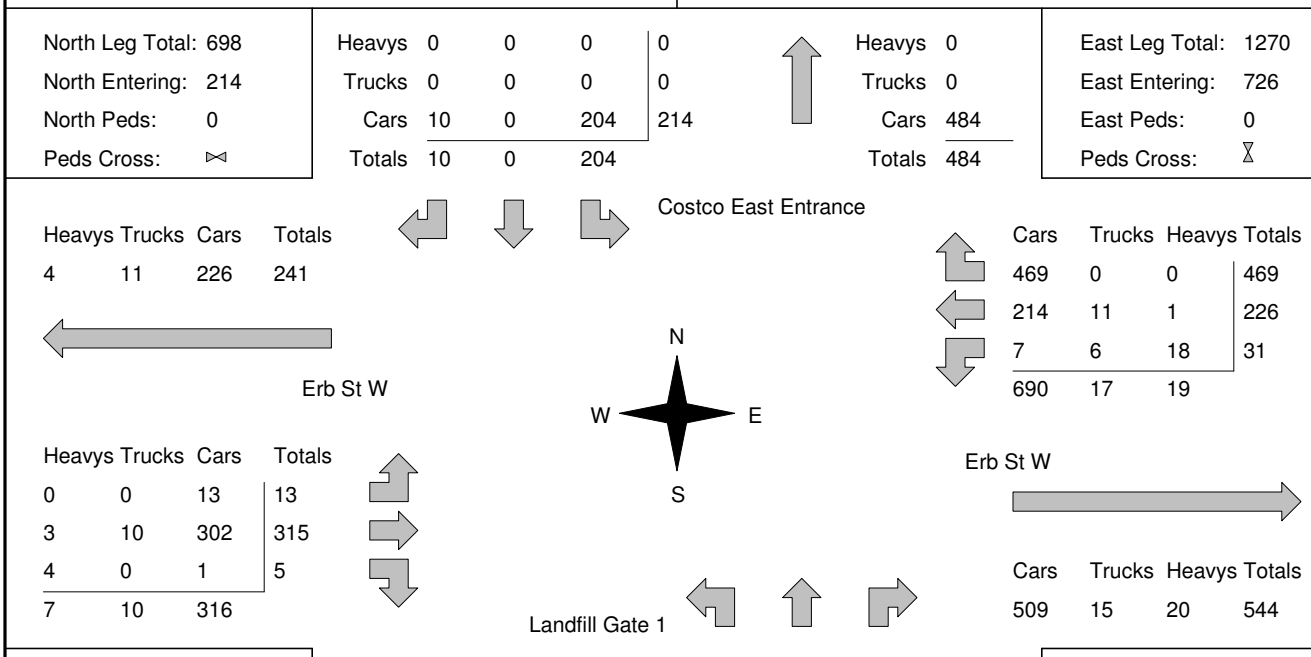
Municipality: Waterloo
Site #: 0000000002
Intersection: Erb St W & Costco East Entrance
TFR File #: 2
Count date: 8-Nov-2018

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Erb St W runs W/E



Comments

Erb St W @ Costco East Entrance

Mid-day Peak Diagram

Specified Period
From: 12:00:00
To: 14:00:00

One Hour Peak
From: 12:00:00
To: 13:00:00

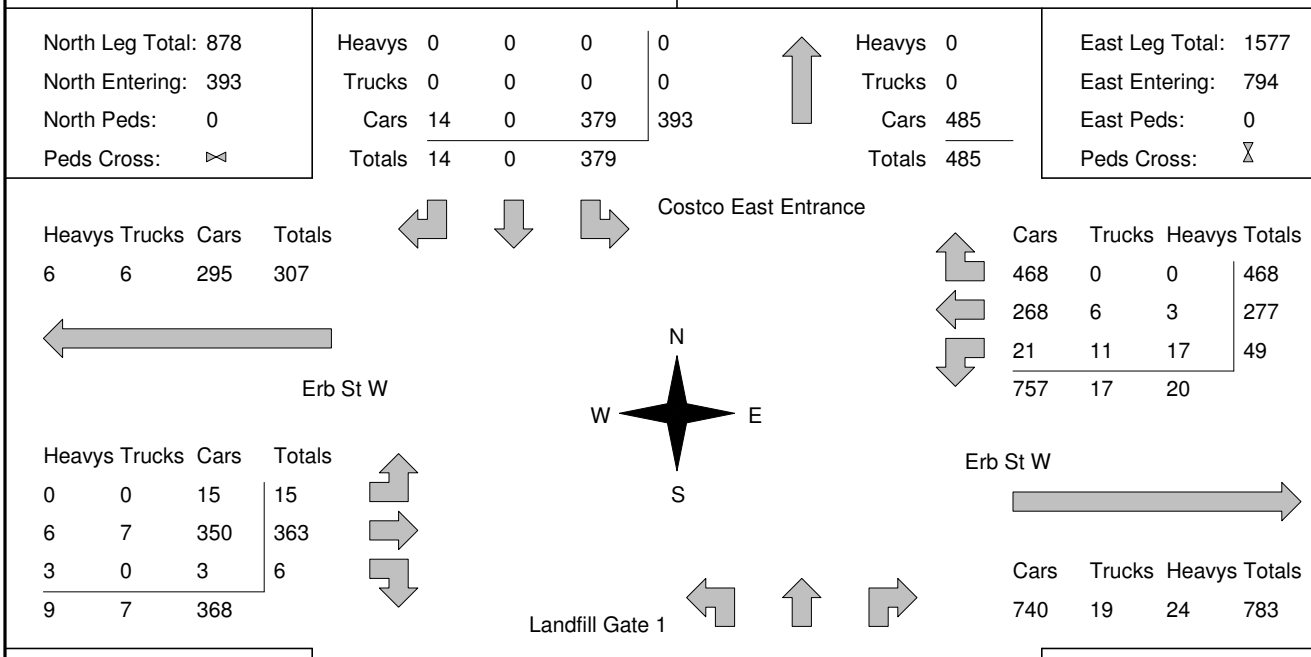
Municipality: Waterloo
Site #: 0000000002
Intersection: Erb St W & Costco East Entrance
TFR File #: 2
Count date: 8-Nov-2018

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Erb St W runs W/E



Comments

Erb St W @ Costco East Entrance

Afternoon Peak Diagram

Specified Period
From: 15:00:00
To: 18:00:00

One Hour Peak
From: 16:30:00
To: 17:30:00

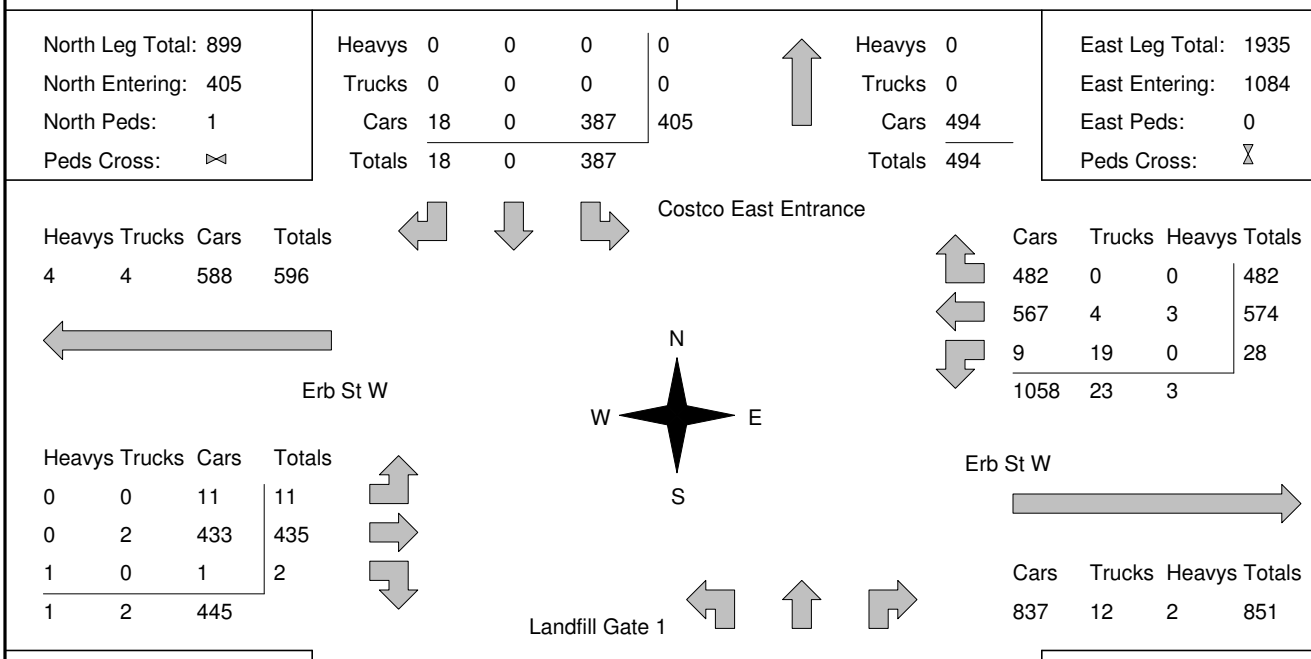
Municipality: Waterloo
Site #: 0000000002
Intersection: Erb St W & Costco East Entrance
TFR File #: 2
Count date: 8-Nov-2018

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Erb St W runs W/E



Comments

Erb St W @ Costco East Entrance

Total Count Diagram

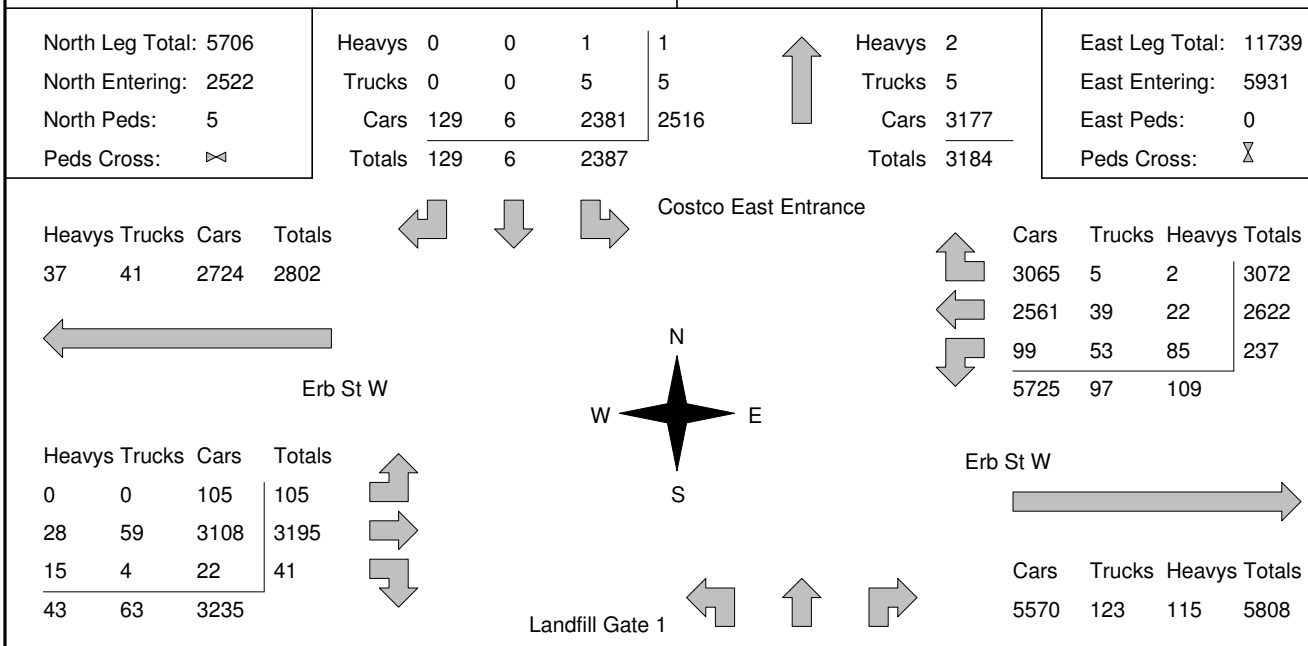
Municipality: Waterloo
Site #: 0000000002
Intersection: Erb St W & Costco East Entrance
TFR File #: 2
Count date: 8-Nov-2018

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Erb St W runs W/E



Comments

Erb St W @ Costco West Entrance

Morning Peak Diagram

Specified Period
From: 7:30:00
To: 10:30:00

One Hour Peak
From: 7:45:00
To: 8:45:00

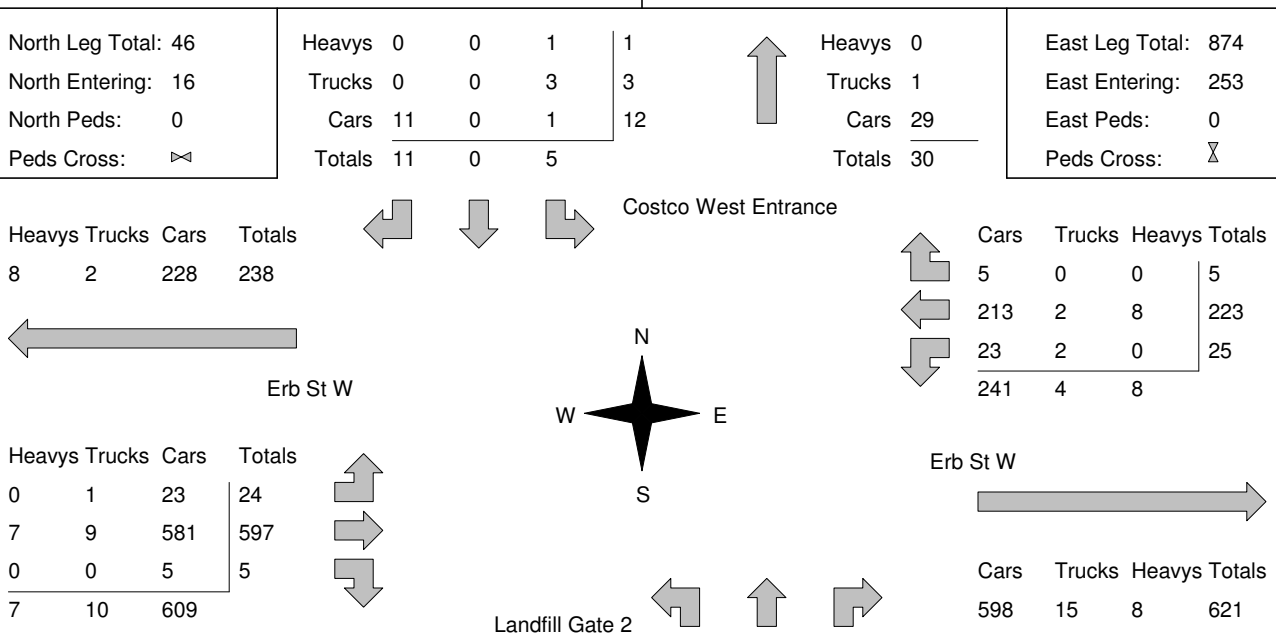
Municipality: Waterloo
Site #: 0000000001
Intersection: Erb St W & Costco West Entrance
TFR File #: 1
Count date: 8-Nov-2018

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Erb St W runs W/E



Comments

Erb St W @ Costco West Entrance

Mid-day Peak Diagram

Specified Period
From: 12:00:00
To: 14:00:00

One Hour Peak
From: 12:00:00
To: 13:00:00

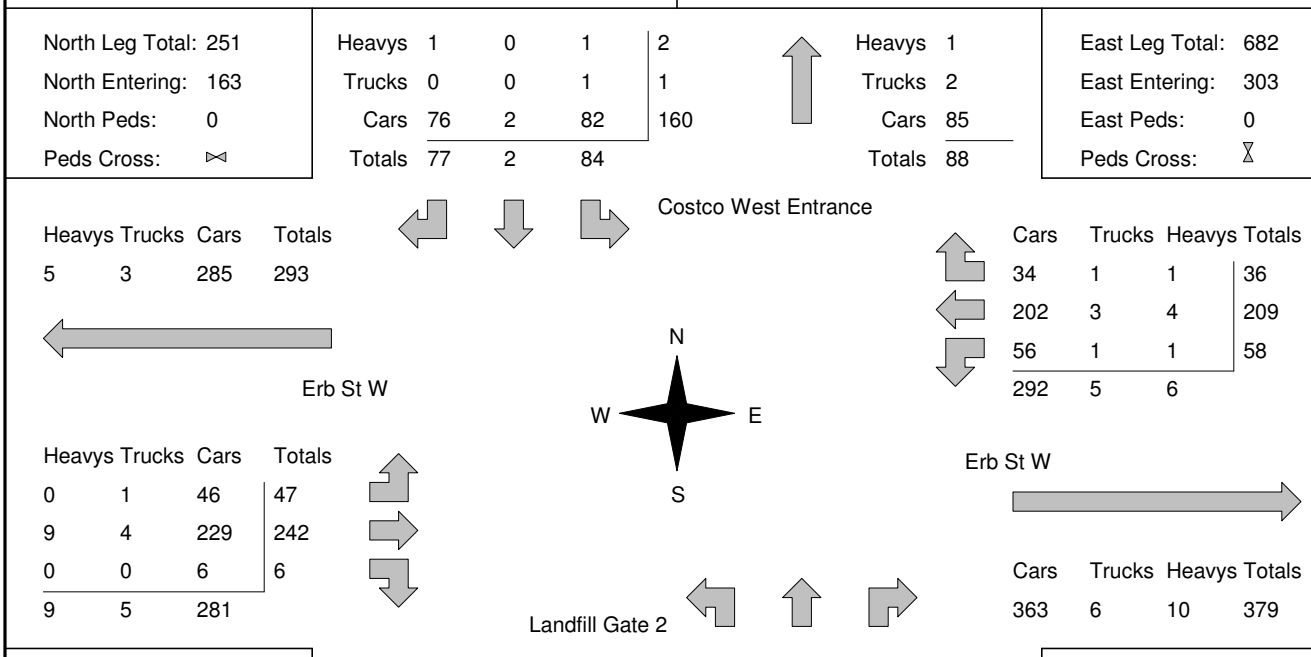
Municipality: Waterloo
Site #: 0000000001
Intersection: Erb St W & Costco West Entrance
TFR File #: 1
Count date: 8-Nov-2018

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Erb St W runs W/E



Comments

Erb St W @ Costco West Entrance

Afternoon Peak Diagram

Specified Period
From: 15:00:00
To: 18:00:00

One Hour Peak
From: 16:30:00
To: 17:30:00

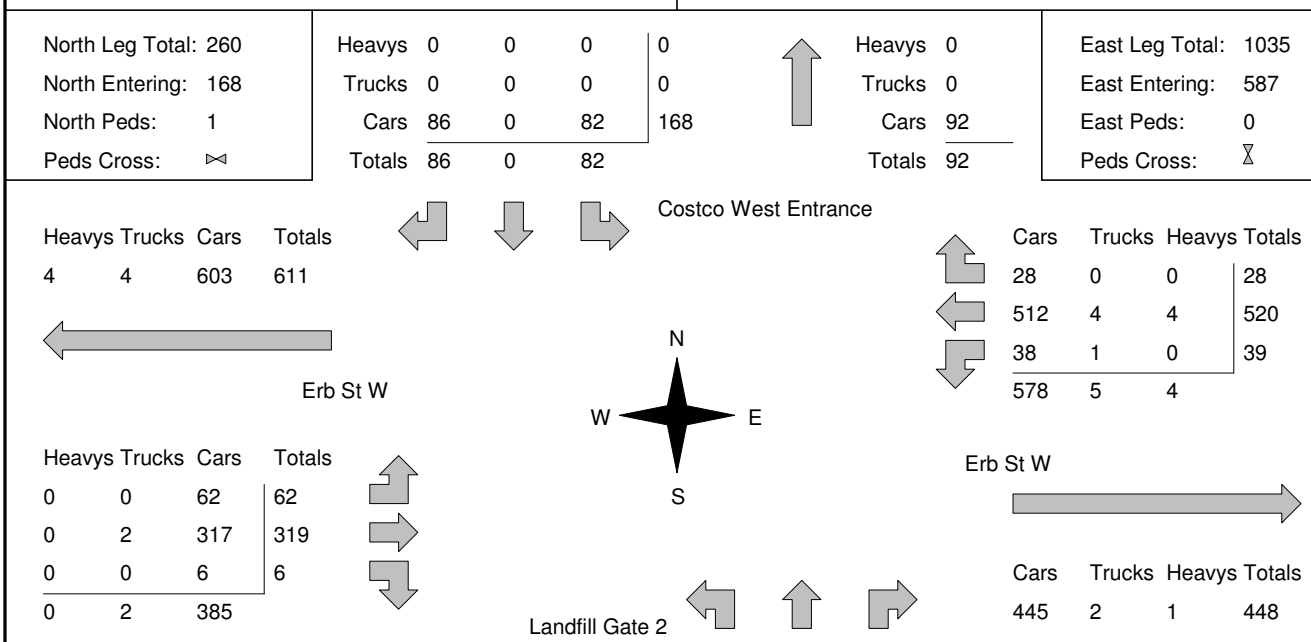
Municipality: Waterloo
Site #: 0000000001
Intersection: Erb St W & Costco West Entrance
TFR File #: 1
Count date: 8-Nov-2018

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Erb St W runs W/E



Comments

Erb St W @ Costco West Entrance

Total Count Diagram

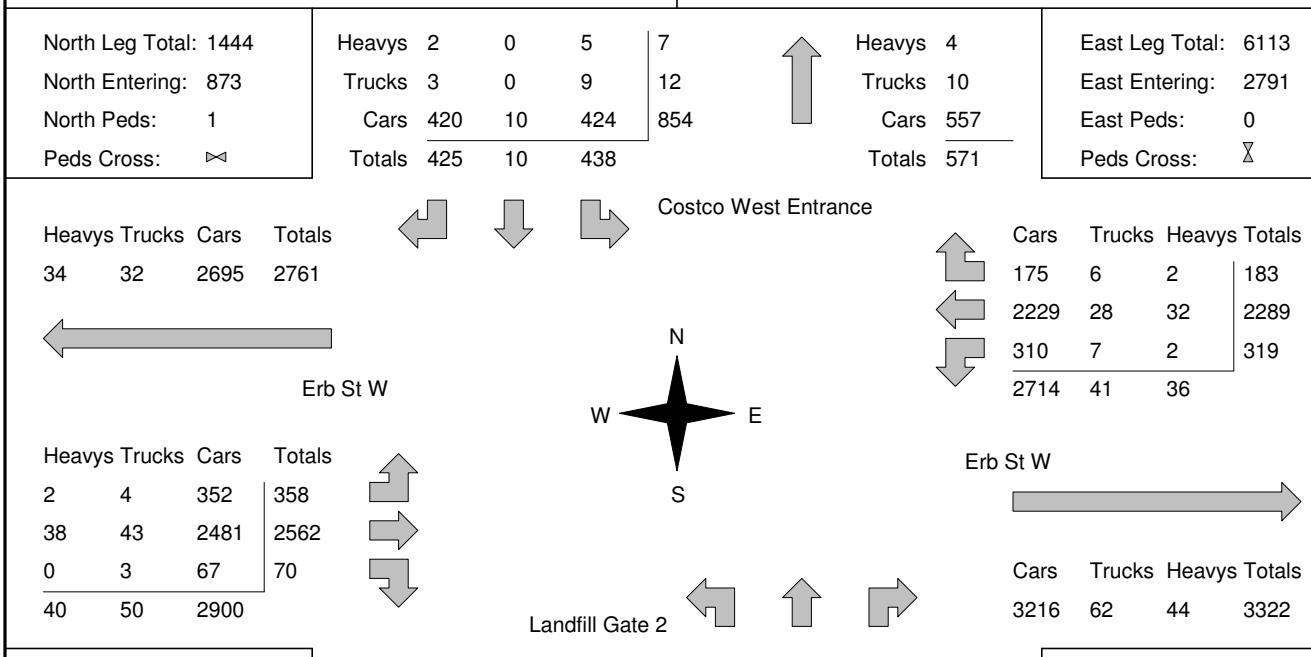
Municipality: Waterloo
Site #: 0000000001
Intersection: Erb St W & Costco West Entrance
TFR File #: 1
Count date: 8-Nov-2018

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Erb St W runs W/E



Comments

Erb St W @ Ira Needles Blvd

Morning Peak Diagram

Specified Period
From: 7:30:00
To: 10:30:00

One Hour Peak
From: 8:00:00
To: 9:00:00

Municipality: Waterloo
Site #: 0000000003
Intersection: Ira Needles Blvd & Erb St W
TFR File #: 3
Count date: 8-Nov-2018

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Ira Needles Blvd runs N/S

North Leg Total:	1885			
North Entering:	1007			
North Peds:	5			
Peds Cross:	⋈			
Heavys	2	19	4	25
Trucks	3	2	3	8
Cars	111	574	289	974
Totals	116	595	296	
Heavys	20			
Trucks	12			
Cars	846			
Totals	878			
East Leg Total:	1193			
East Entering:	446			
East Peds:	8			
Peds Cross:	⧖			

Erbsville Rd

Heavys	Trucks	Cars	Totals
22	13	434	469

	Cars	Trucks	Heavys	Totals
	100	2	4	106
	140	3	7	150
	182	0	8	190
	422	5	19	

Erb St W

N
W E
S

Heavys	Trucks	Cars	Totals
3	7	261	271
3	4	284	291
16	7	183	206
22	18	728	

Erb St W

Cars	Trucks	Heavys	Totals
728	7	12	747

Ira Needles Blvd

Peds Cross:	⧖			
West Peds:	4			
West Entering:	768			
West Leg Total:	1237			
Cars	939			
Trucks	9			
Heavys	43			
Totals	991			
Cars	183	485	155	823
Trucks	7	3	0	10
Heavys	13	13	5	31
Totals	203	501	160	
Peds Cross:	⋈			
South Peds:	6			
South Entering:	864			
South Leg Total:	1855			

Comments

Erb St W @ Ira Needles Blvd

Mid-day Peak Diagram

Specified Period
From: 12:00:00
To: 14:00:00

One Hour Peak
From: 12:00:00
To: 13:00:00

Municipality: Waterloo
Site #: 0000000003
Intersection: Ira Needles Blvd & Erb St W
TFR File #: 3
Count date: 8-Nov-2018

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Ira Needles Blvd runs N/S

North Leg Total:	1477			
North Entering:	732			
North Peds:	8			
Peds Cross:	⋈			
Heavys	2	10	1	13
Trucks	3	7	1	11
Cars	146	450	112	708
Totals	151	467	114	
Heavys	17			
Trucks	14			
Cars	714			
Totals	745			
East Leg Total:	1200			
East Entering:	652			
East Peds:	3			
Peds Cross:	⧖			

Erbsville Rd

Heavys	Trucks	Cars	Totals
22	14	845	881

Cars	Trucks	Heavys	Totals
110	2	1	113
375	4	12	391
145	1	2	148
630	7	15	

Erb St W

N
W E
S

Heavys	Trucks	Cars	Totals
4	5	192	201
13	5	283	301
12	6	299	317
29	16	774	

Erb St W

Cars	Trucks	Heavys	Totals
520	7	21	548

Ira Needles Blvd

Peds Cross:	⧖			
West Peds:	16			
West Entering:	819			
West Leg Total:	1700			
Cars	894			
Trucks	14			
Heavys	24			
Totals	932			
Cars	324	412	125	861
Trucks	7	7	1	15
Heavys	8	12	7	27
Totals	339	431	133	
Peds Cross:	⋈			
South Peds:	7			
South Entering:	903			
South Leg Total:	1835			

Comments

Erb St W @ Ira Needles Blvd

Afternoon Peak Diagram

Specified Period
From: 15:00:00
To: 18:00:00

One Hour Peak
From: 16:30:00
To: 17:30:00

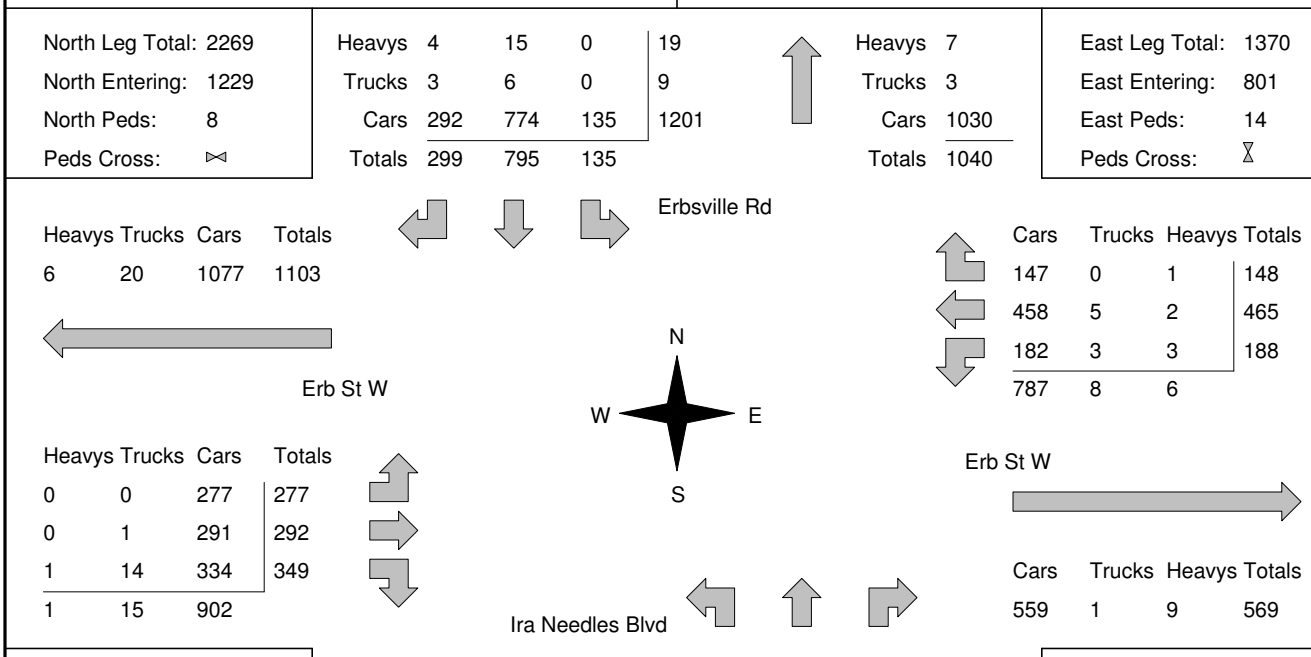
Municipality: Waterloo
Site #: 0000000003
Intersection: Ira Needles Blvd & Erb St W
TFR File #: 3
Count date: 8-Nov-2018

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Ira Needles Blvd runs N/S



Comments

Erb St W @ Ira Needles Blvd

Total Count Diagram

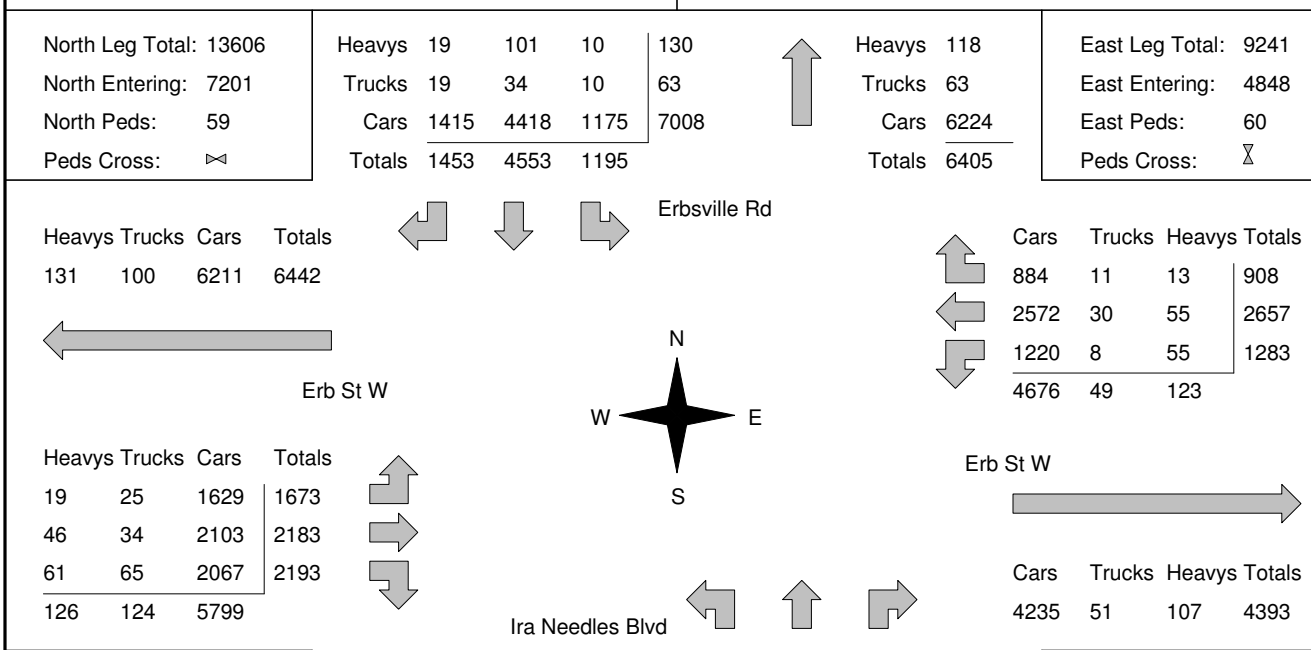
Municipality: Waterloo
Site #: 0000000003
Intersection: Ira Needles Blvd & Erb St W
TFR File #: 3
Count date: 8-Nov-2018

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Ira Needles Blvd runs N/S



Comments

Thorndale Dr @ Ira Needles Blvd

Morning Peak Diagram

Specified Period
From: 7:30:00
To: 10:30:00

One Hour Peak
From: 8:00:00
To: 9:00:00

Municipality: Waterloo
Site #: 0000000004
Intersection: Ira Needles Blvd & Thorndale Dr
TFR File #: 4
Count date: 8-Nov-2018

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Ira Needles Blvd runs N/S

North Leg Total:	1858			
North Entering:	1000			
North Peds:	3			
Peds Cross:	⋈			
Heavys	3	42	2	47
Trucks	1	7	0	8
Cars	105	806	34	945
Totals	109	855	36	
Heavys	28			
Trucks	13			
Cars	817			
Totals	858			
East Leg Total:	258			
East Entering:	161			
East Peds:	5			
Peds Cross:	⧖			

Ira Needles Blvd

Heavys	Trucks	Cars	Totals
3	1	128	132

Thorndale Dr

Cars	Trucks	Heavys	Totals
67	0	1	68
21	0	0	21
71	0	1	72
159	0	2	

N
W E
S

Heavys	Trucks	Cars	Totals
4	5	62	71
0	0	16	16
0	0	2	2
4	5	80	

Thorndale Dr

Cars	Trucks	Heavys	Totals
94	0	3	97

Ira Needles Blvd

Peds Cross:	⧖			
West Peds:	2			
West Entering:	89			
West Leg Total:	221			
Cars	879			
Trucks	7			
Heavys	43			
Totals	929			
Cars	2	688	44	734
Trucks	0	8	0	8
Heavys	0	23	1	24
Totals	2	719	45	
Peds Cross:	⋈			
South Peds:	2			
South Entering:	766			
South Leg Total:	1695			

Comments

Thorndale Dr @ Ira Needles Blvd

Mid-day Peak Diagram

Specified Period
From: 12:00:00
To: 14:00:00

One Hour Peak
From: 12:00:00
To: 13:00:00

Municipality: Waterloo
Site #: 0000000004
Intersection: Ira Needles Blvd & Thorndale Dr
TFR File #: 4
Count date: 8-Nov-2018

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

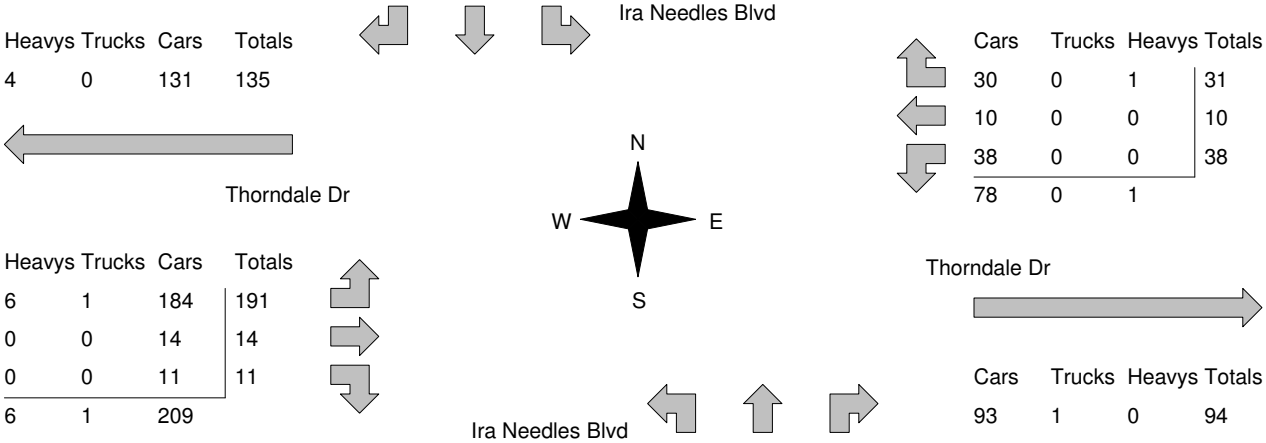
Major Road: Ira Needles Blvd runs N/S

North Leg Total: 1841
North Entering: 957
North Peds: 0
Peds Cross: ⋈

Heavys	1	26	0	27
Trucks	0	9	1	10
Cars	115	766	39	920
Totals	116	801	40	

Heavys	27
Trucks	14
Cars	843
Totals	884

East Leg Total: 173
East Entering: 79
East Peds: 0
Peds Cross: ⧖



Peds Cross: ⧖
West Peds: 0
West Entering: 216
West Leg Total: 351

Cars	815			
Trucks	9			
Heavys	26			
Totals	850			

Cars	6	629	40	675
Trucks	0	13	0	13
Heavys	3	20	0	23
Totals	9	662	40	

Peds Cross: ⋈
South Peds: 0
South Entering: 711
South Leg Total: 1561

Comments

Thorndale Dr @ Ira Needles Blvd

Afternoon Peak Diagram

Specified Period
From: 15:00:00
To: 18:00:00

One Hour Peak
From: 16:30:00
To: 17:30:00

Municipality: Waterloo
Site #: 0000000004
Intersection: Ira Needles Blvd & Thorndale Dr
TFR File #: 4
Count date: 8-Nov-2018

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

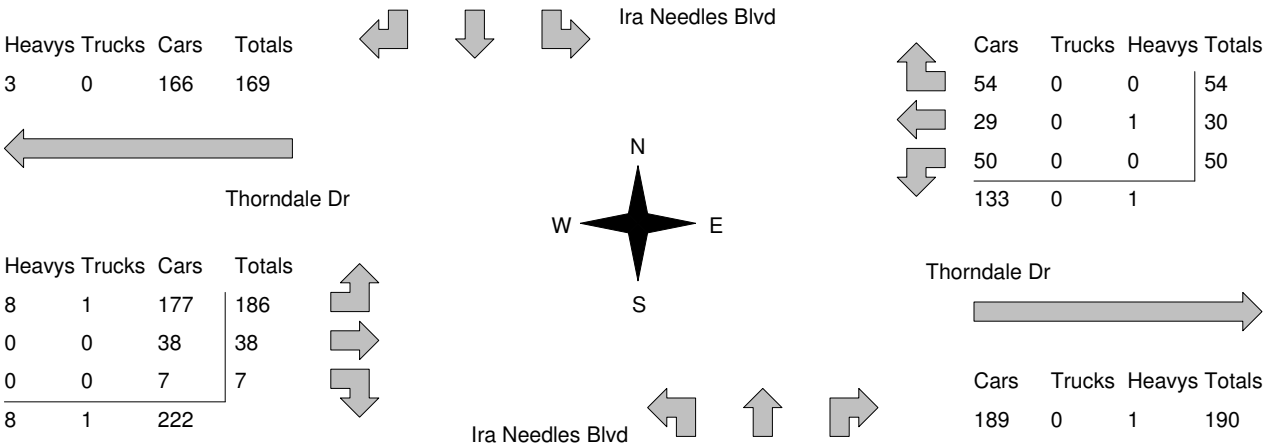
Major Road: Ira Needles Blvd runs N/S

North Leg Total: 2423
North Entering: 1342
North Peds: 3
Peds Cross: ⋈

Heavys	2	20	1	23
Trucks	0	21	0	21
Cars	127	1087	84	1298
Totals	129	1128	85	

Heavys	18
Trucks	13
Cars	1050
Totals	1081

East Leg Total: 324
East Entering: 134
East Peds: 6
Peds Cross: ⧖



Peds Cross: ⧖
West Peds: 4
West Entering: 231
West Leg Total: 400

Cars	1144			
Trucks	21			
Heavys	20			
Totals	1185			

Cars	10	819	67	896
Trucks	0	12	0	12
Heavys	0	10	0	10
Totals	10	841	67	

Peds Cross: ⋈
South Peds: 3
South Entering: 918
South Leg Total: 2103

Comments

Thorndale Dr @ Ira Needles Blvd

Total Count Diagram

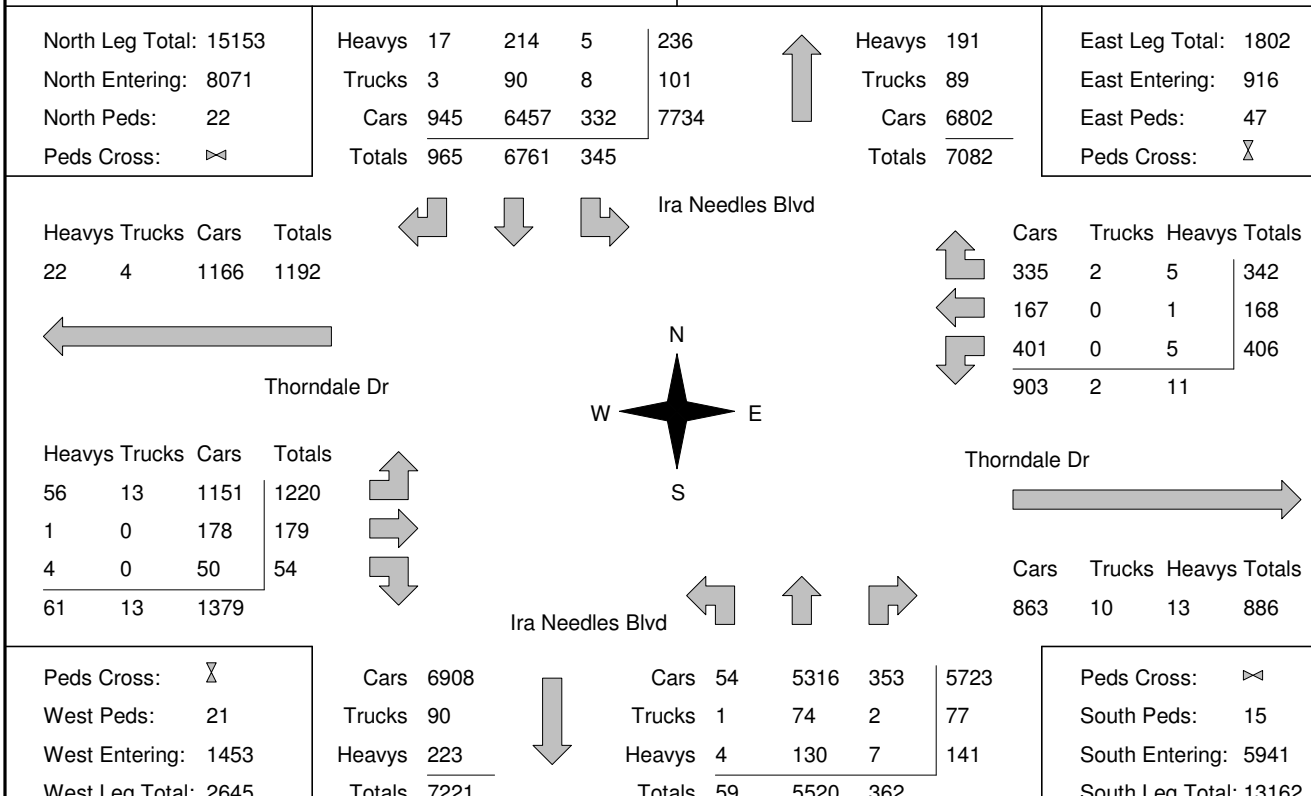
Municipality: Waterloo
Site #: 0000000004
Intersection: Ira Needles Blvd & Thorndale Dr
TFR File #: 4
Count date: 8-Nov-2018

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Ira Needles Blvd runs N/S



Comments

University Ave @ Ira Needles Blvd

Morning Peak Diagram

Specified Period
From: 7:30:00
To: 10:30:00

One Hour Peak
From: 7:45:00
To: 8:45:00

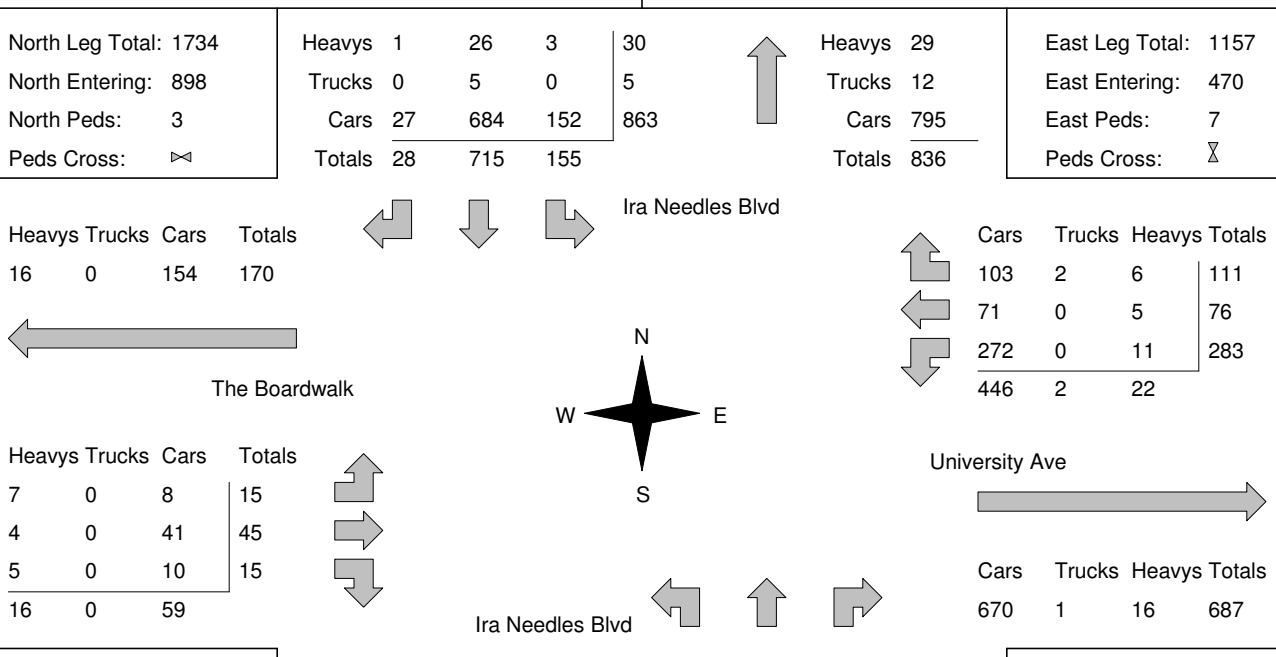
Municipality: Waterloo
Site #: 0000000005
Intersection: Ira Needles Blvd & University Ave
TFR File #: 5
Count date: 8-Nov-2018

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Ira Needles Blvd runs N/S



Comments

University Ave @ Ira Needles Blvd

Mid-day Peak Diagram

Specified Period
From: 12:00:00
To: 14:00:00

One Hour Peak
From: 12:00:00
To: 13:00:00

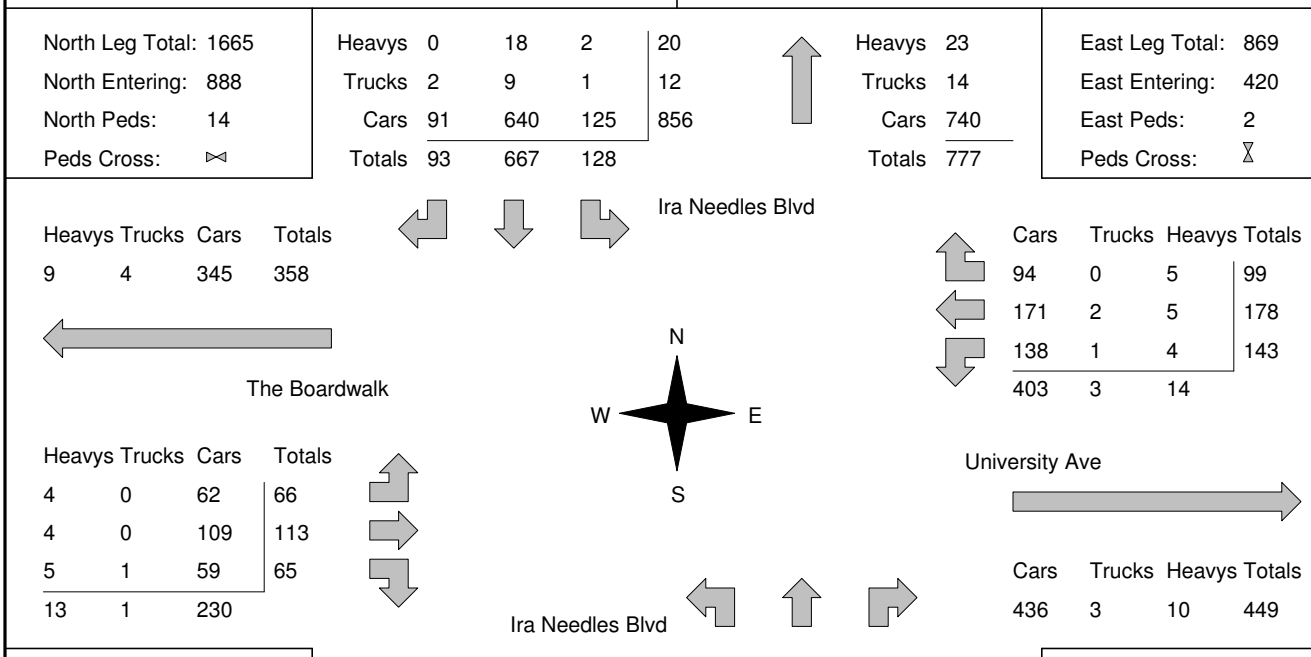
Municipality: Waterloo
Site #: 0000000005
Intersection: Ira Needles Blvd & University Ave
TFR File #: 5
Count date: 8-Nov-2018

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Ira Needles Blvd runs N/S



Comments

University Ave @ Ira Needles Blvd

Afternoon Peak Diagram

Specified Period
From: 15:00:00
To: 18:00:00

One Hour Peak
From: 16:30:00
To: 17:30:00

Municipality: Waterloo
Site #: 0000000005
Intersection: Ira Needles Blvd & University Ave
TFR File #: 5
Count date: 8-Nov-2018

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Ira Needles Blvd runs N/S

North Leg Total:	2262			
North Entering:	1265			
North Peds:	11			
Peds Cross:	⋈			
Heavys	0	12	1	13
Trucks	1	20	0	21
Cars	78	990	163	1231
Totals	79	1022	164	
Heavys	11			
Trucks	11			
Cars	975			
Totals	997			
East Leg Total:	1211			
East Entering:	638			
East Peds:	6			
Peds Cross:	⧖			

Ira Needles Blvd

Heavys	Trucks	Cars	Totals
13	2	395	410

The Boardwalk

Cars	Trucks	Heavys	Totals
174	0	1	175
196	0	3	199
262	0	2	264
632	0	6	

N
W E
S

Heavys	Trucks	Cars	Totals
6	0	58	64
3	0	114	117
4	0	64	68
13	0	236	

University Ave

Cars	Trucks	Heavys	Totals
569	0	4	573

Ira Needles Blvd

Peds Cross:	⧖			
West Peds:	8			
West Entering:	249			
West Leg Total:	659			
Cars	1316			
Trucks	20			
Heavys	18			
Totals	1354			
Cars	121	743	292	1156
Trucks	1	11	0	12
Heavys	10	4	0	14
Totals	132	758	292	
Peds Cross:	⋈			
South Peds:	6			
South Entering:	1182			
South Leg Total:	2536			

Comments

University Ave @ Ira Needles Blvd

Total Count Diagram

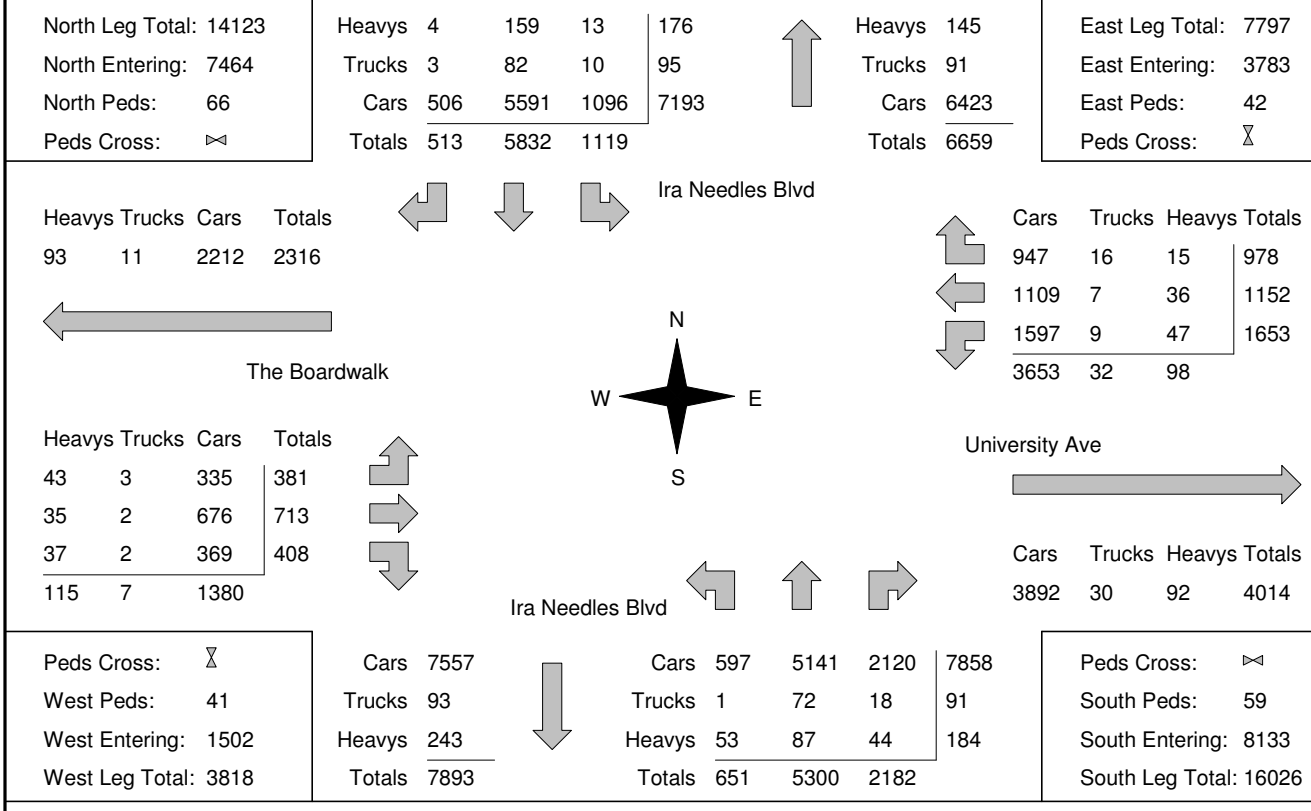
Municipality: Waterloo
Site #: 0000000005
Intersection: Ira Needles Blvd & University Ave
TFR File #: 5
Count date: 8-Nov-2018

Weather conditions:
Cloudy/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Ira Needles Blvd runs N/S



Comments

Erb St W @ Costco East Entrance

Mid-day Peak Diagram

Specified Period
From: 11:00:00
To: 15:00:00

One Hour Peak
From: 13:15:00
To: 14:15:00

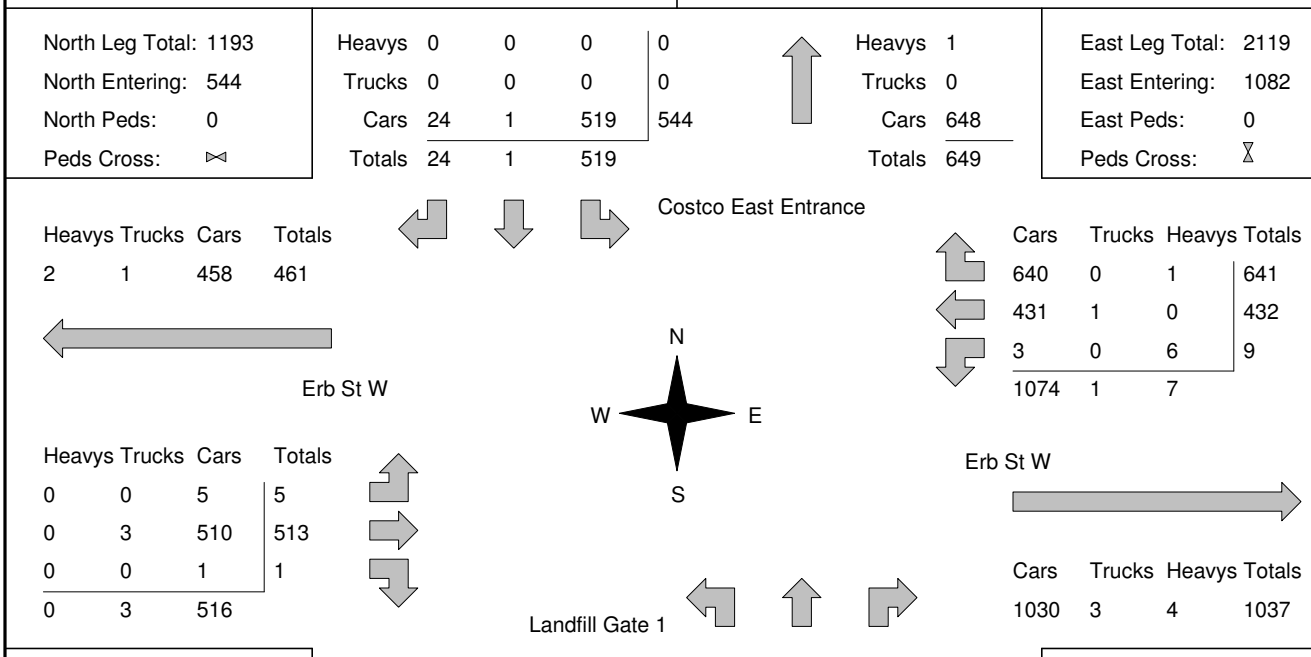
Municipality: Waterloo
Site #: 0000000002
Intersection: Erb St W & Costco East Entrance
TFR File #: 2
Count date: 10-Nov-2018

Weather conditions:
Cloudy/Wet

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Erb St W runs W/E



Comments

Erb St W @ Costco East Entrance

Total Count Diagram

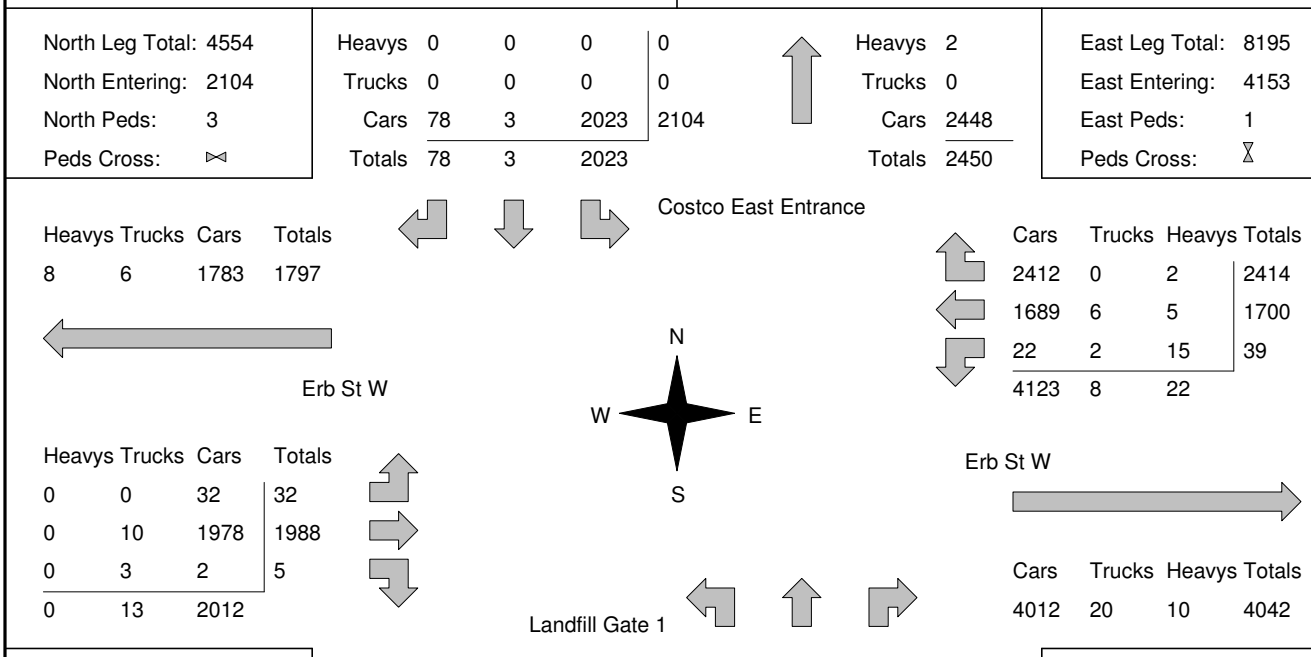
Municipality: Waterloo
Site #: 0000000002
Intersection: Erb St W & Costco East Entrance
TFR File #: 2
Count date: 10-Nov-2018

Weather conditions:
Cloudy/Wet

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Erb St W runs W/E



Comments

Erb St W @ Costco West Entrance

Mid-day Peak Diagram

Specified Period
From: 11:00:00
To: 15:00:00

One Hour Peak
From: 13:00:00
To: 14:00:00

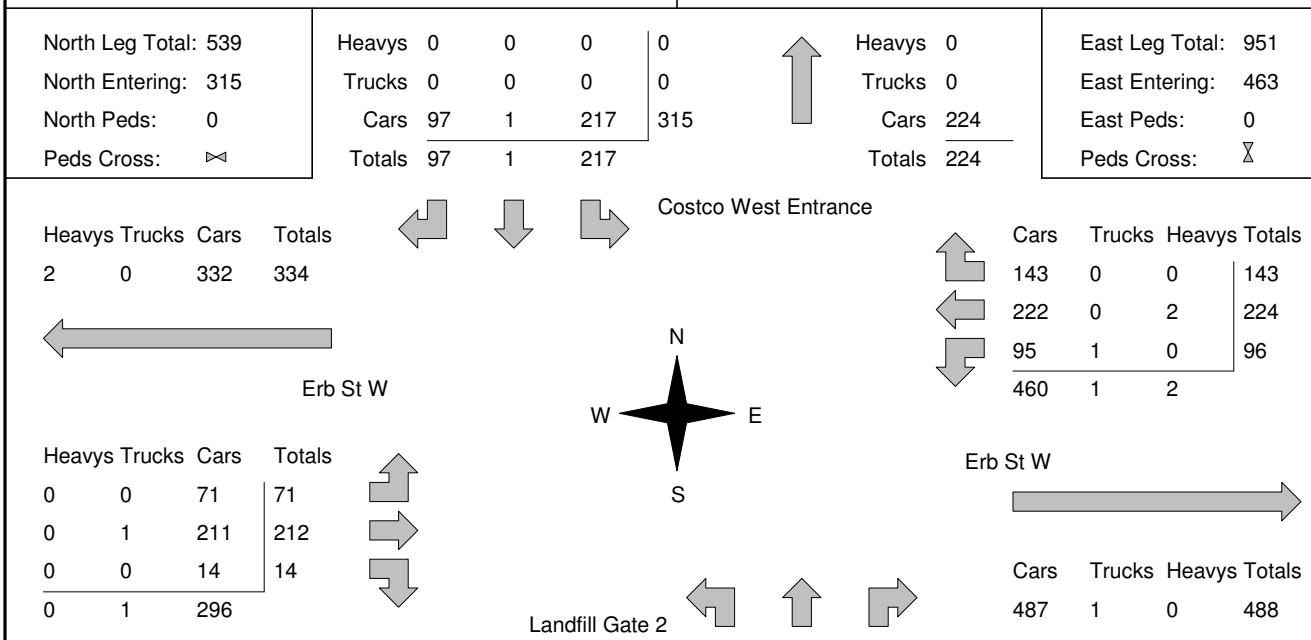
Municipality: Waterloo
Site #: 0000000001
Intersection: Erb St W & Costco West Entrance
TFR File #: 1
Count date: 10-Nov-2018

Weather conditions:
Cloudy/Wet

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Erb St W runs W/E



Comments

Erb St W @ Costco West Entrance

Total Count Diagram

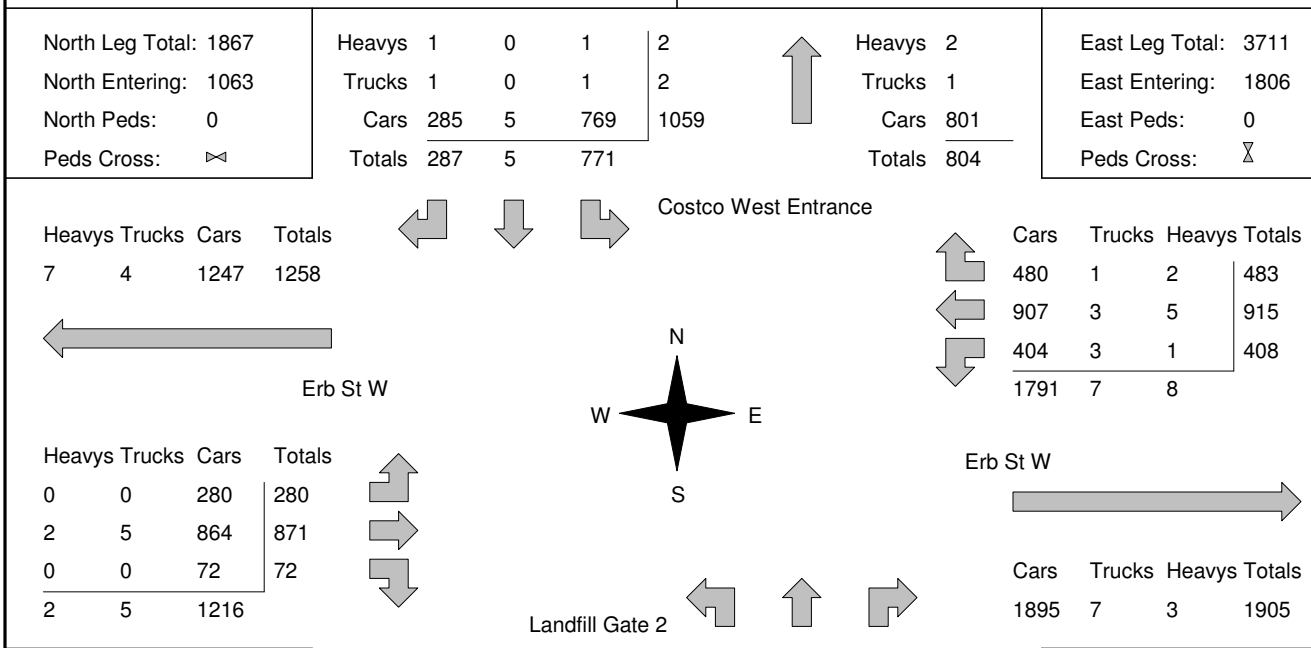
Municipality: Waterloo
Site #: 0000000001
Intersection: Erb St W & Costco West Entrance
TFR File #: 1
Count date: 10-Nov-2018

Weather conditions:
Cloudy/Wet

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Erb St W runs W/E



Comments

Erb St W @ Ira Needles Blvd

Mid-day Peak Diagram

Specified Period
From: 11:00:00
To: 15:00:00

One Hour Peak
From: 14:00:00
To: 15:00:00

Municipality: Waterloo
Site #: 0000000003
Intersection: Ira Needles Blvd & Erb St W
TFR File #: 3
Count date: 10-Nov-2018

Weather conditions:
Cloudy/Wet

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Ira Needles Blvd runs N/S

North Leg Total:	2033			
North Entering:	1030			
North Peds:	4			
Peds Cross:	⋈			
Heavys	0	4	0	4
Trucks	0	3	0	3
Cars	227	659	137	1023
Totals	227	666	137	
Heavys	5			
Trucks	4			
Cars	994			
Totals	1003			
East Leg Total:	1312			
East Entering:	709			
East Peds:	9			
Peds Cross:	⧖			

Erbsville Rd

Heavys	Trucks	Cars	Totals
3	1	1089	1093

Erb St W

Heavys	Trucks	Cars	Totals
0	1	259	260
1	0	315	316
0	1	497	498
1	2	1071	

Cars	Trucks	Heavys	Totals
166	0	0	166
364	1	2	367
173	1	2	176
703	2	4	

N
W E
S

Erb St W

Cars	Trucks	Heavys	Totals
599	0	4	603

Ira Needles Blvd

Peds Cross:	⧖			
West Peds:	26			
West Entering:	1074			
West Leg Total:	2167			
Cars	1329			
Trucks	5			
Heavys	6			
Totals	1340			
Cars	498	569	147	1214
Trucks	0	3	0	3
Heavys	1	5	3	9
Totals	499	577	150	
Peds Cross:	⋈			
South Peds:	10			
South Entering:	1226			
South Leg Total:	2566			

Comments

Erb St W @ Ira Needles Blvd

Total Count Diagram

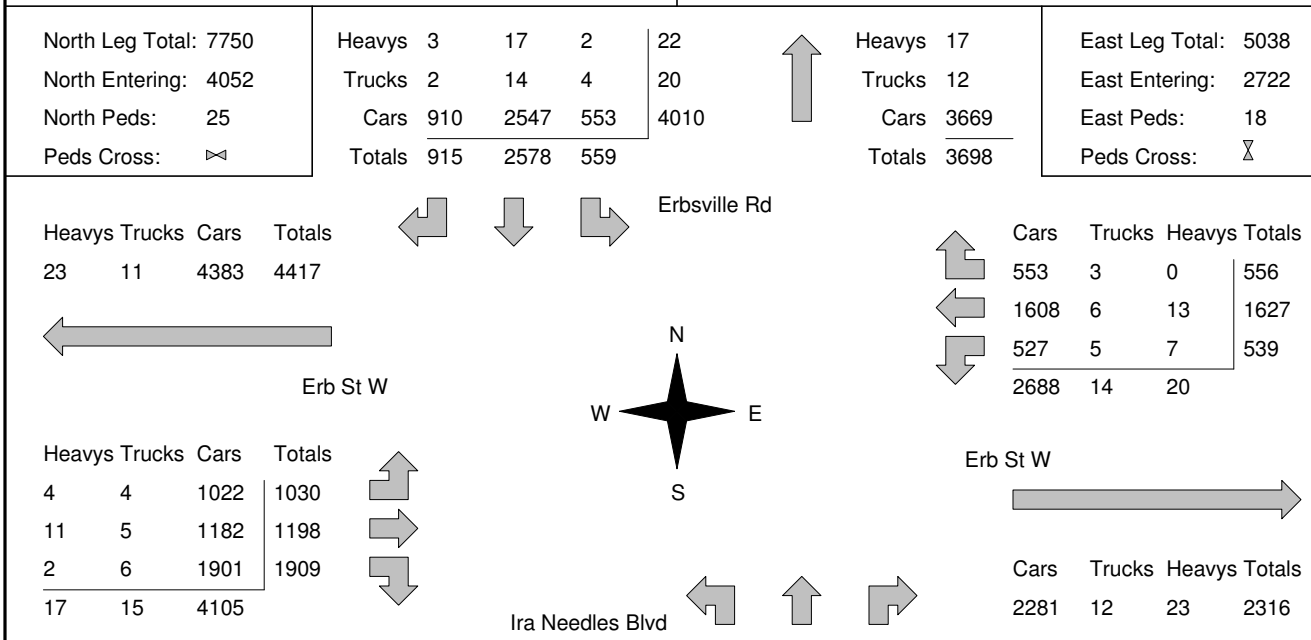
Municipality: Waterloo
Site #: 0000000003
Intersection: Ira Needles Blvd & Erb St W
TFR File #: 3
Count date: 10-Nov-2018

Weather conditions:
Cloudy/Wet

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Ira Needles Blvd runs N/S



Comments

Thorndale Dr @ Ira Needles Blvd

Mid-day Peak Diagram

Specified Period
From: 11:00:00
To: 15:00:00

One Hour Peak
From: 14:00:00
To: 15:00:00

Municipality: Waterloo
Site #: 0000000004
Intersection: Ira Needles Blvd & Thorndale Dr
TFR File #: 4
Count date: 10-Nov-2018

Weather conditions:
Cloudy/Wet

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

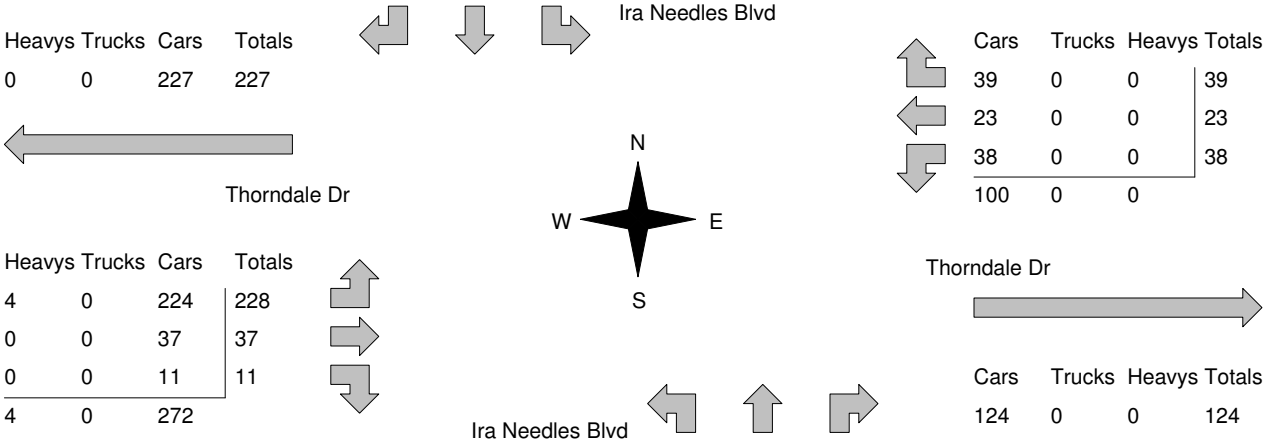
Major Road: Ira Needles Blvd runs N/S

North Leg Total:	2637			
North Entering:	1429			
North Peds:	2			
Peds Cross:	⋈			

Heavys	0	6	0	6
Trucks	0	5	0	5
Cars	201	1176	41	1418
Totals	201	1187	41	

Heavys	8	
Trucks	3	
Cars	1197	
Totals	1208	

East Leg Total:	224
East Entering:	100
East Peds:	0
Peds Cross:	⧖



Peds Cross:	⧖			
West Peds:	3			
West Entering:	276			
West Leg Total:	503			

Cars	1225			
Trucks	5			
Heavys	6			
Totals	1236			

Cars	3	934	46	983
Trucks	0	3	0	3
Heavys	0	4	0	4
Totals	3	941	46	

Peds Cross:	⋈
South Peds:	0
South Entering:	990
South Leg Total:	2226

Comments

Thorndale Dr @ Ira Needles Blvd

Total Count Diagram

Municipality: Waterloo
Site #: 0000000004
Intersection: Ira Needles Blvd & Thorndale Dr
TFR File #: 4
Count date: 10-Nov-2018

Weather conditions:
Cloudy/Wet

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Ira Needles Blvd runs N/S

North Leg Total:	9872			
North Entering:	5321			
North Peds:	3			
Peds Cross:	⋈			
Heavys	0	31	0	31
Trucks	2	18	0	20
Cars	709	4392	169	5270
Totals	711	4441	169	
Heavys	30			
Trucks	10			
Cars	4511			
Totals	4551			
East Leg Total:	923			
East Entering:	466			
East Peds:	12			
Peds Cross:	⧖			

Ira Needles Blvd

Heavys	Trucks	Cars	Totals
0	3	824	827

Thorndale Dr

Cars	Trucks	Heavys	Totals
180	0	1	181
94	1	0	95
190	0	0	190
464	1	1	

N
W E
S

Heavys	Trucks	Cars	Totals
17	1	798	816
0	0	111	111
0	1	24	25
17	2	933	

Thorndale Dr

Cars	Trucks	Heavys	Totals
454	2	1	457

Ira Needles Blvd

Peds Cross:	⧖			
West Peds:	11			
West Entering:	952			
West Leg Total:	1779			
Cars	4606			
Trucks	19			
Heavys	31			
Totals	4656			
Cars	21	3533	174	3728
Trucks	0	9	2	11
Heavys	0	12	1	13
Totals	21	3554	177	
Peds Cross:	⋈			
South Peds:	8			
South Entering:	3752			
South Leg Total:	8408			

Comments

University Ave @ Ira Needles Blvd

Mid-day Peak Diagram

Specified Period
From: 11:00:00
To: 15:00:00

One Hour Peak
From: 12:30:00
To: 13:30:00

Municipality: Waterloo
Site #: 0000000005
Intersection: Ira Needles Blvd & University Ave
TFR File #: 5
Count date: 10-Nov-2018

Weather conditions:
Cloudy/Wet

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Ira Needles Blvd runs N/S

North Leg Total:	2200			
North Entering:	1149			
North Peds:	6			
Peds Cross:	⋈			
Heavys	1	1	1	3
Trucks	0	7	0	7
Cars	130	861	148	1139
Totals	131	869	149	
Heavys	3			
Trucks	5			
Cars	1043			
Totals	1051			
East Leg Total:	1086			
East Entering:	524			
East Peds:	0			
Peds Cross:	⧖			

Ira Needles Blvd

Heavys	Trucks	Cars	Totals
7	0	507	514

The Boardwalk

Heavys	Trucks	Cars	Totals
1	0	95	96
2	0	117	119
2	0	104	106
5	0	316	

N
W E
S

Cars	Trucks	Heavys	Totals
180	1	1	182
215	0	2	217
123	2	0	125
518	3	3	

University Ave

Cars	Trucks	Heavys	Totals
557	2	3	562

Ira Needles Blvd

Peds Cross:	⧖			
West Peds:	1			
West Entering:	321			
West Leg Total:	835			
Cars	1088			
Trucks	9			
Heavys	3			
Totals	1100			
Cars	162	768	292	1222
Trucks	0	4	2	6
Heavys	4	1	0	5
Totals	166	773	294	
Peds Cross:	⋈			
South Peds:	3			
South Entering:	1233			
South Leg Total:	2333			

Comments

University Ave @ Ira Needles Blvd

Total Count Diagram

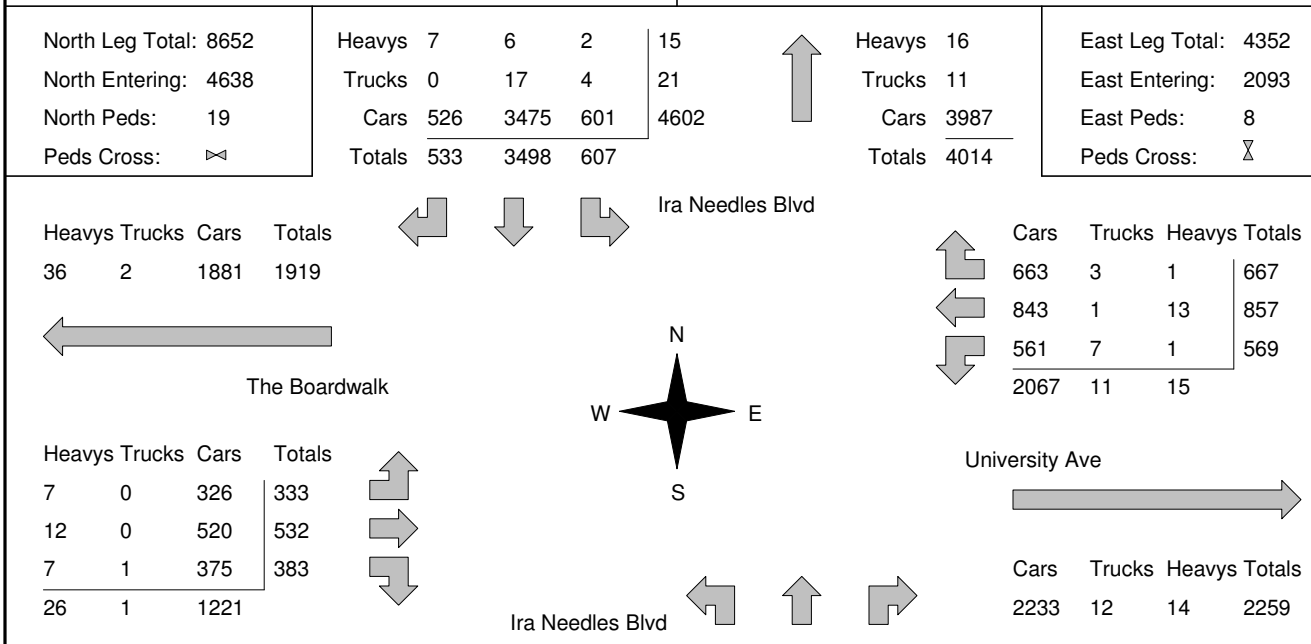
Municipality: Waterloo
Site #: 0000000005
Intersection: Ira Needles Blvd & University Ave
TFR File #: 5
Count date: 10-Nov-2018

Weather conditions:
Cloudy/Wet

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Ira Needles Blvd runs N/S



Comments

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Columbia Street West & Erbsville Road - Saturday
Site Code:
Start Date: 11/10/2018

Turning Movement Data

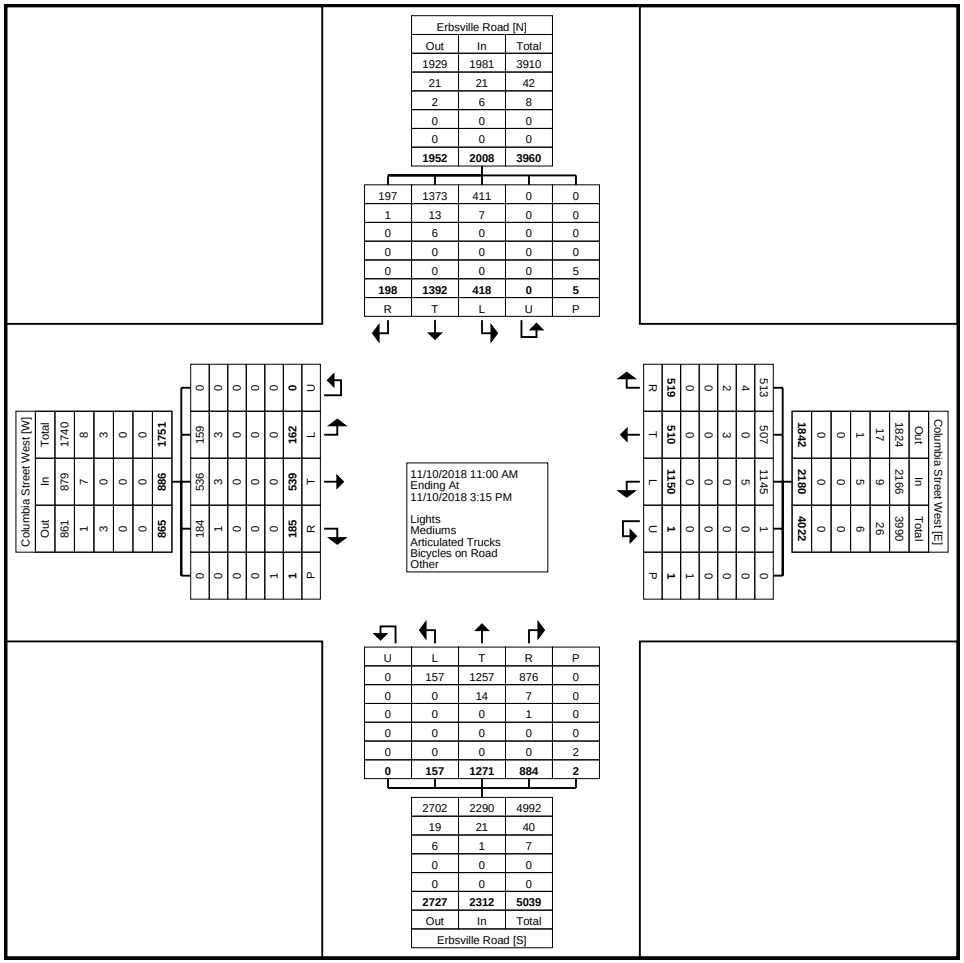
Start Time	Columbia Street West Eastbound						Columbia Street West Westbound						Erbsville Road Northbound						Erbsville Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
11:00 AM	13	34	11	0	0	58	68	31	21	0	0	120	11	72	51	0	0	134	28	86	10	0	1	124	436
11:15 AM	9	20	12	0	0	41	68	38	29	0	0	135	13	66	44	0	0	123	28	77	12	0	0	117	416
11:30 AM	11	42	9	0	0	62	73	38	33	0	0	144	6	81	62	0	1	149	28	95	9	0	0	132	487
11:45 AM	9	31	15	0	0	55	64	31	36	0	1	131	6	55	46	0	0	107	29	104	10	0	2	143	436
Hourly Total	42	127	47	0	0	216	273	138	119	0	1	530	36	274	203	0	1	513	113	362	41	0	3	516	1775
12:00 PM	7	41	10	0	0	58	74	35	29	0	0	138	10	63	58	0	0	131	34	91	15	0	0	140	467
12:15 PM	13	30	3	0	0	46	68	17	38	0	0	123	12	82	57	0	0	151	28	82	16	0	0	126	446
12:30 PM	7	34	12	0	0	53	69	41	30	0	0	140	7	71	68	0	0	146	24	85	9	0	0	118	457
12:45 PM	11	29	12	0	0	52	60	33	29	0	0	122	10	76	47	0	0	133	32	105	9	0	0	146	453
Hourly Total	38	134	37	0	0	209	271	126	126	0	0	523	39	292	230	0	0	561	118	363	49	0	0	530	1823
1:00 PM	10	38	16	0	0	64	62	34	24	0	0	120	12	77	65	0	0	154	8	81	10	0	0	99	437
1:15 PM	13	35	14	0	0	62	69	33	30	0	0	132	8	86	53	0	0	147	26	65	12	0	0	103	444
1:30 PM	10	23	14	0	0	47	94	32	41	0	0	167	16	90	58	0	0	164	17	78	15	0	0	110	488
1:45 PM	6	32	21	0	0	59	67	30	36	0	0	133	9	69	52	0	0	130	30	71	13	0	2	114	436
Hourly Total	39	128	65	0	0	232	292	129	131	0	0	552	45	322	228	0	0	595	81	295	50	0	2	426	1805
2:00 PM	8	38	13	0	0	59	85	32	35	0	0	152	3	97	36	0	0	136	24	97	13	0	0	134	481
2:15 PM	10	35	5	0	0	50	81	23	37	1	0	142	10	112	57	0	0	179	29	87	19	0	0	135	506
2:30 PM	13	37	9	0	1	59	77	26	34	0	0	137	12	79	68	0	1	159	28	96	11	0	0	135	490
2:45 PM	12	40	9	0	0	61	71	36	37	0	0	144	12	95	61	0	0	168	25	92	15	0	0	132	505
Hourly Total	43	150	36	0	1	229	314	117	143	1	0	575	37	383	222	0	1	642	106	372	58	0	0	536	1982
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1
Grand Total	162	539	185	0	1	886	1150	510	519	1	1	2180	157	1271	884	0	2	2312	418	1392	198	0	5	2008	7386
Approach %	18.3	60.8	20.9	0.0	-	-	52.8	23.4	23.8	0.0	-	-	6.8	55.0	38.2	0.0	-	-	20.8	69.3	9.9	0.0	-	-	-
Total %	2.2	7.3	2.5	0.0	-	12.0	15.6	6.9	7.0	0.0	-	29.5	2.1	17.2	12.0	0.0	-	31.3	5.7	18.8	2.7	0.0	-	27.2	-
Lights	159	536	184	0	-	879	1145	507	513	1	-	2166	157	1257	876	0	-	2290	411	1373	197	0	-	1981	7316
% Lights	98.1	99.4	99.5	-	-	99.2	99.6	99.4	98.8	100.0	-	99.4	100.0	98.9	99.1	-	-	99.0	98.3	98.6	99.5	-	-	98.7	99.1
Mediums	3	3	1	0	-	7	5	0	4	0	-	9	0	14	7	0	-	21	7	13	1	0	-	21	58
% Mediums	1.9	0.6	0.5	-	-	0.8	0.4	0.0	0.8	0.0	-	0.4	0.0	1.1	0.8	-	-	0.9	1.7	0.9	0.5	-	-	1.0	0.8
Articulated Trucks	0	0	0	0	-	0	0	3	2	0	-	5	0	0	1	0	-	1	0	6	0	0	-	6	12
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.6	0.4	0.0	-	0.2	0.0	0.0	0.1	-	-	0.0	0.0	0.4	0.0	-	-	0.3	0.2
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	5	-	-

% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Columbia Street West & Erbsville Road - Saturday
Site Code:
Start Date: 11/10/2018



Turning Movement Data Plot

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Count Name: Columbia Street West & Erbsville Road - Saturday
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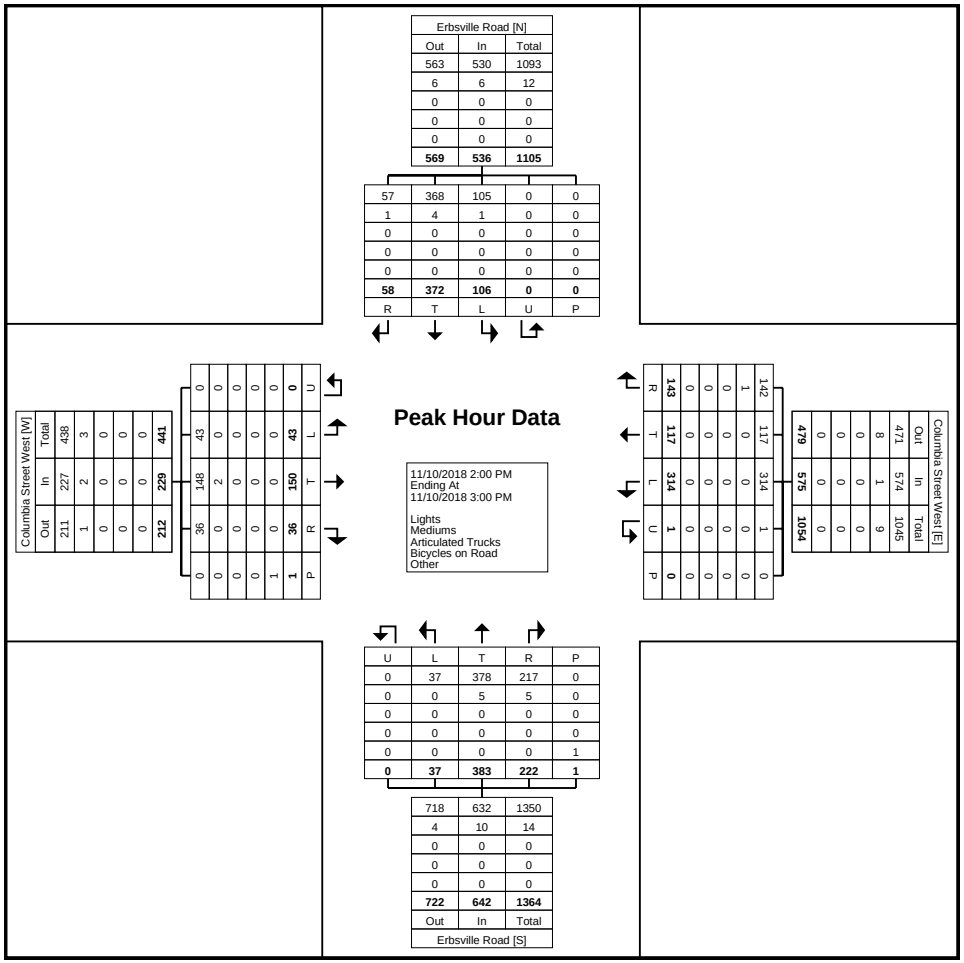
Turning Movement Peak Hour Data (2:00 PM)

Start Time	Columbia Street West Eastbound						Columbia Street West Westbound						Erbsville Road Northbound						Erbsville Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
2:00 PM	8	38	13	0	0	59	85	32	35	0	0	152	3	97	36	0	0	136	24	97	13	0	0	134	481
2:15 PM	10	35	5	0	0	50	81	23	37	1	0	142	10	112	57	0	0	179	29	87	19	0	0	135	506
2:30 PM	13	37	9	0	1	59	77	26	34	0	0	137	12	79	68	0	1	159	28	96	11	0	0	135	490
2:45 PM	12	40	9	0	0	61	71	36	37	0	0	144	12	95	61	0	0	168	25	92	15	0	0	132	505
Total	43	150	36	0	1	229	314	117	143	1	0	575	37	383	222	0	1	642	106	372	58	0	0	536	1982
Approach %	18.8	65.5	15.7	0.0	-	-	54.6	20.3	24.9	0.2	-	-	5.8	59.7	34.6	0.0	-	-	19.8	69.4	10.8	0.0	-	-	-
Total %	2.2	7.6	1.8	0.0	-	11.6	15.8	5.9	7.2	0.1	-	29.0	1.9	19.3	11.2	0.0	-	32.4	5.3	18.8	2.9	0.0	-	27.0	-
PHF	0.827	0.938	0.692	0.000	-	0.939	0.924	0.813	0.966	0.250	-	0.946	0.771	0.855	0.816	0.000	-	0.897	0.914	0.959	0.763	0.000	-	0.993	0.979
Lights	43	148	36	0	-	227	314	117	142	1	-	574	37	378	217	0	-	632	105	368	57	0	-	530	1963
% Lights	100.0	98.7	100.0	-	-	99.1	100.0	100.0	99.3	100.0	-	99.8	100.0	98.7	97.7	-	-	98.4	99.1	98.9	98.3	-	-	98.9	99.0
Mediums	0	2	0	0	-	2	0	0	1	0	-	1	0	5	5	0	-	10	1	4	1	0	-	6	19
% Mediums	0.0	1.3	0.0	-	-	0.9	0.0	0.0	0.7	0.0	-	0.2	0.0	1.3	2.3	-	-	1.6	0.9	1.1	1.7	-	-	1.1	1.0
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-

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Count Name: Columbia Street West & Erbsville Road - Saturday
Site Code:
Start Date: 11/10/2018



Turning Movement Peak Hour Data Plot (2:00 PM)

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Turning Movement Data

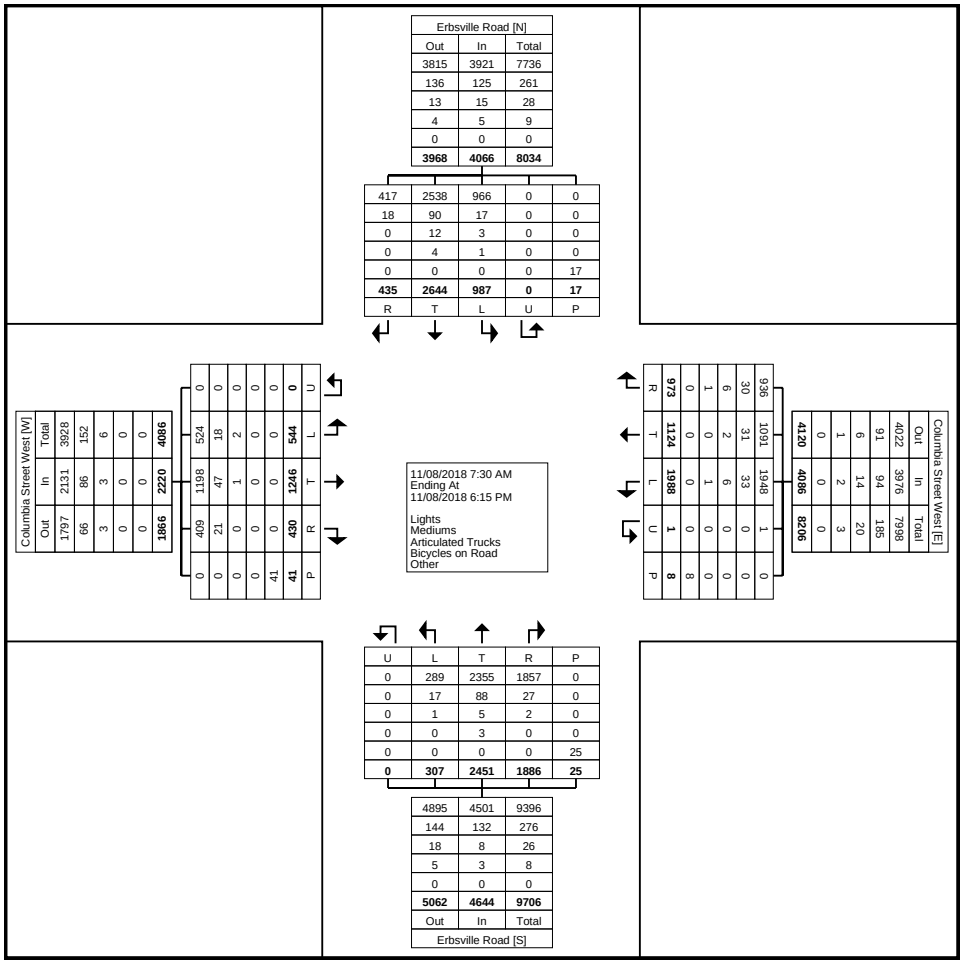
Start Time	Columbia Street West Eastbound						Columbia Street West Westbound						Erbsville Road Northbound						Erbsville Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:30 AM	9	50	15	0	0	74	31	11	16	0	0	58	9	64	64	0	1	137	38	76	7	0	0	121	390
7:45 AM	18	62	11	0	5	91	22	15	17	0	2	54	7	65	87	0	2	159	32	83	5	0	2	120	424
Hourly Total	27	112	26	0	5	165	53	26	33	0	2	112	16	129	151	0	3	296	70	159	12	0	2	241	814
8:00 AM	58	69	10	0	4	137	30	16	17	0	0	63	5	111	93	0	1	209	46	94	12	0	0	152	561
8:15 AM	53	84	16	0	0	153	24	27	23	0	0	74	7	99	127	0	0	233	46	125	40	0	0	211	671
8:30 AM	25	87	15	0	0	127	40	19	30	0	0	89	15	74	95	0	0	184	44	115	19	0	1	178	578
8:45 AM	26	67	13	0	0	106	25	22	22	0	0	69	9	67	95	0	0	171	41	79	10	0	2	130	476
Hourly Total	162	307	54	0	4	523	119	84	92	0	0	295	36	351	410	0	1	797	177	413	81	0	3	671	2286
9:00 AM	28	45	16	0	0	89	29	18	29	0	0	76	8	83	77	0	0	168	48	69	9	0	0	126	459
9:15 AM	13	58	14	0	0	85	31	18	26	0	0	75	6	53	60	0	1	119	45	101	6	0	0	152	431
9:30 AM	15	47	12	0	0	74	37	13	15	0	1	65	8	52	56	0	1	116	29	66	7	0	1	102	357
9:45 AM	7	34	15	0	0	56	45	21	14	0	1	80	7	61	47	0	0	115	36	76	10	0	0	122	373
Hourly Total	63	184	57	0	0	304	142	70	84	0	2	296	29	249	240	0	2	518	158	312	32	0	1	502	1620
10:00 AM	8	35	8	0	0	51	45	18	23	0	0	86	6	57	48	0	0	111	19	70	6	0	0	95	343
10:15 AM	8	29	8	0	0	45	60	19	22	0	0	101	6	47	28	0	1	81	23	56	3	0	0	82	309
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	16	64	16	0	0	96	105	37	45	0	0	187	12	104	76	0	1	192	42	126	9	0	0	177	652
12:00 PM	8	31	9	0	1	48	64	15	22	0	0	101	14	55	64	0	0	133	33	59	5	0	1	97	379
12:15 PM	9	22	8	0	0	39	64	29	26	0	0	119	8	54	44	0	0	106	30	75	9	0	0	114	378
12:30 PM	14	20	15	0	0	49	56	24	24	0	1	104	10	69	55	0	0	134	28	58	4	0	0	90	377
12:45 PM	6	23	14	0	1	43	61	20	30	0	2	111	11	62	60	0	4	133	24	56	7	0	2	87	374
Hourly Total	37	96	46	0	2	179	245	88	102	0	3	435	43	240	223	0	4	506	115	248	25	0	3	388	1508
1:00 PM	3	14	11	0	0	28	65	13	24	0	0	102	7	51	42	0	0	100	16	47	6	0	1	69	299
1:15 PM	8	24	10	0	0	42	55	22	32	0	0	109	10	65	42	0	0	117	23	67	7	0	0	97	365
1:30 PM	8	19	8	0	0	35	56	16	21	1	1	94	12	67	41	0	0	120	23	68	5	0	1	96	345
1:45 PM	9	26	12	0	0	47	52	22	18	0	0	92	5	62	41	0	0	108	23	57	12	0	1	92	339
Hourly Total	28	83	41	0	0	152	228	73	95	1	1	397	34	245	166	0	0	445	85	239	30	0	3	354	1348
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	17	36	12	0	11	65	69	28	36	0	0	133	8	83	45	0	0	136	24	80	16	0	0	120	454
3:15 PM	9	31	11	0	1	51	84	25	36	0	0	145	8	62	48	0	1	118	29	57	11	0	0	97	411
3:30 PM	18	24	8	0	0	50	78	34	36	0	0	148	12	84	51	0	1	147	34	88	11	0	1	133	478
3:45 PM	13	43	10	0	0	66	77	37	30	0	0	144	1	98	56	0	2	155	23	91	20	0	0	134	499
Hourly Total	57	134	41	0	12	232	308	124	138	0	0	570	29	327	200	0	4	556	110	316	58	0	1	484	1842
4:00 PM	17	23	11	0	9	51	106	54	56	0	0	216	11	94	57	0	1	162	28	93	14	0	0	135	564
4:15 PM	17	26	16	0	1	59	102	72	40	0	0	214	20	109	43	0	2	172	36	89	18	0	0	143	588
4:30 PM	13	32	17	0	7	62	101	56	51	0	0	208	10	94	50	0	0	154	31	108	24	0	0	163	587

4:45 PM	26	45	32	0	0	103	86	100	47	0	0	233	8	110	53	0	3	171	34	101	30	0	0	165	672
Hourly Total	73	126	76	0	17	275	395	282	194	0	0	871	49	407	203	0	6	659	129	391	86	0	0	606	2411
5:00 PM	23	30	25	0	0	78	102	93	50	0	0	245	10	95	50	0	1	155	19	130	32	0	0	181	659
5:15 PM	18	30	17	0	0	65	103	96	48	0	0	247	12	103	59	0	2	174	26	116	28	0	2	170	656
5:30 PM	19	44	17	0	1	80	94	85	46	0	0	225	17	86	48	0	0	151	32	91	19	0	2	142	598
5:45 PM	21	36	14	0	0	71	94	65	45	0	0	204	20	115	60	0	1	195	24	103	23	0	0	150	620
Hourly Total	81	140	73	0	1	294	393	339	189	0	0	921	59	399	217	0	4	675	101	440	102	0	4	643	2533
6:00 PM	0	0	0	0	0	0	0	1	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
Grand Total	544	1246	430	0	41	2220	1988	1124	973	1	8	4086	307	2451	1886	0	25	4644	987	2644	435	0	17	4066	15016
Approach %	24.5	56.1	19.4	0.0	-	-	48.7	27.5	23.8	0.0	-	-	6.6	52.8	40.6	0.0	-	-	24.3	65.0	10.7	0.0	-	-	-
Total %	3.6	8.3	2.9	0.0	-	14.8	13.2	7.5	6.5	0.0	-	27.2	2.0	16.3	12.6	0.0	-	30.9	6.6	17.6	2.9	0.0	-	27.1	-
Lights	524	1198	409	0	-	2131	1948	1091	936	1	-	3976	289	2355	1857	0	-	4501	966	2538	417	0	-	3921	14529
% Lights	96.3	96.1	95.1	-	-	96.0	98.0	97.1	96.2	100.0	-	97.3	94.1	96.1	98.5	-	-	96.9	97.9	96.0	95.9	-	-	96.4	96.8
Mediums	18	47	21	0	-	86	33	31	30	0	-	94	17	88	27	0	-	132	17	90	18	0	-	125	437
% Mediums	3.3	3.8	4.9	-	-	3.9	1.7	2.8	3.1	0.0	-	2.3	5.5	3.6	1.4	-	-	2.8	1.7	3.4	4.1	-	-	3.1	2.9
Articulated Trucks	2	1	0	0	-	3	6	2	6	0	-	14	1	5	2	0	-	8	3	12	0	0	-	15	40
% Articulated Trucks	0.4	0.1	0.0	-	-	0.1	0.3	0.2	0.6	0.0	-	0.3	0.3	0.2	0.1	-	-	0.2	0.3	0.5	0.0	-	-	0.4	0.3
Bicycles on Road	0	0	0	0	-	0	1	0	1	0	-	2	0	3	0	0	-	3	1	4	0	0	-	5	10
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.1	0.0	0.1	0.0	-	0.0	0.0	0.1	0.0	-	-	0.1	0.1	0.2	0.0	-	-	0.1	0.1
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	4.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	41	-	-	-	-	-	8	-	-	-	-	-	24	-	-	-	-	-	17	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	96.0	-	-	-	-	-	100.0	-	-

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Count Name: Columbia Street West & Erbsville Road
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Turning Movement Data Plot

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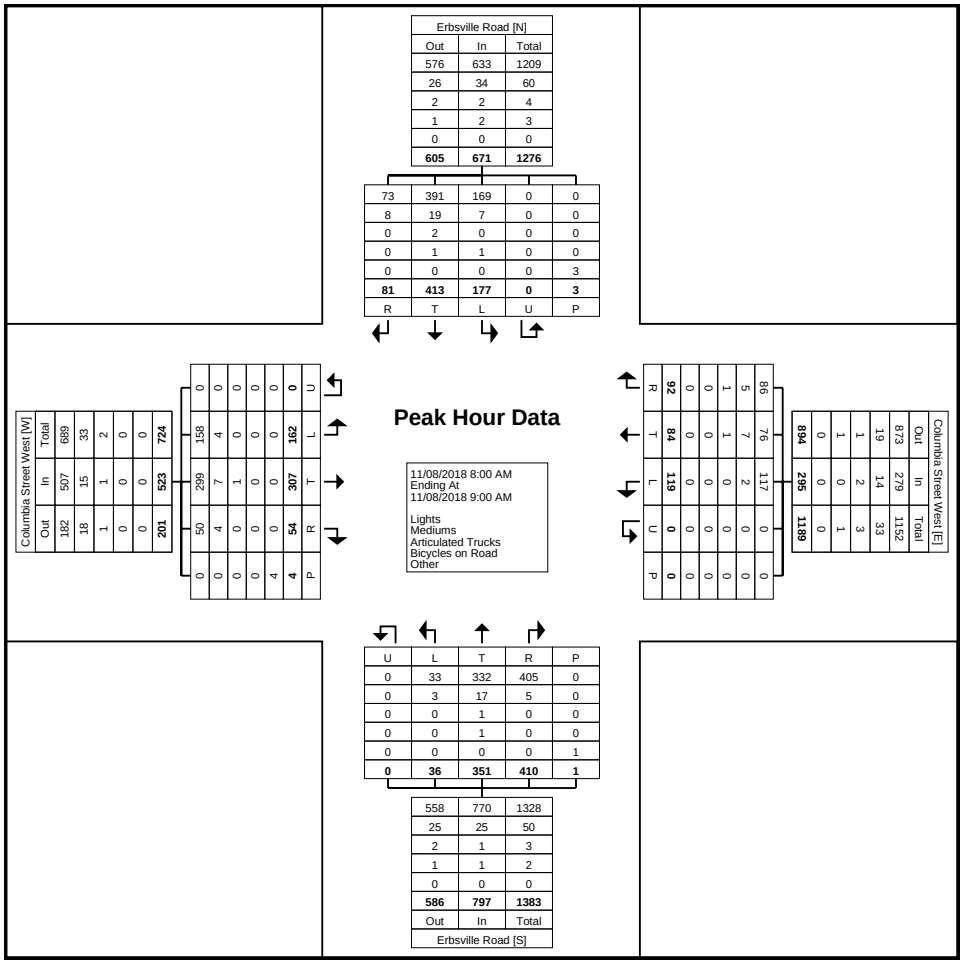
Turning Movement Peak Hour Data (8:00 AM)

Start Time	Columbia Street West Eastbound						Columbia Street West Westbound						Erbsville Road Northbound						Erbsville Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
8:00 AM	58	69	10	0	4	137	30	16	17	0	0	63	5	111	93	0	1	209	46	94	12	0	0	152	561
8:15 AM	53	84	16	0	0	153	24	27	23	0	0	74	7	99	127	0	0	233	46	125	40	0	0	211	671
8:30 AM	25	87	15	0	0	127	40	19	30	0	0	89	15	74	95	0	0	184	44	115	19	0	1	178	578
8:45 AM	26	67	13	0	0	106	25	22	22	0	0	69	9	67	95	0	0	171	41	79	10	0	2	130	476
Total	162	307	54	0	4	523	119	84	92	0	0	295	36	351	410	0	1	797	177	413	81	0	3	671	2286
Approach %	31.0	58.7	10.3	0.0	-	-	40.3	28.5	31.2	0.0	-	-	4.5	44.0	51.4	0.0	-	-	26.4	61.5	12.1	0.0	-	-	-
Total %	7.1	13.4	2.4	0.0	-	22.9	5.2	3.7	4.0	0.0	-	12.9	1.6	15.4	17.9	0.0	-	34.9	7.7	18.1	3.5	0.0	-	29.4	-
PHF	0.698	0.882	0.844	0.000	-	0.855	0.744	0.778	0.767	0.000	-	0.829	0.600	0.791	0.807	0.000	-	0.855	0.962	0.826	0.506	0.000	-	0.795	0.852
Lights	158	299	50	0	-	507	117	76	86	0	-	279	33	332	405	0	-	770	169	391	73	0	-	633	2189
% Lights	97.5	97.4	92.6	-	-	96.9	98.3	90.5	93.5	-	-	94.6	91.7	94.6	98.8	-	-	96.6	95.5	94.7	90.1	-	-	94.3	95.8
Mediums	4	7	4	0	-	15	2	7	5	0	-	14	3	17	5	0	-	25	7	19	8	0	-	34	88
% Mediums	2.5	2.3	7.4	-	-	2.9	1.7	8.3	5.4	-	-	4.7	8.3	4.8	1.2	-	-	3.1	4.0	4.6	9.9	-	-	5.1	3.8
Articulated Trucks	0	1	0	0	-	1	0	1	1	0	-	2	0	1	0	0	-	1	0	2	0	0	-	2	6
% Articulated Trucks	0.0	0.3	0.0	-	-	0.2	0.0	1.2	1.1	-	-	0.7	0.0	0.3	0.0	-	-	0.1	0.0	0.5	0.0	-	-	0.3	0.3
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	1	1	0	0	-	2	3
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.3	0.0	-	-	0.1	0.6	0.2	0.0	-	-	0.3	0.1
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	4	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	3	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

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Count Name: Columbia Street West & Erbsville Road
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Turning Movement Peak Hour Data Plot (8:00 AM)

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Waterloo, Ontario, Canada N2J 1N8
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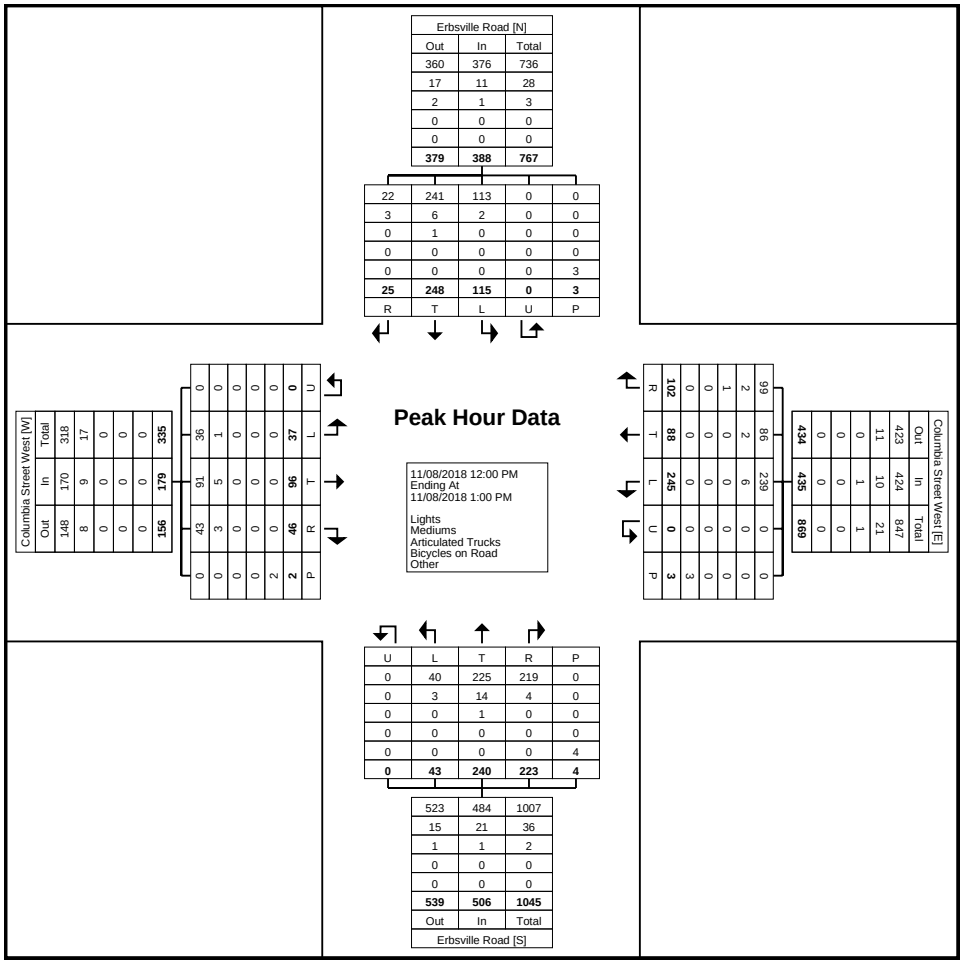
Count Name: Columbia Street West & Erbsville Road
Site Code:
Start Date: 11/08/2018

Turning Movement Peak Hour Data (12:00 PM)

Start Time	Columbia Street West Eastbound						Columbia Street West Westbound						Erbsville Road Northbound						Erbsville Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
12:00 PM	8	31	9	0	1	48	64	15	22	0	0	101	14	55	64	0	0	133	33	59	5	0	1	97	379
12:15 PM	9	22	8	0	0	39	64	29	26	0	0	119	8	54	44	0	0	106	30	75	9	0	0	114	378
12:30 PM	14	20	15	0	0	49	56	24	24	0	1	104	10	69	55	0	0	134	28	58	4	0	0	90	377
12:45 PM	6	23	14	0	1	43	61	20	30	0	2	111	11	62	60	0	4	133	24	56	7	0	2	87	374
Total	37	96	46	0	2	179	245	88	102	0	3	435	43	240	223	0	4	506	115	248	25	0	3	388	1508
Approach %	20.7	53.6	25.7	0.0	-	-	56.3	20.2	23.4	0.0	-	-	8.5	47.4	44.1	0.0	-	-	29.6	63.9	6.4	0.0	-	-	-
Total %	2.5	6.4	3.1	0.0	-	11.9	16.2	5.8	6.8	0.0	-	28.8	2.9	15.9	14.8	0.0	-	33.6	7.6	16.4	1.7	0.0	-	25.7	-
PHF	0.661	0.774	0.767	0.000	-	0.913	0.957	0.759	0.850	0.000	-	0.914	0.768	0.870	0.871	0.000	-	0.944	0.871	0.827	0.694	0.000	-	0.851	0.995
Lights	36	91	43	0	-	170	239	86	99	0	-	424	40	225	219	0	-	484	113	241	22	0	-	376	1454
% Lights	97.3	94.8	93.5	-	-	95.0	97.6	97.7	97.1	-	-	97.5	93.0	93.8	98.2	-	-	95.7	98.3	97.2	88.0	-	-	96.9	96.4
Mediums	1	5	3	0	-	9	6	2	2	0	-	10	3	14	4	0	-	21	2	6	3	0	-	11	51
% Mediums	2.7	5.2	6.5	-	-	5.0	2.4	2.3	2.0	-	-	2.3	7.0	5.8	1.8	-	-	4.2	1.7	2.4	12.0	-	-	2.8	3.4
Articulated Trucks	0	0	0	0	-	0	0	0	1	0	-	1	0	1	0	0	-	1	0	1	0	0	-	1	3
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	1.0	-	-	0.2	0.0	0.4	0.0	-	-	0.2	0.0	0.4	0.0	-	-	0.3	0.2
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	2	-	-	-	-	-	3	-	-	-	-	-	4	-	-	-	-	-	3	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

Paradigm Transportation Solutions Limited
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Turning Movement Peak Hour Data Plot (12:00 PM)

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Count Name: Columbia Street West & Erbsville Road
Site Code:
Start Date: 11/08/2018

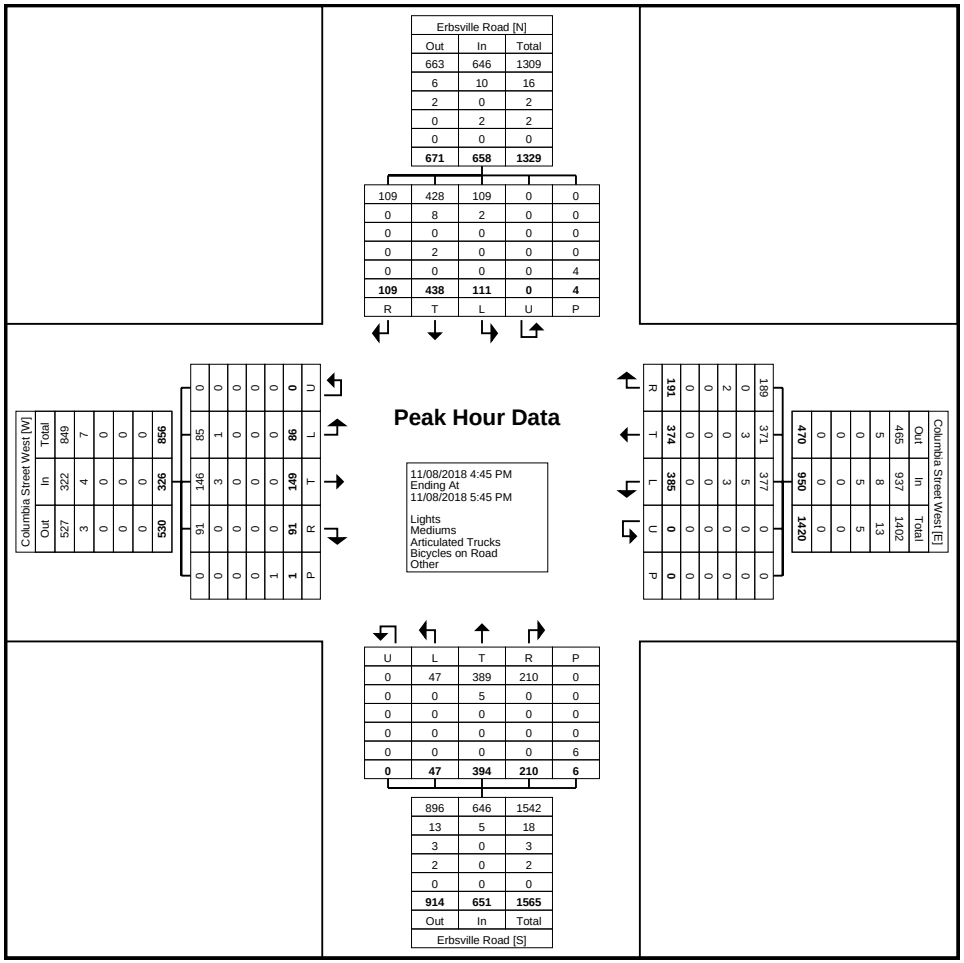
Turning Movement Peak Hour Data (4:45 PM)

Start Time	Columbia Street West Eastbound						Columbia Street West Westbound						Erbsville Road Northbound						Erbsville Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:45 PM	26	45	32	0	0	103	86	100	47	0	0	233	8	110	53	0	3	171	34	101	30	0	0	165	672
5:00 PM	23	30	25	0	0	78	102	93	50	0	0	245	10	95	50	0	1	155	19	130	32	0	0	181	659
5:15 PM	18	30	17	0	0	65	103	96	48	0	0	247	12	103	59	0	2	174	26	116	28	0	2	170	656
5:30 PM	19	44	17	0	1	80	94	85	46	0	0	225	17	86	48	0	0	151	32	91	19	0	2	142	598
Total	86	149	91	0	1	326	385	374	191	0	0	950	47	394	210	0	6	651	111	438	109	0	4	658	2585
Approach %	26.4	45.7	27.9	0.0	-	-	40.5	39.4	20.1	0.0	-	-	7.2	60.5	32.3	0.0	-	-	16.9	66.6	16.6	0.0	-	-	-
Total %	3.3	5.8	3.5	0.0	-	12.6	14.9	14.5	7.4	0.0	-	36.8	1.8	15.2	8.1	0.0	-	25.2	4.3	16.9	4.2	0.0	-	25.5	-
PHF	0.827	0.828	0.711	0.000	-	0.791	0.934	0.935	0.955	0.000	-	0.962	0.691	0.895	0.890	0.000	-	0.935	0.816	0.842	0.852	0.000	-	0.909	0.962
Lights	85	146	91	0	-	322	377	371	189	0	-	937	47	389	210	0	-	646	109	428	109	0	-	646	2551
% Lights	98.8	98.0	100.0	-	-	98.8	97.9	99.2	99.0	-	-	98.6	100.0	98.7	100.0	-	-	99.2	98.2	97.7	100.0	-	-	98.2	98.7
Mediums	1	3	0	0	-	4	5	3	0	0	-	8	0	5	0	0	-	5	2	8	0	0	-	10	27
% Mediums	1.2	2.0	0.0	-	-	1.2	1.3	0.8	0.0	-	-	0.8	0.0	1.3	0.0	-	-	0.8	1.8	1.8	0.0	-	-	1.5	1.0
Articulated Trucks	0	0	0	0	-	0	3	0	2	0	-	5	0	0	0	0	-	0	0	0	0	0	-	0	5
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.8	0.0	1.0	-	-	0.5	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.2
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	2	0	0	-	2	2
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.5	0.0	-	-	0.3	0.1
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	6	-	-	-	-	-	4	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

Paradigm Transportation Solutions Limited
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Count Name: Columbia Street West & Erbsville Road
Site Code:
Start Date: 11/08/2018



Turning Movement Peak Hour Data Plot (4:45 PM)

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Site Code:
Start Date: 11/08/2018

Paradigm Transportation Solutions Limited
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519-896-3163 cbowness@ptsl.com

Count Name: Erb Street West & Commercial Entrance (Beer/Shoppers) - Saturday
Site Code:
Start Date: 11/10/2018

Turning Movement Data

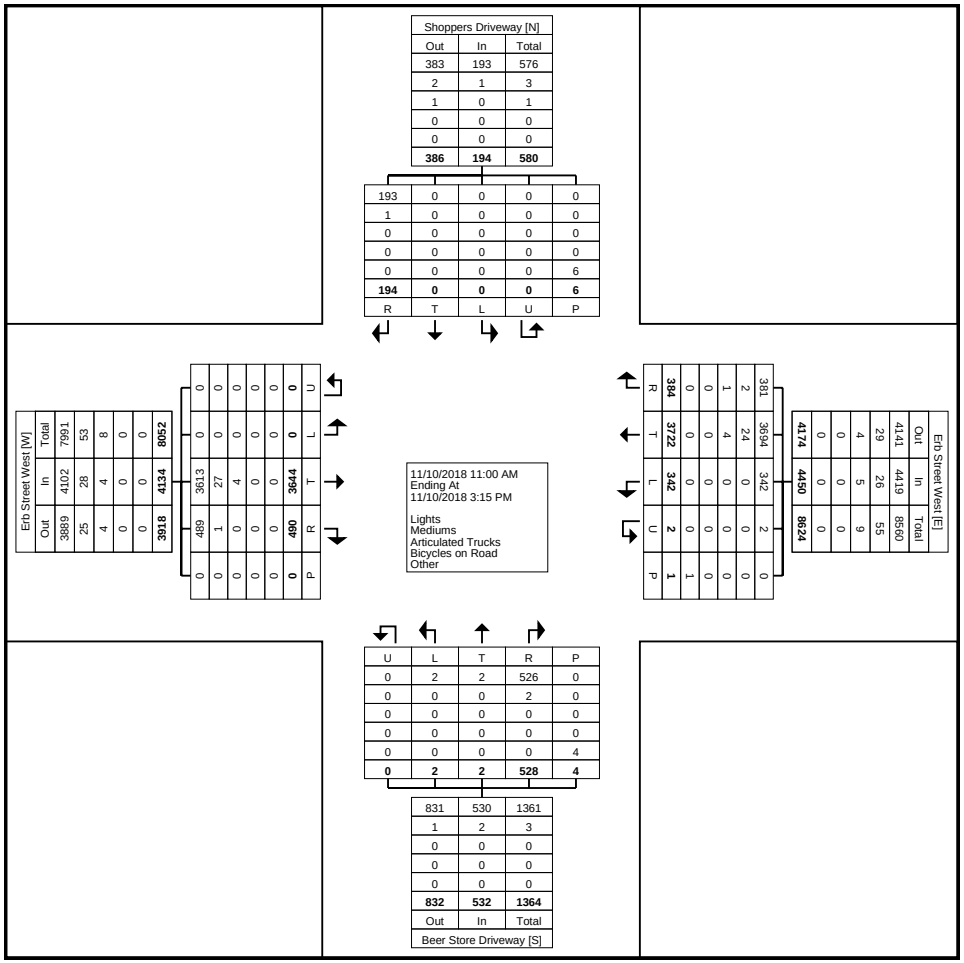
Start Time	Erb Street West Eastbound						Erb Street West Westbound						Beer Store Driveway Northbound						Shoppers Driveway Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
11:00 AM	0	211	34	0	0	245	19	240	17	0	0	276	0	0	26	0	0	26	0	0	13	0	1	13	560
11:15 AM	0	223	30	0	0	253	16	225	18	0	0	259	0	0	35	0	0	35	0	0	8	0	1	8	555
11:30 AM	0	242	29	0	0	271	12	226	34	0	0	272	0	0	23	0	0	23	0	0	14	0	1	14	580
11:45 AM	0	228	34	0	0	262	25	242	25	0	0	292	0	0	34	0	1	34	0	0	17	0	0	17	605
Hourly Total	0	904	127	0	0	1031	72	933	94	0	0	1099	0	0	118	0	1	118	0	0	52	0	3	52	2300
12:00 PM	0	240	24	0	0	264	27	233	21	1	0	282	0	1	29	0	0	30	0	0	16	0	0	16	592
12:15 PM	0	218	28	0	0	246	17	210	24	0	0	251	0	1	27	0	0	28	0	0	11	0	1	11	536
12:30 PM	0	237	30	0	0	267	24	236	28	1	0	289	1	0	32	0	0	33	0	0	17	0	0	17	606
12:45 PM	0	189	21	0	0	210	30	226	36	0	0	292	0	0	31	0	0	31	0	0	15	0	0	15	548
Hourly Total	0	884	103	0	0	987	98	905	109	2	0	1114	1	2	119	0	0	122	0	0	59	0	1	59	2282
1:00 PM	0	224	32	0	0	256	21	228	17	0	0	266	1	0	37	0	0	38	0	0	13	0	0	13	573
1:15 PM	0	226	33	0	0	259	24	245	24	0	0	293	0	0	42	0	1	42	0	0	10	0	0	10	604
1:30 PM	0	232	30	0	0	262	24	246	24	0	1	294	0	0	25	0	0	25	0	0	14	0	0	14	595
1:45 PM	0	235	35	0	0	270	27	226	26	0	0	279	0	0	41	0	0	41	0	0	8	0	0	8	598
Hourly Total	0	917	130	0	0	1047	96	945	91	0	1	1132	1	0	145	0	1	146	0	0	45	0	0	45	2370
2:00 PM	0	244	24	0	0	268	26	239	25	0	0	290	0	0	39	0	2	39	0	0	13	0	0	13	610
2:15 PM	0	232	40	0	0	272	25	244	24	0	0	293	0	0	38	0	0	38	0	0	8	0	1	8	611
2:30 PM	0	231	39	0	0	270	10	228	22	0	0	260	0	0	36	0	0	36	0	0	10	0	1	10	576
2:45 PM	0	232	27	0	0	259	15	228	19	0	0	262	0	0	33	0	0	33	0	0	7	0	0	7	561
Hourly Total	0	939	130	0	0	1069	76	939	90	0	0	1105	0	0	146	0	2	146	0	0	38	0	2	38	2358
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	3644	490	0	0	4134	342	3722	384	2	1	4450	2	2	528	0	4	532	0	0	194	0	6	194	9310
Approach %	0.0	88.1	11.9	0.0	-	-	7.7	83.6	8.6	0.0	-	-	0.4	0.4	99.2	0.0	-	-	0.0	0.0	100.0	0.0	-	-	-
Total %	0.0	39.1	5.3	0.0	-	44.4	3.7	40.0	4.1	0.0	-	47.8	0.0	0.0	5.7	0.0	-	5.7	0.0	0.0	2.1	0.0	-	2.1	-
Lights	0	3613	489	0	-	4102	342	3694	381	2	-	4419	2	2	526	0	-	530	0	0	193	0	-	193	9244
% Lights	-	99.1	99.8	-	-	99.2	100.0	99.2	99.2	100.0	-	99.3	100.0	100.0	99.6	-	-	99.6	-	-	99.5	-	-	99.5	99.3
Mediums	0	27	1	0	-	28	0	24	2	0	-	26	0	0	2	0	-	2	0	0	1	0	-	1	57
% Mediums	-	0.7	0.2	-	-	0.7	0.0	0.6	0.5	0.0	-	0.6	0.0	0.0	0.4	-	-	0.4	-	-	0.5	-	-	0.5	0.6
Articulated Trucks	0	4	0	0	-	4	0	4	1	0	-	5	0	0	0	0	-	0	0	0	0	0	-	0	9
% Articulated Trucks	-	0.1	0.0	-	-	0.1	0.0	0.1	0.3	0.0	-	0.1	0.0	0.0	0.0	-	-	0.0	-	-	0.0	-	-	0.0	0.1
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	-	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	-	-	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	4	-	-	-	-	-	6	-	-

% Pedestrians	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

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Count Name: Erb Street West & Commercial Entrance (Beer/Shoppers) - Saturday
Site Code:
Start Date: 11/10/2018



Turning Movement Data Plot

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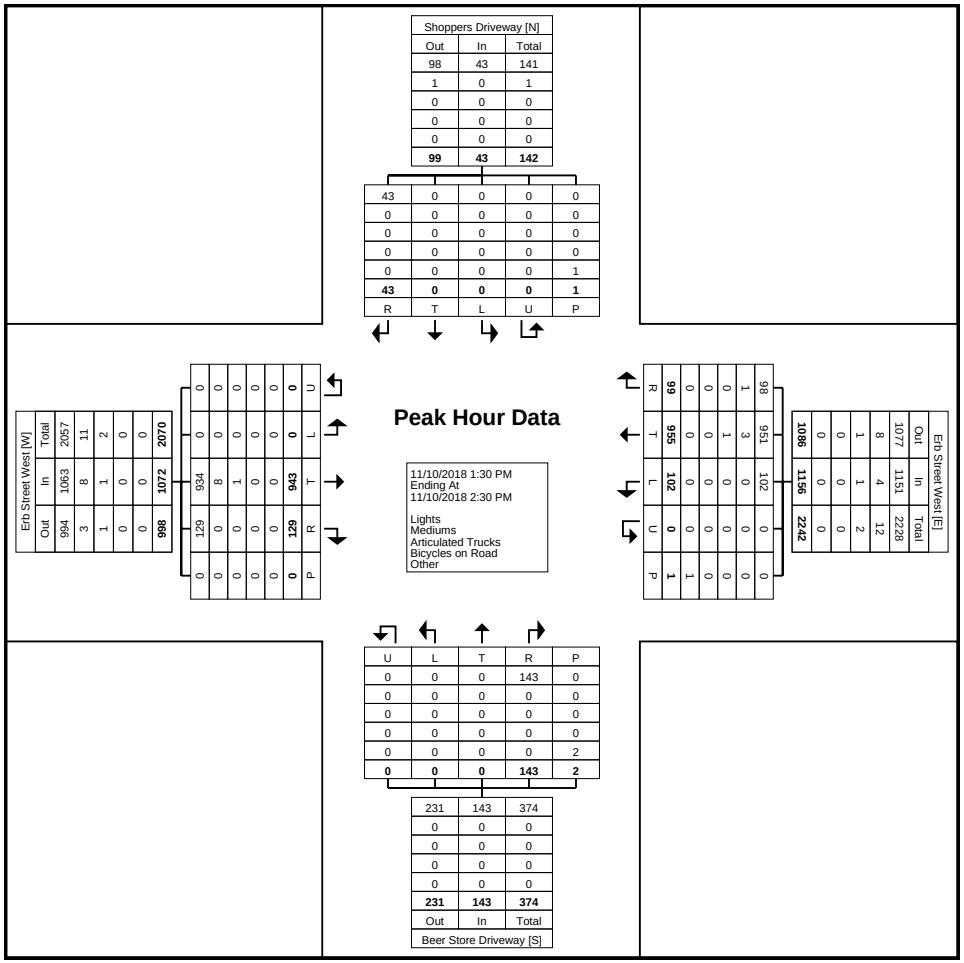
Turning Movement Peak Hour Data (1:30 PM)

Start Time	Erb Street West Eastbound						Erb Street West Westbound						Beer Store Driveway Northbound						Shoppers Driveway Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
1:30 PM	0	232	30	0	0	262	24	246	24	0	1	294	0	0	25	0	0	25	0	0	14	0	0	14	595
1:45 PM	0	235	35	0	0	270	27	226	26	0	0	279	0	0	41	0	0	41	0	0	8	0	0	8	598
2:00 PM	0	244	24	0	0	268	26	239	25	0	0	290	0	0	39	0	2	39	0	0	13	0	0	13	610
2:15 PM	0	232	40	0	0	272	25	244	24	0	0	293	0	0	38	0	0	38	0	0	8	0	1	8	611
Total	0	943	129	0	0	1072	102	955	99	0	1	1156	0	0	143	0	2	143	0	0	43	0	1	43	2414
Approach %	0.0	88.0	12.0	0.0	-	-	8.8	82.6	8.6	0.0	-	-	0.0	0.0	100.0	0.0	-	-	0.0	0.0	100.0	0.0	-	-	-
Total %	0.0	39.1	5.3	0.0	-	44.4	4.2	39.6	4.1	0.0	-	47.9	0.0	0.0	5.9	0.0	-	5.9	0.0	0.0	1.8	0.0	-	1.8	-
PHF	0.000	0.966	0.806	0.000	-	0.985	0.944	0.971	0.952	0.000	-	0.983	0.000	0.000	0.872	0.000	-	0.872	0.000	0.000	0.768	0.000	-	0.768	0.988
Lights	0	934	129	0	-	1063	102	951	98	0	-	1151	0	0	143	0	-	143	0	0	43	0	-	43	2400
% Lights	-	99.0	100.0	-	-	99.2	100.0	99.6	99.0	-	-	99.6	-	-	100.0	-	-	100.0	-	-	100.0	-	-	100.0	99.4
Mediums	0	8	0	0	-	8	0	3	1	0	-	4	0	0	0	0	-	0	0	0	0	0	-	0	12
% Mediums	-	0.8	0.0	-	-	0.7	0.0	0.3	1.0	-	-	0.3	-	-	0.0	-	-	0.0	-	-	0.0	-	-	0.0	0.5
Articulated Trucks	0	1	0	0	-	1	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	2
% Articulated Trucks	-	0.1	0.0	-	-	0.1	0.0	0.1	0.0	-	-	0.1	-	-	0.0	-	-	0.0	-	-	0.0	-	-	0.0	0.1
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	-	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	-	-	0.0	-	-	0.0	-	-	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

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Site Code:
Start Date: 11/10/2018



Turning Movement Peak Hour Data Plot (1:30 PM)

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Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Erb Street West & Commercial Entrance (Beer/Shoppers) - Saturday
Site Code:
Start Date: 11/10/2018

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Erb Street West & Commercial Entrance (Beer/Shoppers)
Site Code:
Start Date: 11/08/2018

Turning Movement Data

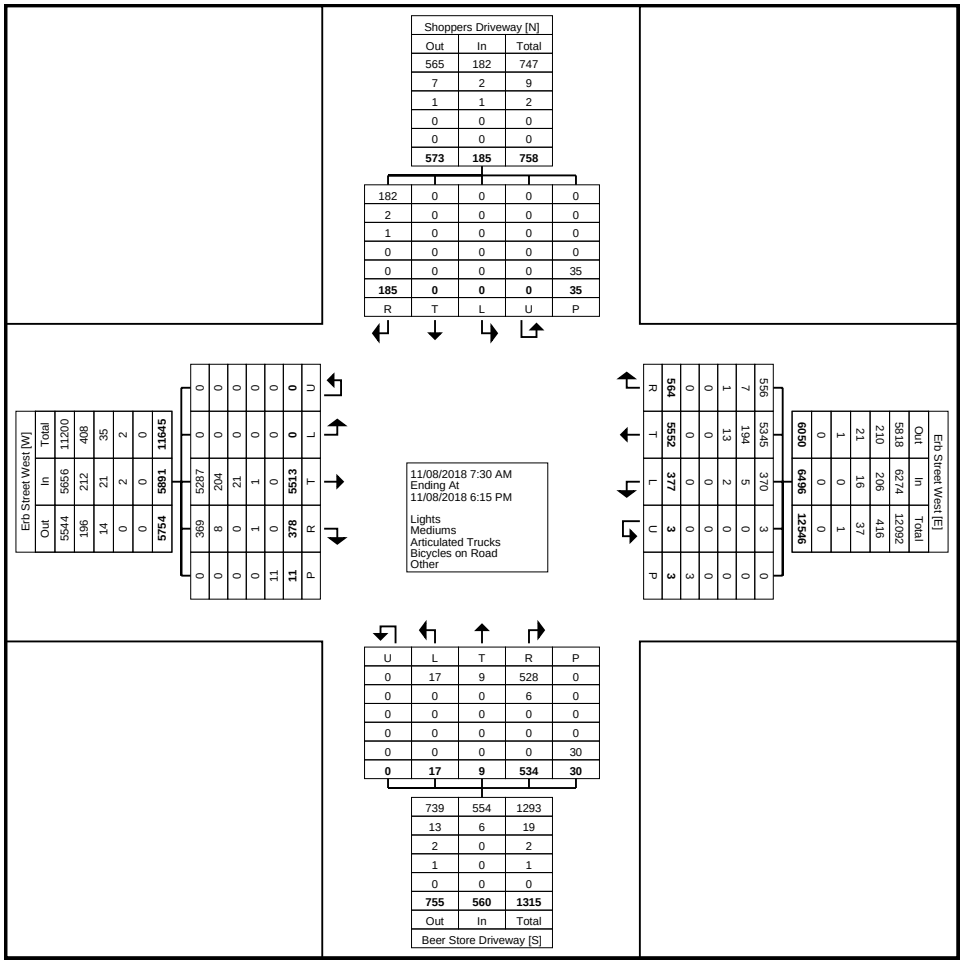
Start Time	Erb Street West Eastbound						Erb Street West Westbound						Beer Store Driveway Northbound						Shoppers Driveway Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:30 AM	0	143	1	0	0	144	3	98	8	0	0	109	0	0	2	0	0	2	0	0	3	0	0	3	258
7:45 AM	0	163	0	0	0	163	2	94	14	0	0	110	0	0	3	0	0	3	0	0	3	0	0	3	279
Hourly Total	0	306	1	0	0	307	5	192	22	0	0	219	0	0	5	0	0	5	0	0	6	0	0	6	537
8:00 AM	0	200	1	0	0	201	3	103	9	0	0	115	1	0	2	0	0	3	0	0	3	0	0	3	322
8:15 AM	0	194	0	0	0	194	2	107	14	0	0	123	0	1	1	0	0	2	0	0	3	0	0	3	322
8:30 AM	0	204	4	0	0	208	4	95	12	0	0	111	0	0	4	0	0	4	0	0	5	0	0	5	328
8:45 AM	0	156	8	0	1	164	6	103	13	0	0	122	0	0	5	0	0	5	0	0	2	0	0	2	293
Hourly Total	0	754	13	0	1	767	15	408	48	0	0	471	1	1	12	0	0	14	0	0	13	0	0	13	1265
9:00 AM	0	135	6	0	0	141	6	76	22	0	0	104	0	0	7	0	1	7	0	0	1	0	0	1	253
9:15 AM	0	152	7	0	1	159	13	115	17	0	0	145	0	0	8	0	0	8	0	0	7	0	0	7	319
9:30 AM	0	124	12	0	0	136	12	141	21	0	0	174	1	0	12	0	0	13	0	0	4	0	0	4	327
9:45 AM	0	106	10	0	0	116	8	179	11	0	0	198	2	2	9	0	0	13	0	0	5	0	0	5	332
Hourly Total	0	517	35	0	1	552	39	511	71	0	0	621	3	2	36	0	1	41	0	0	17	0	0	17	1231
10:00 AM	0	116	5	0	0	121	5	195	15	1	0	216	0	0	14	0	1	14	0	0	11	0	0	11	362
10:15 AM	0	161	11	0	0	172	9	171	17	0	0	197	0	0	10	0	0	10	0	0	6	0	0	6	385
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	277	16	0	0	293	14	366	32	1	0	413	0	0	24	0	1	24	0	0	17	0	0	17	747
12:00 PM	0	173	20	0	0	193	15	194	16	0	0	225	0	1	22	0	4	23	0	0	12	0	0	12	453
12:15 PM	0	183	20	0	0	203	7	185	21	0	0	213	0	0	18	0	2	18	0	0	3	0	2	3	437
12:30 PM	0	180	11	0	0	191	16	169	17	0	0	202	0	0	22	0	1	22	0	0	10	0	0	10	425
12:45 PM	0	193	13	0	0	206	15	200	21	0	0	236	0	1	23	0	0	24	0	0	6	0	0	6	472
Hourly Total	0	729	64	0	0	793	53	748	75	0	0	876	0	2	85	0	7	87	0	0	31	0	2	31	1787
1:00 PM	0	136	23	0	5	159	13	174	18	0	0	205	1	0	22	0	5	23	0	0	6	0	6	6	393
1:15 PM	0	169	22	0	0	191	16	183	19	0	0	218	3	0	23	0	1	26	0	0	7	0	7	7	442
1:30 PM	0	181	15	0	0	196	14	177	22	0	0	213	1	0	20	0	0	21	0	0	9	0	1	9	439
1:45 PM	0	182	20	0	3	202	10	158	18	0	1	186	2	0	20	0	4	22	0	0	6	0	3	6	416
Hourly Total	0	668	80	0	8	748	53	692	77	0	1	822	7	0	85	0	10	92	0	0	28	0	17	28	1690
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	0	171	14	0	0	185	13	171	20	0	0	204	0	2	23	0	0	25	0	0	10	0	0	10	424
3:15 PM	0	162	10	0	0	172	12	194	25	0	1	231	1	0	19	0	0	20	0	0	10	0	1	10	433
3:30 PM	0	189	16	0	0	205	16	184	21	0	0	221	4	0	11	0	4	15	0	0	2	0	1	2	443
3:45 PM	0	189	11	0	0	200	15	197	21	0	0	233	1	0	21	0	1	22	0	0	3	0	0	3	458
Hourly Total	0	711	51	0	0	762	56	746	87	0	1	889	6	2	74	0	5	82	0	0	25	0	2	25	1758
4:00 PM	0	171	11	0	0	182	17	225	17	0	0	259	0	0	27	0	0	27	0	0	5	0	2	5	473
4:15 PM	0	188	12	0	0	200	19	253	28	0	0	300	0	1	16	0	0	17	0	0	7	0	1	7	524

4:30 PM	0	213	25	0	0	238	22	216	19	0	0	257	0	1	26	0	1	27	0	0	7	0	0	7	529
4:45 PM	0	184	11	0	0	195	23	235	25	0	0	283	0	0	40	0	1	40	0	0	6	0	1	6	524
Hourly Total	0	756	59	0	0	815	81	929	89	0	0	1099	0	2	109	0	2	111	0	0	25	0	4	25	2050
5:00 PM	0	211	21	0	1	232	19	257	22	0	0	298	0	0	21	0	2	21	0	0	7	0	1	7	558
5:15 PM	0	199	15	0	0	214	17	275	12	1	1	305	0	0	31	0	0	31	0	0	6	0	1	6	556
5:30 PM	0	219	14	0	0	233	16	204	14	0	0	234	0	0	30	0	1	30	0	0	4	0	8	4	501
5:45 PM	0	166	9	0	0	175	9	224	15	1	0	249	0	0	22	0	1	22	0	0	6	0	0	6	452
Hourly Total	0	795	59	0	1	854	61	960	63	2	1	1086	0	0	104	0	4	104	0	0	23	0	10	23	2067
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	5513	378	0	11	5891	377	5552	564	3	3	6496	17	9	534	0	30	560	0	0	185	0	35	185	13132
Approach %	0.0	93.6	6.4	0.0	-	-	5.8	85.5	8.7	0.0	-	-	3.0	1.6	95.4	0.0	-	-	0.0	0.0	100.0	0.0	-	-	-
Total %	0.0	42.0	2.9	0.0	-	44.9	2.9	42.3	4.3	0.0	-	49.5	0.1	0.1	4.1	0.0	-	4.3	0.0	0.0	1.4	0.0	-	1.4	-
Lights	0	5287	369	0	-	5656	370	5345	556	3	-	6274	17	9	528	0	-	554	0	0	182	0	-	182	12666
% Lights	-	95.9	97.6	-	-	96.0	98.1	96.3	98.6	100.0	-	96.6	100.0	100.0	98.9	-	-	98.9	-	-	98.4	-	-	98.4	96.5
Mediums	0	204	8	0	-	212	5	194	7	0	-	206	0	0	6	0	-	6	0	0	2	0	-	2	426
% Mediums	-	3.7	2.1	-	-	3.6	1.3	3.5	1.2	0.0	-	3.2	0.0	0.0	1.1	-	-	1.1	-	-	1.1	-	-	1.1	3.2
Articulated Trucks	0	21	0	0	-	21	2	13	1	0	-	16	0	0	0	0	-	0	0	0	1	0	-	1	38
% Articulated Trucks	-	0.4	0.0	-	-	0.4	0.5	0.2	0.2	0.0	-	0.2	0.0	0.0	0.0	-	-	0.0	-	-	0.5	-	-	0.5	0.3
Bicycles on Road	0	1	1	0	-	2	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	2
% Bicycles on Road	-	0.0	0.3	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	-	-	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	11	-	-	-	-	-	3	-	-	-	-	-	30	-	-	-	-	-	35	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

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Count Name: Erb Street West & Commercial Entrance (Beer/Shoppers)
Site Code:
Start Date: 11/08/2018



Turning Movement Data Plot

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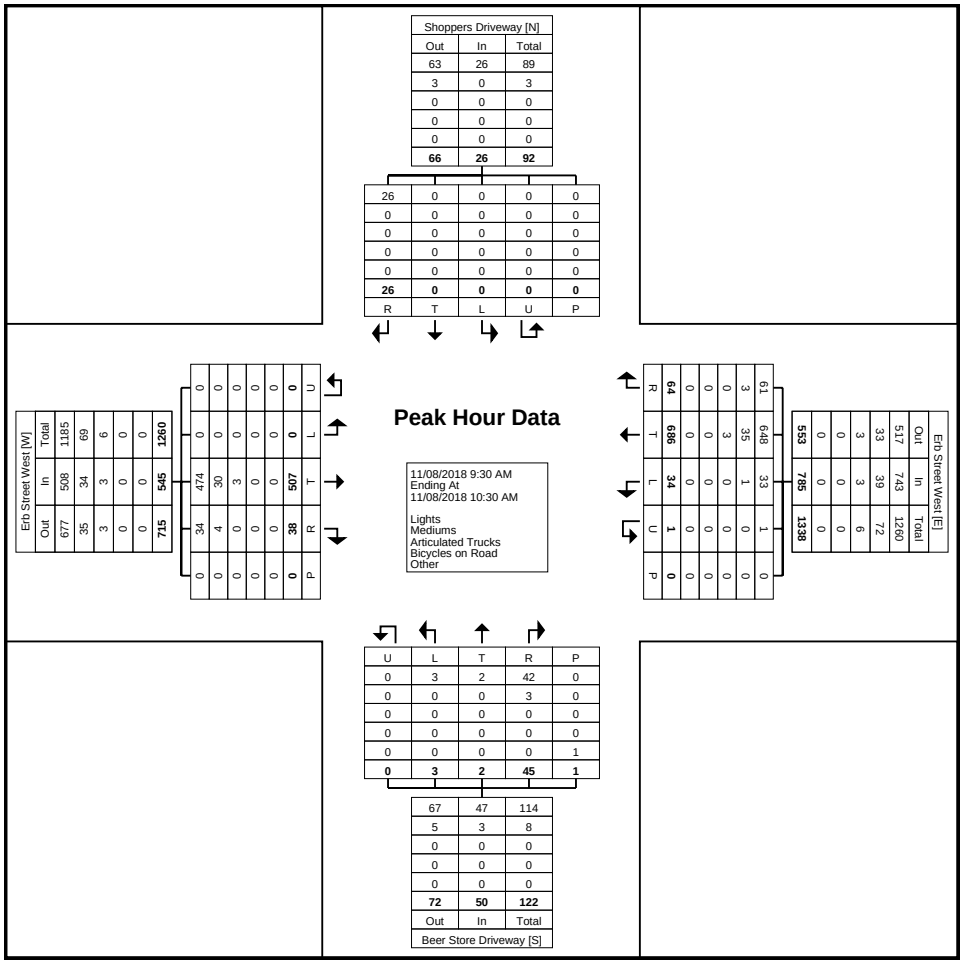
Turning Movement Peak Hour Data (9:30 AM)

Start Time	Erb Street West Eastbound						Erb Street West Westbound						Beer Store Driveway Northbound						Shoppers Driveway Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
9:30 AM	0	124	12	0	0	136	12	141	21	0	0	174	1	0	12	0	0	13	0	0	4	0	0	4	327
9:45 AM	0	106	10	0	0	116	8	179	11	0	0	198	2	2	9	0	0	13	0	0	5	0	0	5	332
10:00 AM	0	116	5	0	0	121	5	195	15	1	0	216	0	0	14	0	1	14	0	0	11	0	0	11	362
10:15 AM	0	161	11	0	0	172	9	171	17	0	0	197	0	0	10	0	0	10	0	0	6	0	0	6	385
Total	0	507	38	0	0	545	34	686	64	1	0	785	3	2	45	0	1	50	0	0	26	0	0	26	1406
Approach %	0.0	93.0	7.0	0.0	-	-	4.3	87.4	8.2	0.1	-	-	6.0	4.0	90.0	0.0	-	-	0.0	0.0	100.0	0.0	-	-	-
Total %	0.0	36.1	2.7	0.0	-	38.8	2.4	48.8	4.6	0.1	-	55.8	0.2	0.1	3.2	0.0	-	3.6	0.0	0.0	1.8	0.0	-	1.8	-
PHF	0.000	0.787	0.792	0.000	-	0.792	0.708	0.879	0.762	0.250	-	0.909	0.375	0.250	0.804	0.000	-	0.893	0.000	0.000	0.591	0.000	-	0.591	0.913
Lights	0	474	34	0	-	508	33	648	61	1	-	743	3	2	42	0	-	47	0	0	26	0	-	26	1324
% Lights	-	93.5	89.5	-	-	93.2	97.1	94.5	95.3	100.0	-	94.6	100.0	100.0	93.3	-	-	94.0	-	-	100.0	-	-	100.0	94.2
Mediums	0	30	4	0	-	34	1	35	3	0	-	39	0	0	3	0	-	3	0	0	0	0	-	0	76
% Mediums	-	5.9	10.5	-	-	6.2	2.9	5.1	4.7	0.0	-	5.0	0.0	0.0	6.7	-	-	6.0	-	-	0.0	-	-	0.0	5.4
Articulated Trucks	0	3	0	0	-	3	0	3	0	0	-	3	0	0	0	0	-	0	0	0	0	0	-	0	6
% Articulated Trucks	-	0.6	0.0	-	-	0.6	0.0	0.4	0.0	0.0	-	0.4	0.0	0.0	0.0	-	-	0.0	-	-	0.0	-	-	0.0	0.4
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	-	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	-	-	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-

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Count Name: Erb Street West & Commercial Entrance (Beer/Shoppers)
Site Code:
Start Date: 11/08/2018



Turning Movement Peak Hour Data Plot (9:30 AM)

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Count Name: Erb Street West & Commercial Entrance (Beer/Shoppers)
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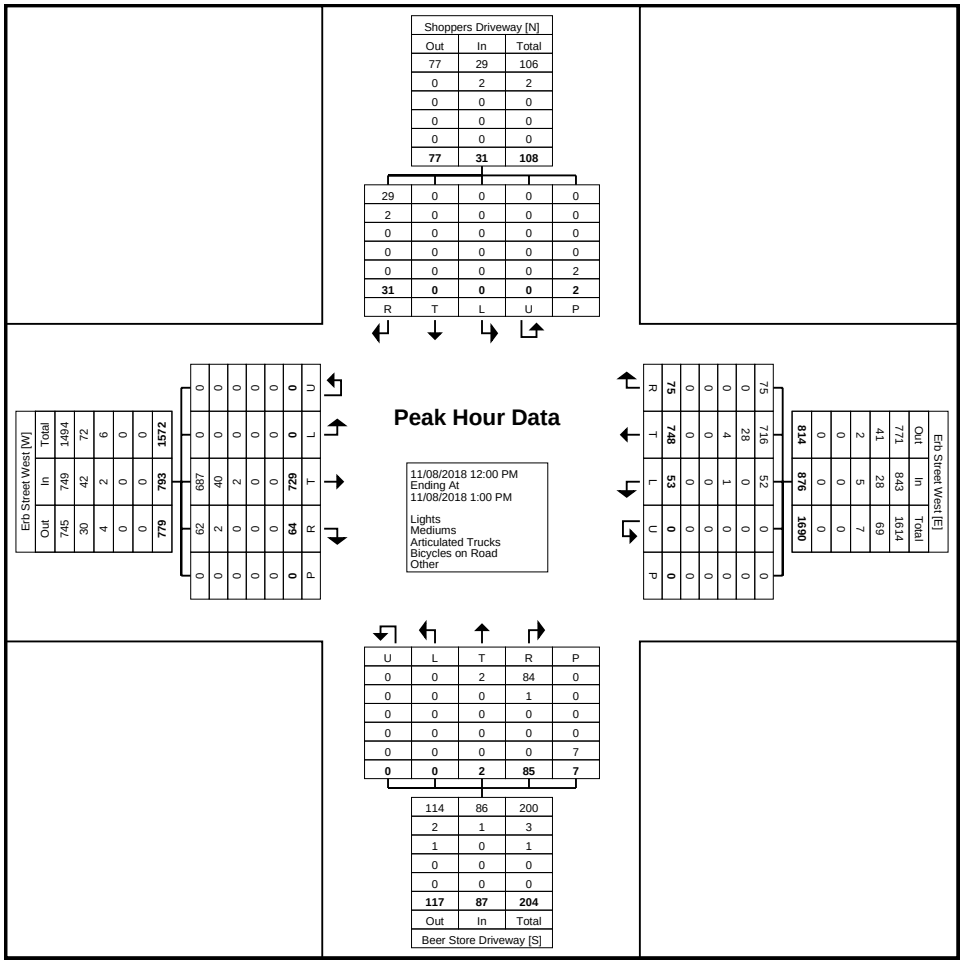
Turning Movement Peak Hour Data (12:00 PM)

Start Time	Erb Street West Eastbound						Erb Street West Westbound						Beer Store Driveway Northbound						Shoppers Driveway Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
12:00 PM	0	173	20	0	0	193	15	194	16	0	0	225	0	1	22	0	4	23	0	0	12	0	0	12	453
12:15 PM	0	183	20	0	0	203	7	185	21	0	0	213	0	0	18	0	2	18	0	0	3	0	2	3	437
12:30 PM	0	180	11	0	0	191	16	169	17	0	0	202	0	0	22	0	1	22	0	0	10	0	0	10	425
12:45 PM	0	193	13	0	0	206	15	200	21	0	0	236	0	1	23	0	0	24	0	0	6	0	0	6	472
Total	0	729	64	0	0	793	53	748	75	0	0	876	0	2	85	0	7	87	0	0	31	0	2	31	1787
Approach %	0.0	91.9	8.1	0.0	-	-	6.1	85.4	8.6	0.0	-	-	0.0	2.3	97.7	0.0	-	-	0.0	0.0	100.0	0.0	-	-	-
Total %	0.0	40.8	3.6	0.0	-	44.4	3.0	41.9	4.2	0.0	-	49.0	0.0	0.1	4.8	0.0	-	4.9	0.0	0.0	1.7	0.0	-	1.7	-
PHF	0.000	0.944	0.800	0.000	-	0.962	0.828	0.935	0.893	0.000	-	0.928	0.000	0.500	0.924	0.000	-	0.906	0.000	0.000	0.646	0.000	-	0.646	0.947
Lights	0	687	62	0	-	749	52	716	75	0	-	843	0	2	84	0	-	86	0	0	29	0	-	29	1707
% Lights	-	94.2	96.9	-	-	94.5	98.1	95.7	100.0	-	-	96.2	-	100.0	98.8	-	-	98.9	-	-	93.5	-	-	93.5	95.5
Mediums	0	40	2	0	-	42	0	28	0	0	-	28	0	0	1	0	-	1	0	0	2	0	-	2	73
% Mediums	-	5.5	3.1	-	-	5.3	0.0	3.7	0.0	-	-	3.2	-	0.0	1.2	-	-	1.1	-	-	6.5	-	-	6.5	4.1
Articulated Trucks	0	2	0	0	-	2	1	4	0	0	-	5	0	0	0	0	-	0	0	0	0	0	-	0	7
% Articulated Trucks	-	0.3	0.0	-	-	0.3	1.9	0.5	0.0	-	-	0.6	-	0.0	0.0	-	-	0.0	-	-	0.0	-	-	0.0	0.4
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	-	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	-	0.0	0.0	-	-	0.0	-	-	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	7	-	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

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Site Code:
Start Date: 11/08/2018



Turning Movement Peak Hour Data Plot (12:00 PM)

Paradigm Transportation Solutions Limited
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Count Name: Erb Street West & Commercial Entrance (Beer/Shoppers)
Site Code:
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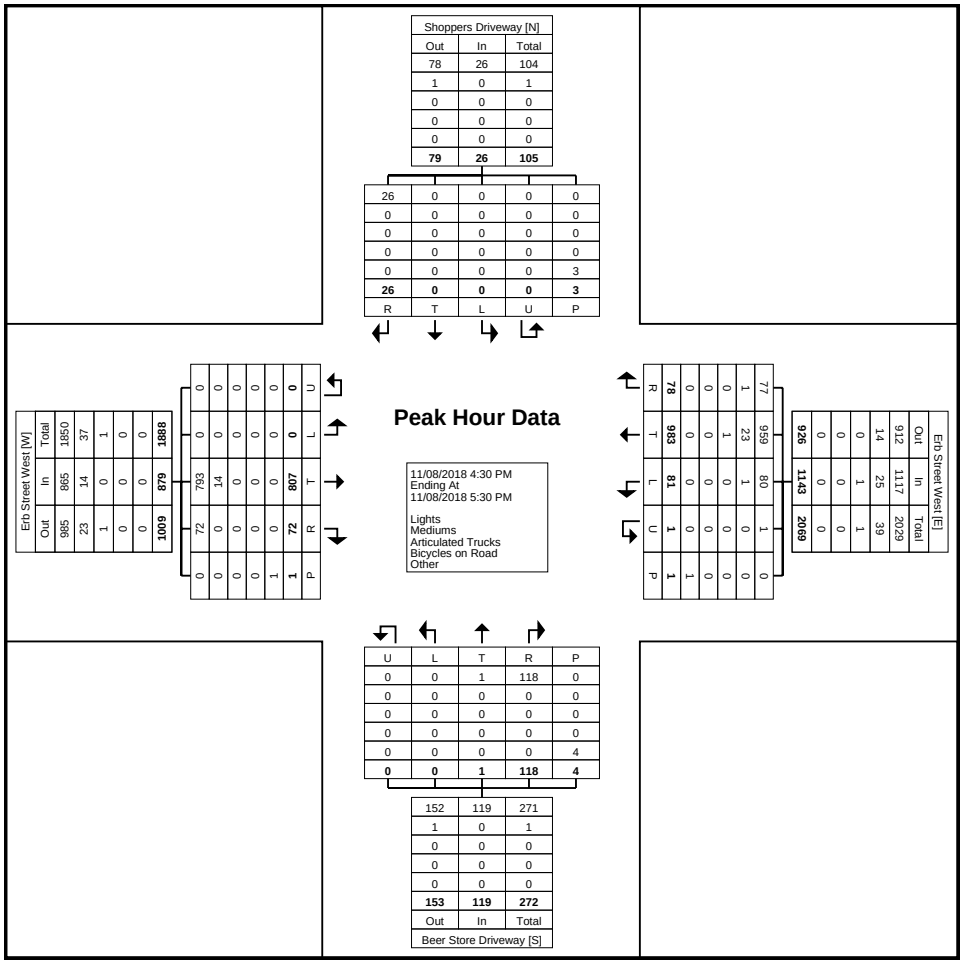
Turning Movement Peak Hour Data (4:30 PM)

Start Time	Erb Street West Eastbound						Erb Street West Westbound						Beer Store Driveway Northbound						Shoppers Driveway Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:30 PM	0	213	25	0	0	238	22	216	19	0	0	257	0	1	26	0	1	27	0	0	7	0	0	7	529
4:45 PM	0	184	11	0	0	195	23	235	25	0	0	283	0	0	40	0	1	40	0	0	6	0	1	6	524
5:00 PM	0	211	21	0	1	232	19	257	22	0	0	298	0	0	21	0	2	21	0	0	7	0	1	7	558
5:15 PM	0	199	15	0	0	214	17	275	12	1	1	305	0	0	31	0	0	31	0	0	6	0	1	6	556
Total	0	807	72	0	1	879	81	983	78	1	1	1143	0	1	118	0	4	119	0	0	26	0	3	26	2167
Approach %	0.0	91.8	8.2	0.0	-	-	7.1	86.0	6.8	0.1	-	-	0.0	0.8	99.2	0.0	-	-	0.0	0.0	100.0	0.0	-	-	-
Total %	0.0	37.2	3.3	0.0	-	40.6	3.7	45.4	3.6	0.0	-	52.7	0.0	0.0	5.4	0.0	-	5.5	0.0	0.0	1.2	0.0	-	1.2	-
PHF	0.000	0.947	0.720	0.000	-	0.923	0.880	0.894	0.780	0.250	-	0.937	0.000	0.250	0.738	0.000	-	0.744	0.000	0.000	0.929	0.000	-	0.929	0.971
Lights	0	793	72	0	-	865	80	959	77	1	-	1117	0	1	118	0	-	119	0	0	26	0	-	26	2127
% Lights	-	98.3	100.0	-	-	98.4	98.8	97.6	98.7	100.0	-	97.7	-	100.0	100.0	-	-	100.0	-	-	100.0	-	-	100.0	98.2
Mediums	0	14	0	0	-	14	1	23	1	0	-	25	0	0	0	0	-	0	0	0	0	0	-	0	39
% Mediums	-	1.7	0.0	-	-	1.6	1.2	2.3	1.3	0.0	-	2.2	-	0.0	0.0	-	-	0.0	-	-	0.0	-	-	0.0	1.8
Articulated Trucks	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	1
% Articulated Trucks	-	0.0	0.0	-	-	0.0	0.0	0.1	0.0	0.0	-	0.1	-	0.0	0.0	-	-	0.0	-	-	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	-	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	-	0.0	0.0	-	-	0.0	-	-	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	4	-	-	-	-	-	3	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Erb Street West & Commercial Entrance (Beer/Shoppers)
Site Code:
Start Date: 11/08/2018



Turning Movement Peak Hour Data Plot (4:30 PM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
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Count Name: Erb Street West & Commercial Entrance (Beer/Shoppers)
Site Code:
Start Date: 11/08/2018

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Erb Street West & Commercial Entrance (BMO) - Saturday
Site Code:
Start Date: 11/10/2018

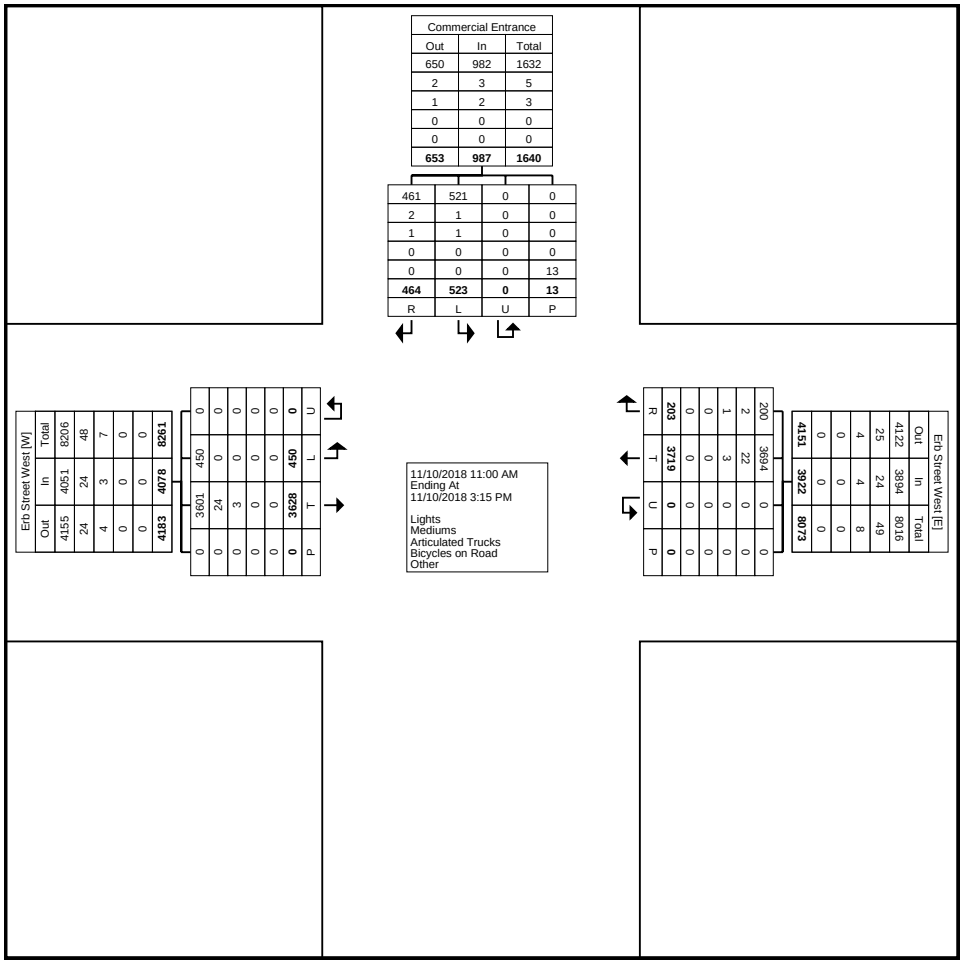
Turning Movement Data

Start Time	Erb Street West Eastbound					Erb Street West Westbound					Commercial Entrance BMO Southbound					Int. Total
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
11:00 AM	29	215	0	0	244	242	13	0	0	255	32	26	0	4	58	557
11:15 AM	20	220	0	0	240	228	13	0	0	241	32	34	0	2	66	547
11:30 AM	25	243	0	0	268	220	18	0	0	238	30	30	0	1	60	566
11:45 AM	30	224	0	0	254	234	14	0	0	248	36	33	0	0	69	571
Hourly Total	104	902	0	0	1006	924	58	0	0	982	130	123	0	7	253	2241
12:00 PM	29	241	0	0	270	243	15	0	0	258	27	23	0	1	50	578
12:15 PM	34	212	0	0	246	215	6	0	0	221	35	28	0	1	63	530
12:30 PM	25	235	0	0	260	233	22	0	0	255	30	32	0	0	62	577
12:45 PM	22	186	0	0	208	235	16	0	0	251	29	27	0	1	56	515
Hourly Total	110	874	0	0	984	926	59	0	0	985	121	110	0	3	231	2200
1:00 PM	27	231	0	0	258	222	12	0	0	234	28	27	0	0	55	547
1:15 PM	34	226	0	0	260	248	6	0	0	254	34	29	0	0	63	577
1:30 PM	31	225	0	0	256	244	15	0	0	259	31	35	0	0	66	581
1:45 PM	34	237	0	0	271	226	13	0	0	239	40	29	0	0	69	579
Hourly Total	126	919	0	0	1045	940	46	0	0	986	133	120	0	0	253	2284
2:00 PM	22	232	0	0	254	241	10	0	0	251	37	29	0	2	66	571
2:15 PM	27	235	0	0	262	238	13	0	0	251	40	33	0	1	73	586
2:30 PM	31	227	0	0	258	229	9	0	0	238	41	18	0	0	59	555
2:45 PM	30	239	0	0	269	221	8	0	0	229	21	31	0	0	52	550
Hourly Total	110	933	0	0	1043	929	40	0	0	969	139	111	0	3	250	2262
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	450	3628	0	0	4078	3719	203	0	0	3922	523	464	0	13	987	8987
Approach %	11.0	89.0	0.0	-	-	94.8	5.2	0.0	-	-	53.0	47.0	0.0	-	-	-
Total %	5.0	40.4	0.0	-	45.4	41.4	2.3	0.0	-	43.6	5.8	5.2	0.0	-	11.0	-
Lights	450	3601	0	-	4051	3694	200	0	-	3894	521	461	0	-	982	8927
% Lights	100.0	99.3	-	-	99.3	99.3	98.5	-	-	99.3	99.6	99.4	-	-	99.5	99.3
Mediums	0	24	0	-	24	22	2	0	-	24	1	2	0	-	3	51
% Mediums	0.0	0.7	-	-	0.6	0.6	1.0	-	-	0.6	0.2	0.4	-	-	0.3	0.6
Articulated Trucks	0	3	0	-	3	3	1	0	-	4	1	1	0	-	2	9
% Articulated Trucks	0.0	0.1	-	-	0.1	0.1	0.5	-	-	0.1	0.2	0.2	-	-	0.2	0.1
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	13	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

Paradigm Transportation Solutions Limited
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Count Name: Erb Street West & Commercial Entrance (BMO) - Saturday
Site Code:
Start Date: 11/10/2018



Turning Movement Data Plot

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Count Name: Erb Street West & Commercial Entrance (BMO) - Saturday
Site Code:
Start Date: 11/10/2018

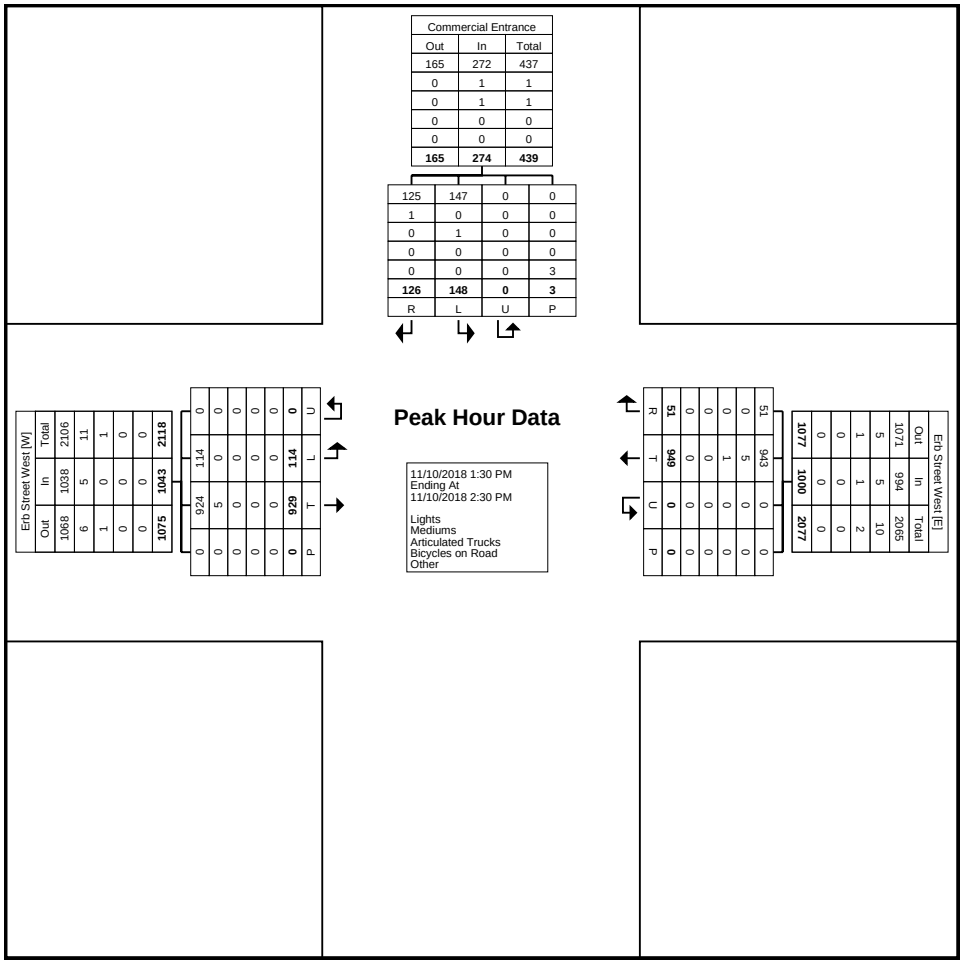
Turning Movement Peak Hour Data (1:30 PM)

Start Time	Erb Street West Eastbound					Erb Street West Westbound					Commercial Entrance BMO Southbound					
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	Int. Total
1:30 PM	31	225	0	0	256	244	15	0	0	259	31	35	0	0	66	581
1:45 PM	34	237	0	0	271	226	13	0	0	239	40	29	0	0	69	579
2:00 PM	22	232	0	0	254	241	10	0	0	251	37	29	0	2	66	571
2:15 PM	27	235	0	0	262	238	13	0	0	251	40	33	0	1	73	586
Total	114	929	0	0	1043	949	51	0	0	1000	148	126	0	3	274	2317
Approach %	10.9	89.1	0.0	-	-	94.9	5.1	0.0	-	-	54.0	46.0	0.0	-	-	-
Total %	4.9	40.1	0.0	-	45.0	41.0	2.2	0.0	-	43.2	6.4	5.4	0.0	-	11.8	-
PHF	0.838	0.980	0.000	-	0.962	0.972	0.850	0.000	-	0.965	0.925	0.900	0.000	-	0.938	0.988
Lights	114	924	0	-	1038	943	51	0	-	994	147	125	0	-	272	2304
% Lights	100.0	99.5	-	-	99.5	99.4	100.0	-	-	99.4	99.3	99.2	-	-	99.3	99.4
Mediums	0	5	0	-	5	5	0	0	-	5	0	1	0	-	1	11
% Mediums	0.0	0.5	-	-	0.5	0.5	0.0	-	-	0.5	0.0	0.8	-	-	0.4	0.5
Articulated Trucks	0	0	0	-	0	1	0	0	-	1	1	0	0	-	1	2
% Articulated Trucks	0.0	0.0	-	-	0.0	0.1	0.0	-	-	0.1	0.7	0.0	-	-	0.4	0.1
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	3	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

Paradigm Transportation Solutions Limited
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Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Erb Street West & Commercial Entrance (BMO) - Saturday
Site Code:
Start Date: 11/10/2018



Turning Movement Peak Hour Data Plot (1:30 PM)

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Site Code:
Start Date: 11/10/2018

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Count Name: Erb Street West & Commercial Entrance (BMO)
Site Code:
Start Date: 11/08/2018

Turning Movement Data

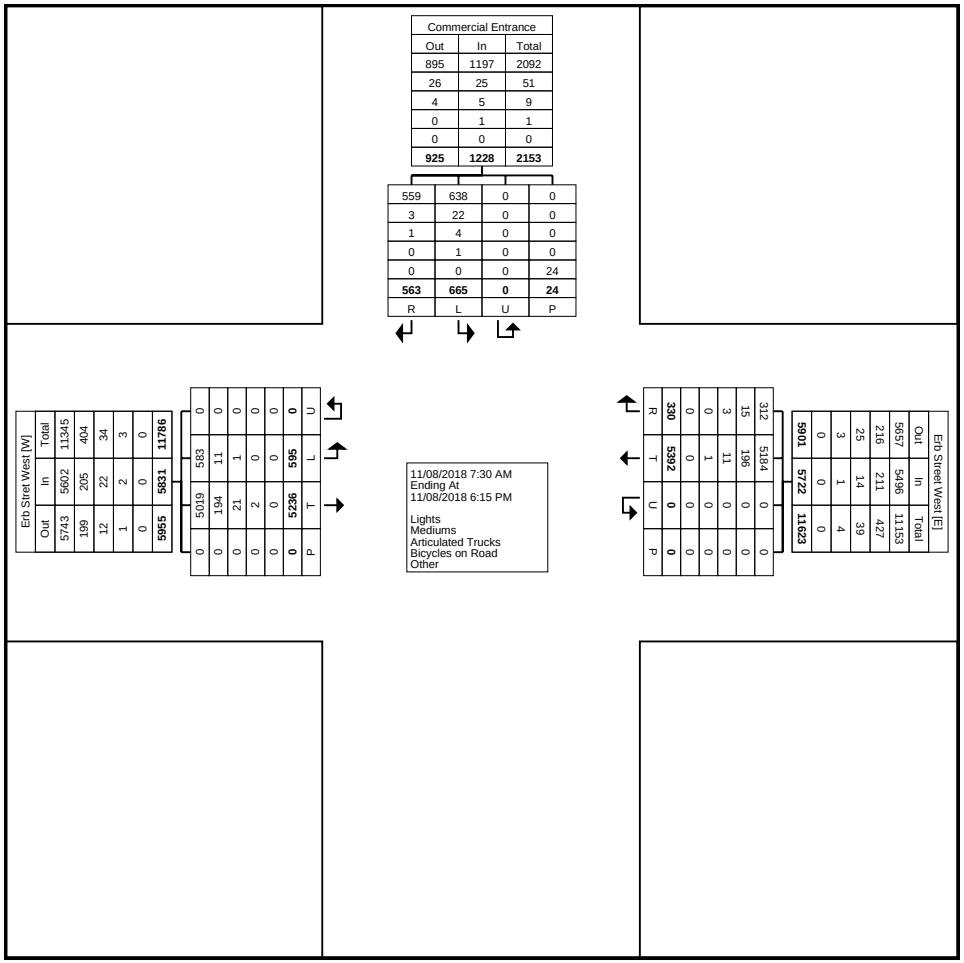
Start Time	Erb Stret West Eastbound					Erb Street West Westbound					Commercial Entrance BMO Southbound					Int. Total
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
7:30 AM	14	146	0	0	160	92	10	0	0	102	3	4	0	1	7	269
7:45 AM	17	152	0	0	169	90	3	0	0	93	6	9	0	0	15	277
Hourly Total	31	298	0	0	329	182	13	0	0	195	9	13	0	1	22	546
8:00 AM	12	185	0	0	197	99	7	0	0	106	13	7	0	0	20	323
8:15 AM	24	187	0	0	211	104	8	0	0	112	11	7	0	0	18	341
8:30 AM	12	183	0	0	195	95	5	0	0	100	26	13	0	0	39	334
8:45 AM	21	153	0	0	174	84	15	0	0	99	13	6	0	0	19	292
Hourly Total	69	708	0	0	777	382	35	0	0	417	63	33	0	0	96	1290
9:00 AM	14	127	0	0	141	73	11	0	0	84	14	7	0	0	21	246
9:15 AM	19	142	0	0	161	106	10	0	0	116	16	2	0	1	18	295
9:30 AM	16	122	0	0	138	130	11	0	0	141	12	13	0	0	25	304
9:45 AM	13	96	0	0	109	175	12	0	0	187	20	18	0	0	38	334
Hourly Total	62	487	0	0	549	484	44	0	0	528	62	40	0	1	102	1179
10:00 AM	12	107	0	0	119	190	12	0	0	202	13	22	0	3	35	356
10:15 AM	18	154	0	0	172	172	5	0	0	177	17	20	0	0	37	386
10:30 AM	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	30	261	0	0	291	363	17	0	0	380	30	42	0	3	72	743
12:00 PM	20	171	0	0	191	188	12	0	0	200	22	14	0	0	36	427
12:15 PM	31	178	0	0	209	181	12	0	0	193	24	17	0	2	41	443
12:30 PM	20	168	0	0	188	166	12	0	0	178	25	16	0	1	41	407
12:45 PM	19	184	0	0	203	187	15	0	0	202	23	22	0	1	45	450
Hourly Total	90	701	0	0	791	722	51	0	0	773	94	69	0	4	163	1727
1:00 PM	24	138	0	0	162	164	7	0	0	171	18	16	0	2	34	367
1:15 PM	24	165	0	0	189	188	14	0	0	202	28	14	0	0	42	433
1:30 PM	12	177	0	0	189	183	9	0	0	192	24	22	0	7	46	427
1:45 PM	20	174	0	0	194	152	8	0	0	160	26	23	0	0	49	403
Hourly Total	80	654	0	0	734	687	38	0	0	725	96	75	0	9	171	1630
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	15	161	0	0	176	179	11	0	0	190	25	27	0	0	52	418
3:15 PM	23	153	0	0	176	194	8	0	0	202	21	15	0	1	36	414
3:30 PM	17	178	0	0	195	176	12	0	0	188	26	24	0	0	50	433
3:45 PM	20	174	0	0	194	178	9	0	0	187	27	19	0	0	46	427
Hourly Total	75	666	0	0	741	727	40	0	0	767	99	85	0	1	184	1692
4:00 PM	19	154	0	0	173	239	9	0	0	248	28	19	0	1	47	468
4:15 PM	21	170	0	0	191	237	13	0	0	250	31	22	0	0	53	494

4:30 PM	17	209	0	0	226	221	12	0	0	233	29	22	0	0	51	510
4:45 PM	26	185	0	0	211	240	10	0	0	250	17	28	0	0	45	506
Hourly Total	83	718	0	0	801	937	44	0	0	981	105	91	0	1	196	1978
5:00 PM	19	191	0	0	210	253	5	0	0	258	38	32	0	0	70	538
5:15 PM	20	187	0	0	207	247	19	0	0	266	22	35	0	1	57	530
5:30 PM	21	213	0	0	234	197	13	0	0	210	24	29	0	3	53	497
5:45 PM	15	152	0	0	167	210	11	0	0	221	23	18	0	0	41	429
Hourly Total	75	743	0	0	818	907	48	0	0	955	107	114	0	4	221	1994
6:00 PM	0	0	0	0	0	1	0	0	0	1	0	1	0	0	1	2
Grand Total	595	5236	0	0	5831	5392	330	0	0	5722	665	563	0	24	1228	12781
Approach %	10.2	89.8	0.0	-	-	94.2	5.8	0.0	-	-	54.2	45.8	0.0	-	-	-
Total %	4.7	41.0	0.0	-	45.6	42.2	2.6	0.0	-	44.8	5.2	4.4	0.0	-	9.6	-
Lights	583	5019	0	-	5602	5184	312	0	-	5496	638	559	0	-	1197	12295
% Lights	98.0	95.9	-	-	96.1	96.1	94.5	-	-	96.1	95.9	99.3	-	-	97.5	96.2
Mediums	11	194	0	-	205	196	15	0	-	211	22	3	0	-	25	441
% Mediums	1.8	3.7	-	-	3.5	3.6	4.5	-	-	3.7	3.3	0.5	-	-	2.0	3.5
Articulated Trucks	1	21	0	-	22	11	3	0	-	14	4	1	0	-	5	41
% Articulated Trucks	0.2	0.4	-	-	0.4	0.2	0.9	-	-	0.2	0.6	0.2	-	-	0.4	0.3
Bicycles on Road	0	2	0	-	2	1	0	0	-	1	1	0	0	-	1	4
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.2	0.0	-	-	0.1	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	24	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

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Turning Movement Data Plot

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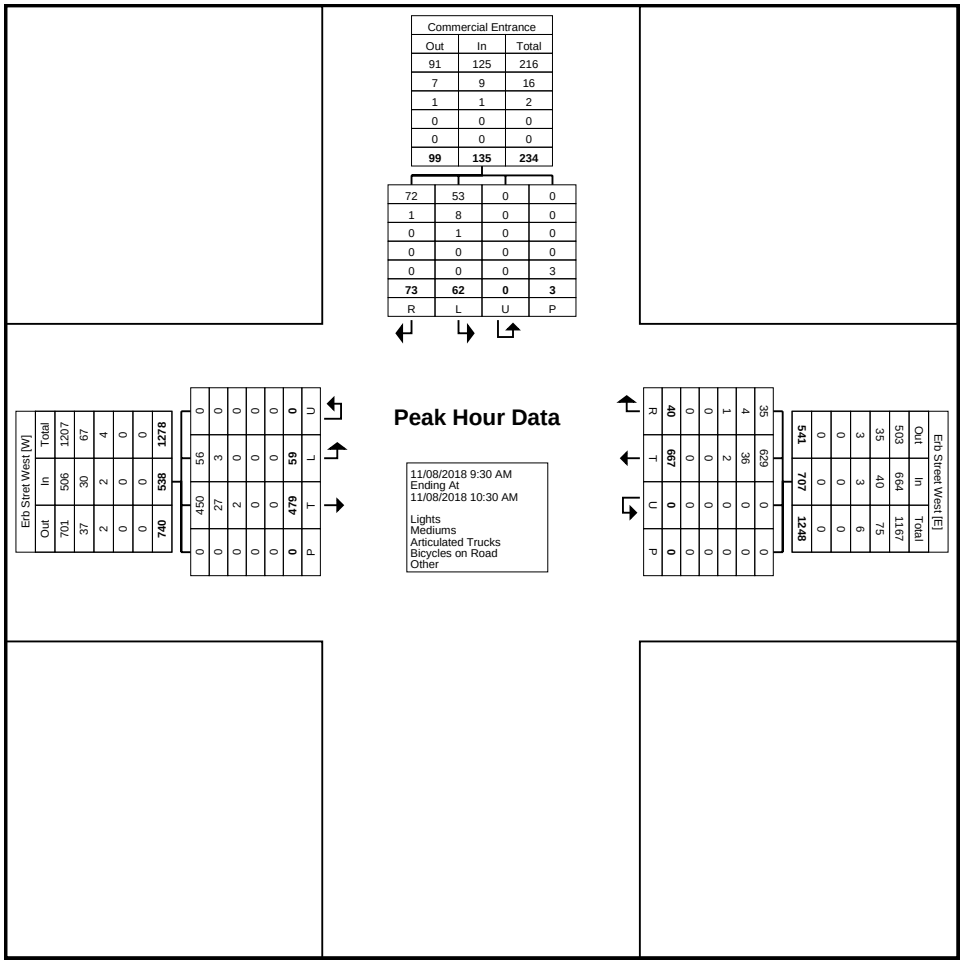
Turning Movement Peak Hour Data (9:30 AM)

Start Time	Erb Stret West Eastbound					Erb Street West Westbound					Commercial Entrance BMO Southbound					
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	Int. Total
9:30 AM	16	122	0	0	138	130	11	0	0	141	12	13	0	0	25	304
9:45 AM	13	96	0	0	109	175	12	0	0	187	20	18	0	0	38	334
10:00 AM	12	107	0	0	119	190	12	0	0	202	13	22	0	3	35	356
10:15 AM	18	154	0	0	172	172	5	0	0	177	17	20	0	0	37	386
Total	59	479	0	0	538	667	40	0	0	707	62	73	0	3	135	1380
Approach %	11.0	89.0	0.0	-	-	94.3	5.7	0.0	-	-	45.9	54.1	0.0	-	-	-
Total %	4.3	34.7	0.0	-	39.0	48.3	2.9	0.0	-	51.2	4.5	5.3	0.0	-	9.8	-
PHF	0.819	0.778	0.000	-	0.782	0.878	0.833	0.000	-	0.875	0.775	0.830	0.000	-	0.888	0.894
Lights	56	450	0	-	506	629	35	0	-	664	53	72	0	-	125	1295
% Lights	94.9	93.9	-	-	94.1	94.3	87.5	-	-	93.9	85.5	98.6	-	-	92.6	93.8
Mediums	3	27	0	-	30	36	4	0	-	40	8	1	0	-	9	79
% Mediums	5.1	5.6	-	-	5.6	5.4	10.0	-	-	5.7	12.9	1.4	-	-	6.7	5.7
Articulated Trucks	0	2	0	-	2	2	1	0	-	3	1	0	0	-	1	6
% Articulated Trucks	0.0	0.4	-	-	0.4	0.3	2.5	-	-	0.4	1.6	0.0	-	-	0.7	0.4
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	3	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Erb Street West & Commercial Entrance (BMO)
Site Code:
Start Date: 11/08/2018



Turning Movement Peak Hour Data Plot (9:30 AM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Erb Street West & Commercial Entrance (BMO)
Site Code:
Start Date: 11/08/2018

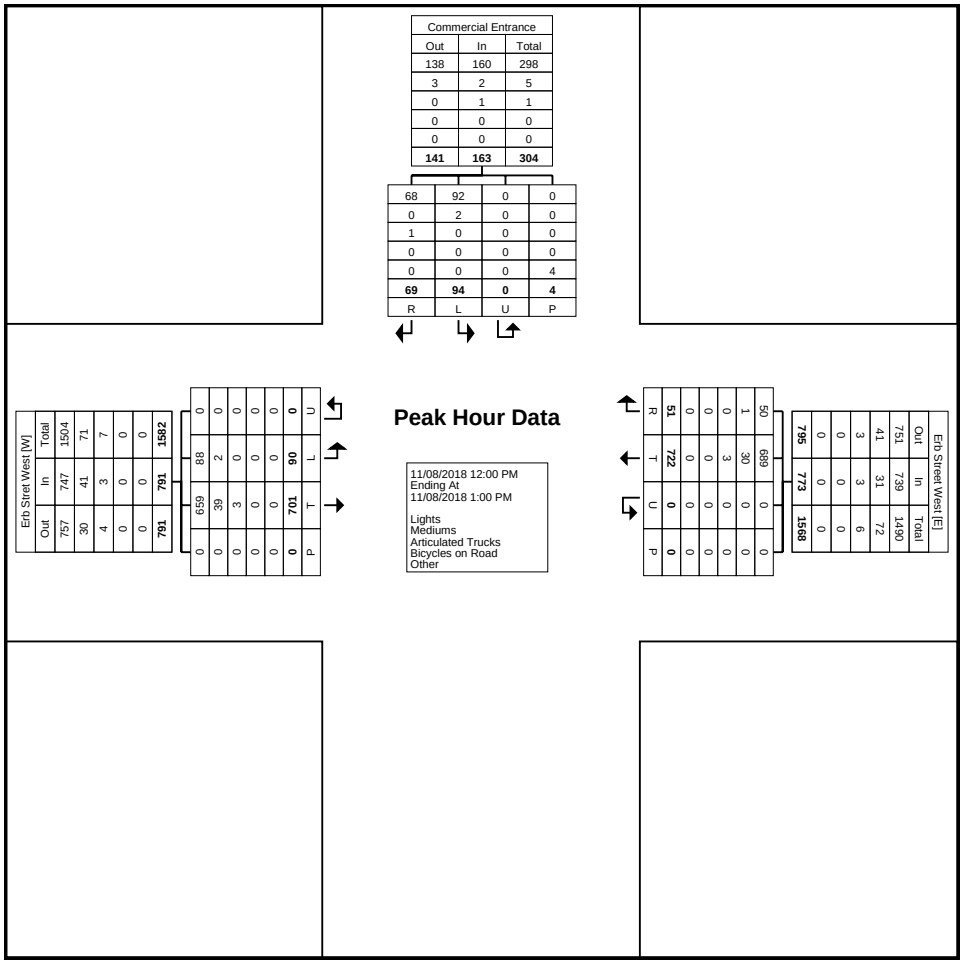
Turning Movement Peak Hour Data (12:00 PM)

Start Time	Erb Stret West Eastbound					Erb Street West Westbound					Commercial Entrance BMO Southbound					
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	Int. Total
12:00 PM	20	171	0	0	191	188	12	0	0	200	22	14	0	0	36	427
12:15 PM	31	178	0	0	209	181	12	0	0	193	24	17	0	2	41	443
12:30 PM	20	168	0	0	188	166	12	0	0	178	25	16	0	1	41	407
12:45 PM	19	184	0	0	203	187	15	0	0	202	23	22	0	1	45	450
Total	90	701	0	0	791	722	51	0	0	773	94	69	0	4	163	1727
Approach %	11.4	88.6	0.0	-	-	93.4	6.6	0.0	-	-	57.7	42.3	0.0	-	-	-
Total %	5.2	40.6	0.0	-	45.8	41.8	3.0	0.0	-	44.8	5.4	4.0	0.0	-	9.4	-
PHF	0.726	0.952	0.000	-	0.946	0.960	0.850	0.000	-	0.957	0.940	0.784	0.000	-	0.906	0.959
Lights	88	659	0	-	747	689	50	0	-	739	92	68	0	-	160	1646
% Lights	97.8	94.0	-	-	94.4	95.4	98.0	-	-	95.6	97.9	98.6	-	-	98.2	95.3
Mediums	2	39	0	-	41	30	1	0	-	31	2	0	0	-	2	74
% Mediums	2.2	5.6	-	-	5.2	4.2	2.0	-	-	4.0	2.1	0.0	-	-	1.2	4.3
Articulated Trucks	0	3	0	-	3	3	0	0	-	3	0	1	0	-	1	7
% Articulated Trucks	0.0	0.4	-	-	0.4	0.4	0.0	-	-	0.4	0.0	1.4	-	-	0.6	0.4
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	4	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

Paradigm Transportation Solutions Limited
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Count Name: Erb Street West & Commercial Entrance (BMO)
Site Code:
Start Date: 11/08/2018



Turning Movement Peak Hour Data Plot (12:00 PM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

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519-896-3163 cbowness@ptsl.com

Count Name: Erb Street West & Commercial Entrance (BMO)
Site Code:
Start Date: 11/08/2018

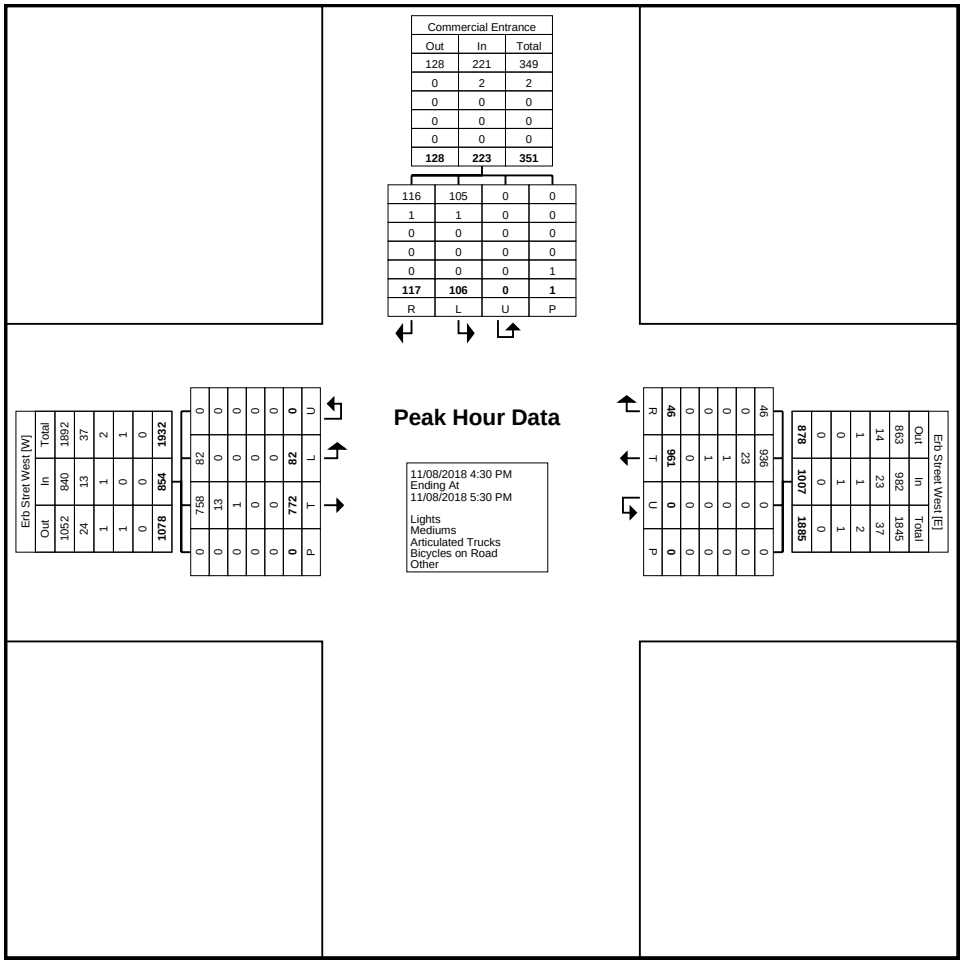
Turning Movement Peak Hour Data (4:30 PM)

Start Time	Erb Stret West Eastbound					Erb Street West Westbound					Commercial Entrance BMO Southbound					
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	Int. Total
4:30 PM	17	209	0	0	226	221	12	0	0	233	29	22	0	0	51	510
4:45 PM	26	185	0	0	211	240	10	0	0	250	17	28	0	0	45	506
5:00 PM	19	191	0	0	210	253	5	0	0	258	38	32	0	0	70	538
5:15 PM	20	187	0	0	207	247	19	0	0	266	22	35	0	1	57	530
Total	82	772	0	0	854	961	46	0	0	1007	106	117	0	1	223	2084
Approach %	9.6	90.4	0.0	-	-	95.4	4.6	0.0	-	-	47.5	52.5	0.0	-	-	-
Total %	3.9	37.0	0.0	-	41.0	46.1	2.2	0.0	-	48.3	5.1	5.6	0.0	-	10.7	-
PHF	0.788	0.923	0.000	-	0.945	0.950	0.605	0.000	-	0.946	0.697	0.836	0.000	-	0.796	0.968
Lights	82	758	0	-	840	936	46	0	-	982	105	116	0	-	221	2043
% Lights	100.0	98.2	-	-	98.4	97.4	100.0	-	-	97.5	99.1	99.1	-	-	99.1	98.0
Mediums	0	13	0	-	13	23	0	0	-	23	1	1	0	-	2	38
% Mediums	0.0	1.7	-	-	1.5	2.4	0.0	-	-	2.3	0.9	0.9	-	-	0.9	1.8
Articulated Trucks	0	1	0	-	1	1	0	0	-	1	0	0	0	-	0	2
% Articulated Trucks	0.0	0.1	-	-	0.1	0.1	0.0	-	-	0.1	0.0	0.0	-	-	0.0	0.1
Bicycles on Road	0	0	0	-	0	1	0	0	-	1	0	0	0	-	0	1
% Bicycles on Road	0.0	0.0	-	-	0.0	0.1	0.0	-	-	0.1	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

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Count Name: Erb Street West & Commercial Entrance (BMO)
Site Code:
Start Date: 11/08/2018



Turning Movement Peak Hour Data Plot (4:30 PM)

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Count Name: Erb Street West & Commercial Entrance (BMO)
Site Code:
Start Date: 11/08/2018

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Erb Street West & Erbsville Court - Saturday
Site Code:
Start Date: 11/10/2018

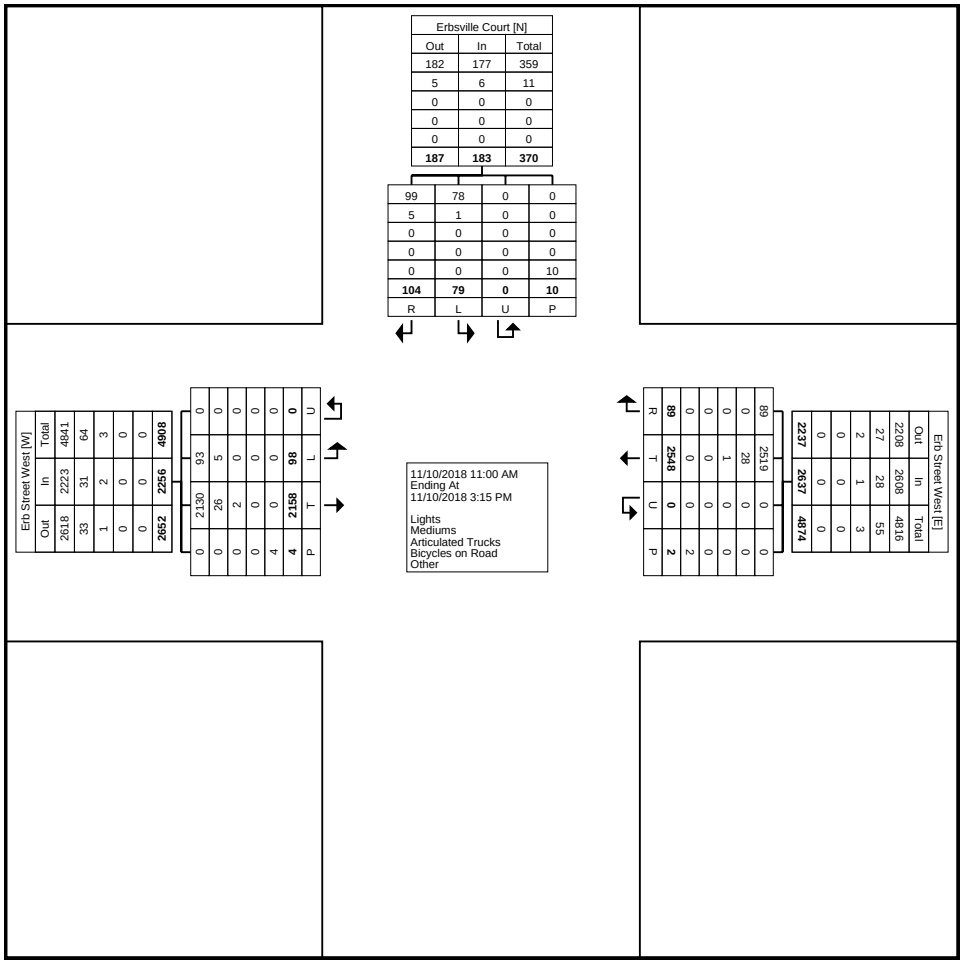
Turning Movement Data

Start Time	Erb Street West Eastbound					Erb Street West Westbound					Erbsville Court Southbound					Int. Total
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
11:00 AM	5	121	0	0	126	155	5	0	0	160	10	3	0	0	13	299
11:15 AM	4	125	0	0	129	125	9	0	0	134	3	6	0	0	9	272
11:30 AM	8	121	0	0	129	144	5	0	0	149	4	7	0	0	11	289
11:45 AM	5	136	0	0	141	166	7	0	0	173	4	10	0	0	14	328
Hourly Total	22	503	0	0	525	590	26	0	0	616	21	26	0	0	47	1188
12:00 PM	5	122	0	0	127	174	8	0	0	182	4	6	0	1	10	319
12:15 PM	7	129	0	1	136	158	8	0	0	166	4	6	0	0	10	312
12:30 PM	8	150	0	0	158	170	8	0	0	178	6	16	0	3	22	358
12:45 PM	8	144	0	0	152	164	1	0	0	165	9	5	0	1	14	331
Hourly Total	28	545	0	1	573	666	25	0	0	691	23	33	0	5	56	1320
1:00 PM	9	136	0	2	145	143	3	0	0	146	3	3	0	1	6	297
1:15 PM	3	140	0	1	143	171	9	0	0	180	8	5	0	0	13	336
1:30 PM	8	151	0	0	159	171	4	0	0	175	3	2	0	1	5	339
1:45 PM	5	130	0	0	135	153	2	0	0	155	1	4	0	0	5	295
Hourly Total	25	557	0	3	582	638	18	0	0	656	15	14	0	2	29	1267
2:00 PM	4	134	0	0	138	172	2	0	0	174	5	9	0	0	14	326
2:15 PM	7	123	0	0	130	164	8	0	0	172	9	8	0	1	17	319
2:30 PM	3	145	0	0	148	168	5	0	0	173	3	7	0	2	10	331
2:45 PM	9	151	0	0	160	150	5	0	2	155	3	7	0	0	10	325
Hourly Total	23	553	0	0	576	654	20	0	2	674	20	31	0	3	51	1301
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	98	2158	0	4	2256	2548	89	0	2	2637	79	104	0	10	183	5076
Approach %	4.3	95.7	0.0	-	-	96.6	3.4	0.0	-	-	43.2	56.8	0.0	-	-	-
Total %	1.9	42.5	0.0	-	44.4	50.2	1.8	0.0	-	52.0	1.6	2.0	0.0	-	3.6	-
Lights	93	2130	0	-	2223	2519	89	0	-	2608	78	99	0	-	177	5008
% Lights	94.9	98.7	-	-	98.5	98.9	100.0	-	-	98.9	98.7	95.2	-	-	96.7	98.7
Mediums	5	26	0	-	31	28	0	0	-	28	1	5	0	-	6	65
% Mediums	5.1	1.2	-	-	1.4	1.1	0.0	-	-	1.1	1.3	4.8	-	-	3.3	1.3
Articulated Trucks	0	2	0	-	2	1	0	0	-	1	0	0	0	-	0	3
% Articulated Trucks	0.0	0.1	-	-	0.1	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.1
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	4	-	-	-	-	2	-	-	-	-	10	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Erb Street West & Erbsville Court - Saturday
Site Code:
Start Date: 11/10/2018



Turning Movement Data Plot

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519-896-3163 cbowness@ptsl.com

Count Name: Erb Street West & Erbsville Court - Saturday
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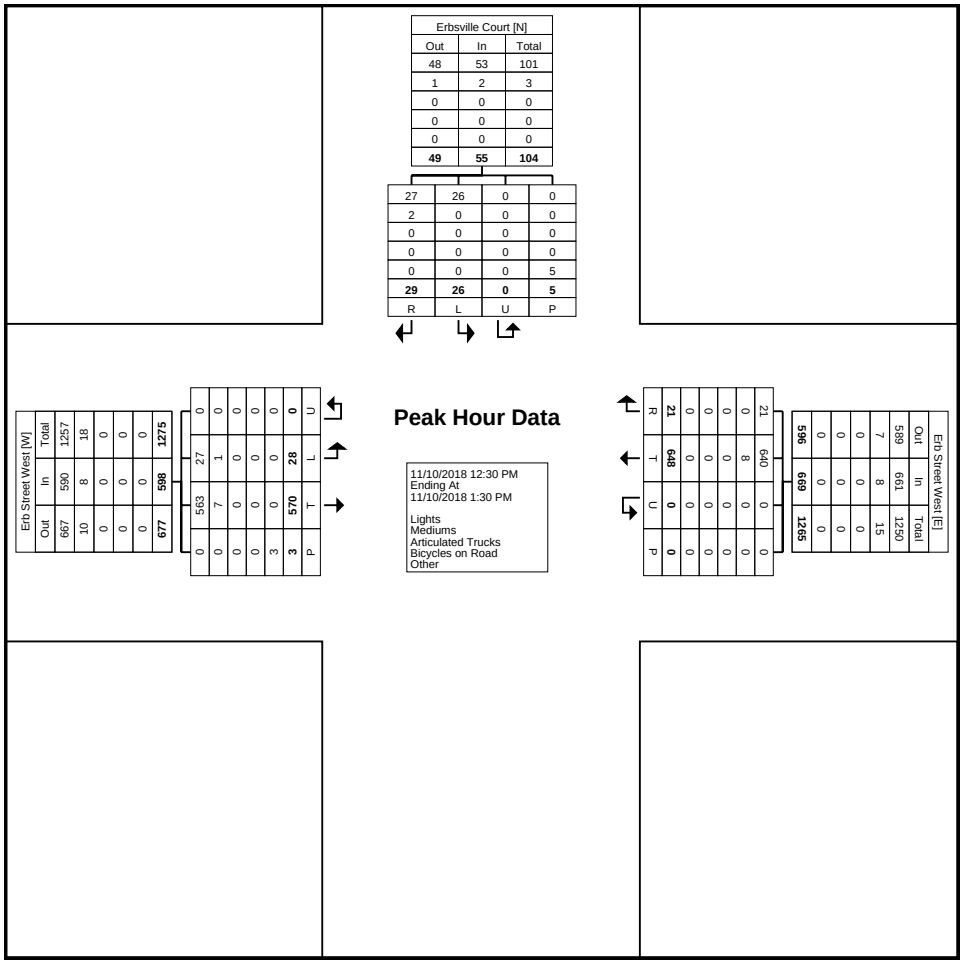
Turning Movement Peak Hour Data (12:30 PM)

Start Time	Erb Street West Eastbound					Erb Street West Westbound					Erbsville Court Southbound					
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	Int. Total
12:30 PM	8	150	0	0	158	170	8	0	0	178	6	16	0	3	22	358
12:45 PM	8	144	0	0	152	164	1	0	0	165	9	5	0	1	14	331
1:00 PM	9	136	0	2	145	143	3	0	0	146	3	3	0	1	6	297
1:15 PM	3	140	0	1	143	171	9	0	0	180	8	5	0	0	13	336
Total	28	570	0	3	598	648	21	0	0	669	26	29	0	5	55	1322
Approach %	4.7	95.3	0.0	-	-	96.9	3.1	0.0	-	-	47.3	52.7	0.0	-	-	-
Total %	2.1	43.1	0.0	-	45.2	49.0	1.6	0.0	-	50.6	2.0	2.2	0.0	-	4.2	-
PHF	0.778	0.950	0.000	-	0.946	0.947	0.583	0.000	-	0.929	0.722	0.453	0.000	-	0.625	0.923
Lights	27	563	0	-	590	640	21	0	-	661	26	27	0	-	53	1304
% Lights	96.4	98.8	-	-	98.7	98.8	100.0	-	-	98.8	100.0	93.1	-	-	96.4	98.6
Mediums	1	7	0	-	8	8	0	0	-	8	0	2	0	-	2	18
% Mediums	3.6	1.2	-	-	1.3	1.2	0.0	-	-	1.2	0.0	6.9	-	-	3.6	1.4
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	3	-	-	-	-	0	-	-	-	-	5	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	100.0	-	-

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Count Name: Erb Street West & Erbsville Court - Saturday
Site Code:
Start Date: 11/10/2018



Turning Movement Peak Hour Data Plot (12:30 PM)

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Turning Movement Data

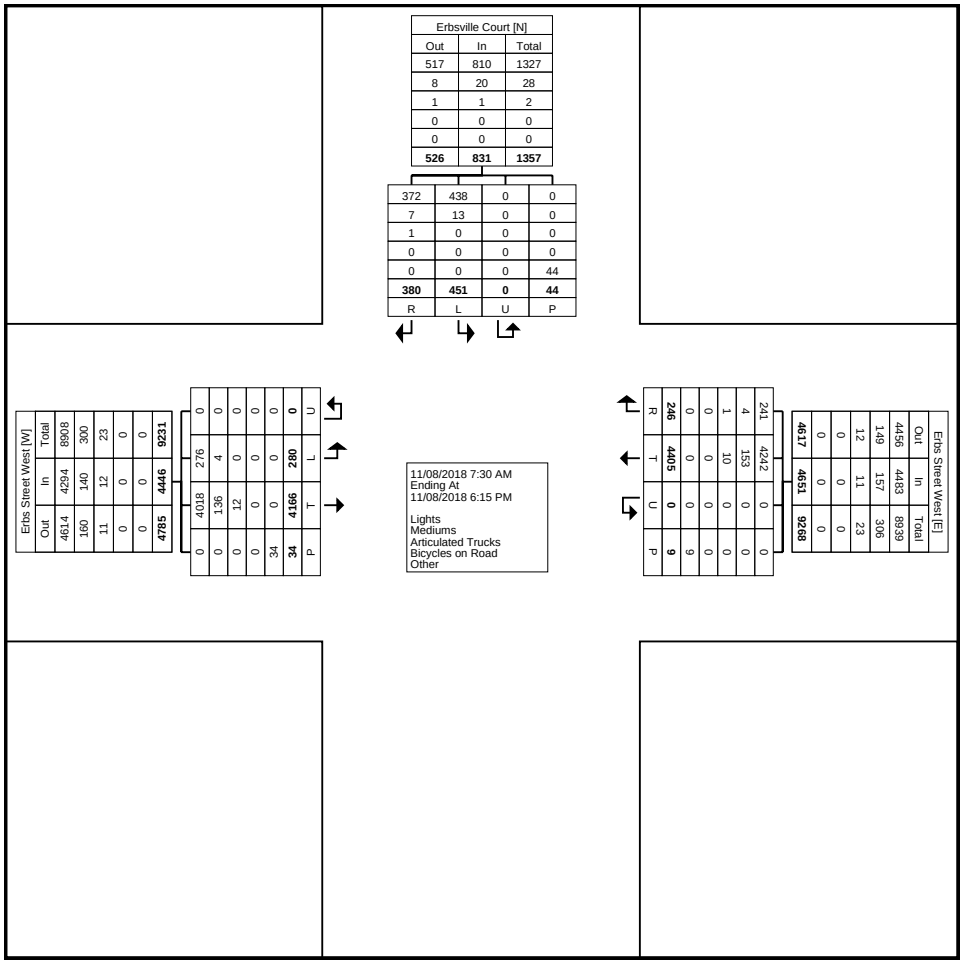
Start Time	Erbs Street West Eastbound					Erbs Street West Westbound					Erbsville Court Southbound					Int. Total
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
7:30 AM	7	142	0	1	149	77	2	0	1	79	10	13	0	1	23	251
7:45 AM	4	122	0	3	126	75	3	0	0	78	11	11	0	0	22	226
Hourly Total	11	264	0	4	275	152	5	0	1	157	21	24	0	1	45	477
8:00 AM	6	179	0	2	185	82	7	0	1	89	23	13	0	1	36	310
8:15 AM	16	188	0	0	204	74	8	0	0	82	26	19	0	0	45	331
8:30 AM	22	194	0	3	216	77	13	0	0	90	28	18	0	0	46	352
8:45 AM	25	151	0	1	176	76	20	0	1	96	41	36	0	1	77	349
Hourly Total	69	712	0	6	781	309	48	0	2	357	118	86	0	2	204	1342
9:00 AM	9	138	0	0	147	70	2	0	0	72	30	24	0	0	54	273
9:15 AM	7	99	0	1	106	101	4	0	0	105	14	6	0	0	20	231
9:30 AM	2	115	0	0	117	101	4	0	0	105	7	3	0	0	10	232
9:45 AM	2	107	0	2	109	119	3	0	0	122	5	10	0	0	15	246
Hourly Total	20	459	0	3	479	391	13	0	0	404	56	43	0	0	99	982
10:00 AM	2	83	0	0	85	154	3	0	0	157	8	6	0	0	14	256
10:15 AM	2	102	0	4	104	109	1	0	0	110	7	8	0	1	15	229
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	4	185	0	4	189	263	4	0	0	267	15	14	0	1	29	485
12:00 PM	6	107	0	0	113	177	5	0	0	182	6	7	0	1	13	308
12:15 PM	4	126	0	0	130	150	2	0	1	152	4	4	0	1	8	290
12:30 PM	19	113	0	3	132	126	1	0	0	127	5	9	0	0	14	273
12:45 PM	6	167	0	1	173	161	6	0	0	167	3	6	0	2	9	349
Hourly Total	35	513	0	4	548	614	14	0	1	628	18	26	0	4	44	1220
1:00 PM	6	101	0	0	107	135	6	0	0	141	16	8	0	2	24	272
1:15 PM	6	138	0	0	144	148	5	0	0	153	8	7	0	0	15	312
1:30 PM	2	124	0	0	126	153	5	0	0	158	4	5	0	1	9	293
1:45 PM	3	134	0	2	137	131	4	0	2	135	2	7	0	1	9	281
Hourly Total	17	497	0	2	514	567	20	0	2	587	30	27	0	4	57	1158
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	16	138	0	1	154	149	11	0	0	160	10	5	0	4	15	329
3:15 PM	10	116	0	0	126	156	18	0	0	174	5	6	0	0	11	311
3:30 PM	12	126	0	4	138	145	12	0	1	157	33	28	0	4	61	356
3:45 PM	10	145	0	1	155	154	12	0	0	166	25	20	0	1	45	366
Hourly Total	48	525	0	6	573	604	53	0	1	657	73	59	0	9	132	1362
4:00 PM	14	124	0	1	138	180	7	0	0	187	30	13	0	5	43	368
4:15 PM	6	129	0	0	135	218	15	0	0	233	20	12	0	0	32	400
4:30 PM	11	126	0	0	137	176	5	0	2	181	18	9	0	2	27	345
4:45 PM	13	133	0	2	146	201	10	0	0	211	13	15	0	1	28	385

Hourly Total	44	512	0	3	556	775	37	0	2	812	81	49	0	8	130	1498
5:00 PM	9	126	0	1	135	201	14	0	0	215	13	10	0	2	23	373
5:15 PM	6	131	0	1	137	201	16	0	0	217	10	11	0	3	21	375
5:30 PM	7	130	0	0	137	170	14	0	0	184	8	21	0	6	29	350
5:45 PM	10	112	0	0	122	158	8	0	0	166	8	10	0	4	18	306
Hourly Total	32	499	0	2	531	730	52	0	0	782	39	52	0	15	91	1404
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	280	4166	0	34	4446	4405	246	0	9	4651	451	380	0	44	831	9928
Approach %	6.3	93.7	0.0	-	-	94.7	5.3	0.0	-	-	54.3	45.7	0.0	-	-	-
Total %	2.8	42.0	0.0	-	44.8	44.4	2.5	0.0	-	46.8	4.5	3.8	0.0	-	8.4	-
Lights	276	4018	0	-	4294	4242	241	0	-	4483	438	372	0	-	810	9587
% Lights	98.6	96.4	-	-	96.6	96.3	98.0	-	-	96.4	97.1	97.9	-	-	97.5	96.6
Mediums	4	136	0	-	140	153	4	0	-	157	13	7	0	-	20	317
% Mediums	1.4	3.3	-	-	3.1	3.5	1.6	-	-	3.4	2.9	1.8	-	-	2.4	3.2
Articulated Trucks	0	12	0	-	12	10	1	0	-	11	0	1	0	-	1	24
% Articulated Trucks	0.0	0.3	-	-	0.3	0.2	0.4	-	-	0.2	0.0	0.3	-	-	0.1	0.2
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	34	-	-	-	-	9	-	-	-	-	44	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Erb Street West & Erbsville Court
Site Code:
Start Date: 11/08/2018



Turning Movement Data Plot

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
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Count Name: Erb Street West & Erbsville Court
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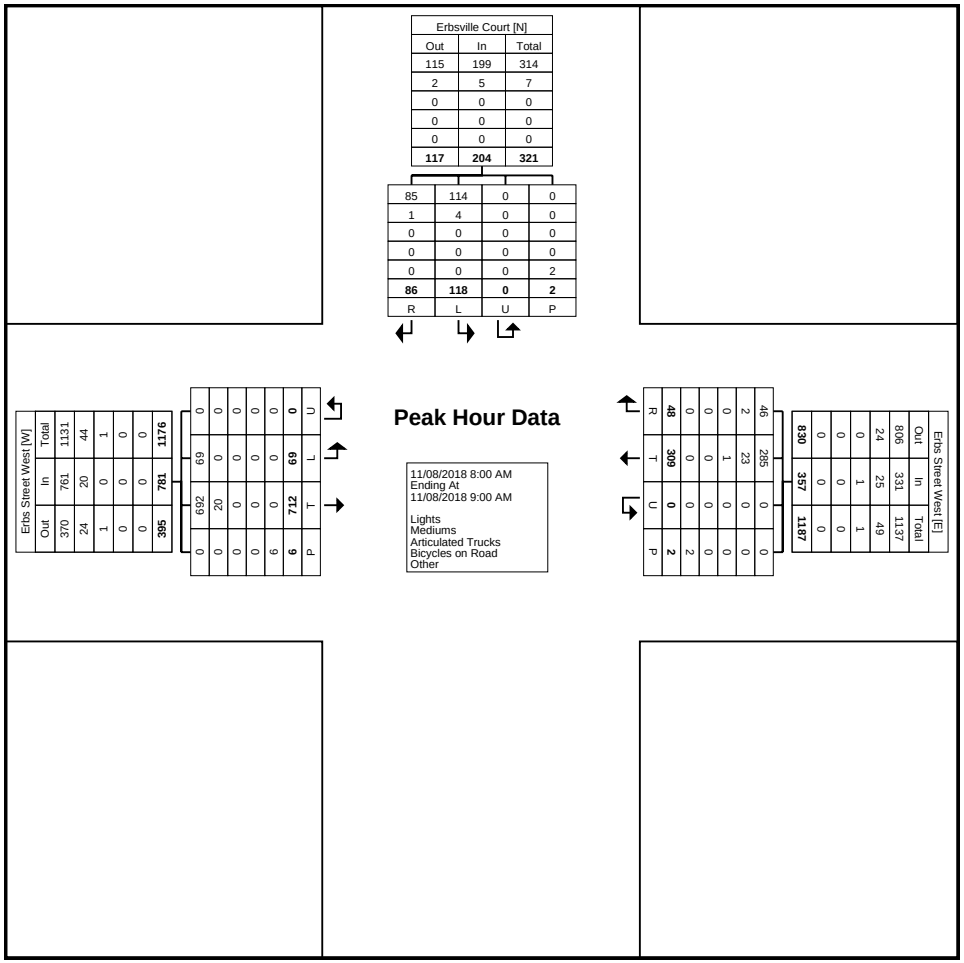
Turning Movement Peak Hour Data (8:00 AM)

Start Time	Erbs Street West Eastbound					Erbs Street West Westbound					Erbsville Court Southbound					
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	Int. Total
8:00 AM	6	179	0	2	185	82	7	0	1	89	23	13	0	1	36	310
8:15 AM	16	188	0	0	204	74	8	0	0	82	26	19	0	0	45	331
8:30 AM	22	194	0	3	216	77	13	0	0	90	28	18	0	0	46	352
8:45 AM	25	151	0	1	176	76	20	0	1	96	41	36	0	1	77	349
Total	69	712	0	6	781	309	48	0	2	357	118	86	0	2	204	1342
Approach %	8.8	91.2	0.0	-	-	86.6	13.4	0.0	-	-	57.8	42.2	0.0	-	-	-
Total %	5.1	53.1	0.0	-	58.2	23.0	3.6	0.0	-	26.6	8.8	6.4	0.0	-	15.2	-
PHF	0.690	0.918	0.000	-	0.904	0.942	0.600	0.000	-	0.930	0.720	0.597	0.000	-	0.662	0.953
Lights	69	692	0	-	761	285	46	0	-	331	114	85	0	-	199	1291
% Lights	100.0	97.2	-	-	97.4	92.2	95.8	-	-	92.7	96.6	98.8	-	-	97.5	96.2
Mediums	0	20	0	-	20	23	2	0	-	25	4	1	0	-	5	50
% Mediums	0.0	2.8	-	-	2.6	7.4	4.2	-	-	7.0	3.4	1.2	-	-	2.5	3.7
Articulated Trucks	0	0	0	-	0	1	0	0	-	1	0	0	0	-	0	1
% Articulated Trucks	0.0	0.0	-	-	0.0	0.3	0.0	-	-	0.3	0.0	0.0	-	-	0.0	0.1
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	6	-	-	-	-	2	-	-	-	-	2	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-

Paradigm Transportation Solutions Limited
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Count Name: Erb Street West & Erbsville Court
Site Code:
Start Date: 11/08/2018



Turning Movement Peak Hour Data Plot (8:00 AM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

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Count Name: Erb Street West & Erbsville Court
Site Code:
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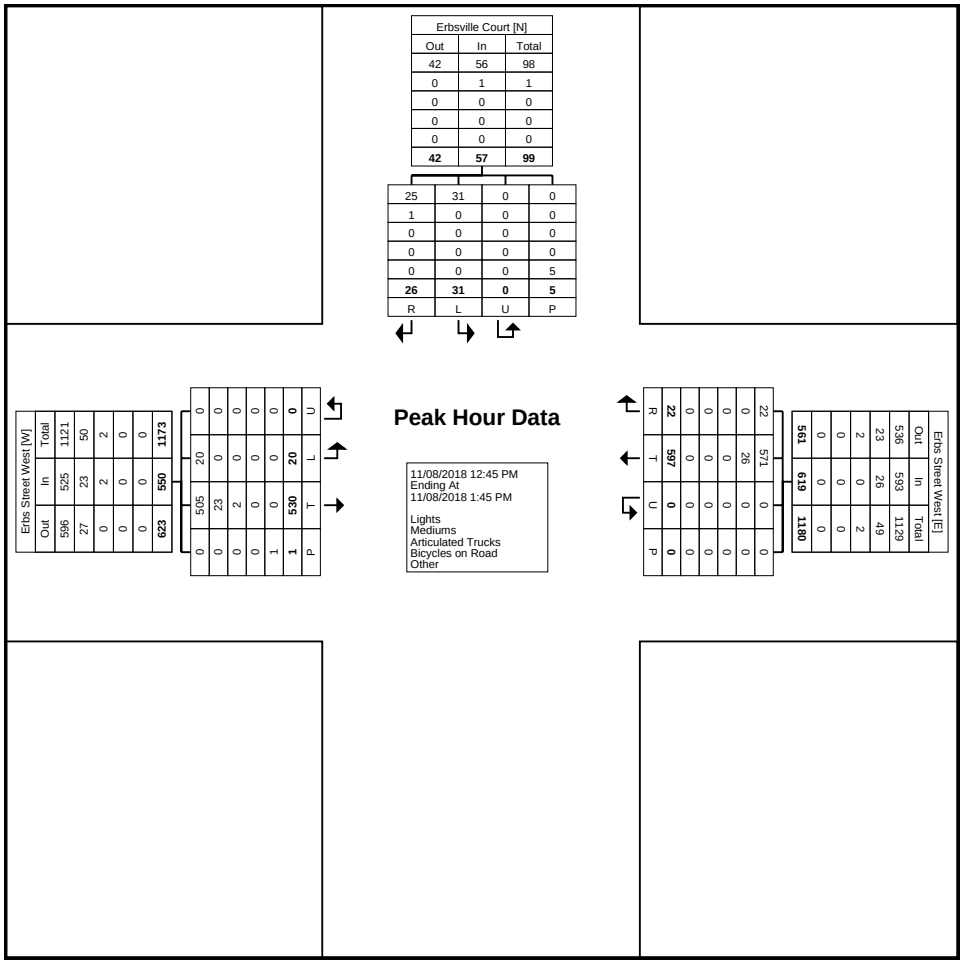
Turning Movement Peak Hour Data (12:45 PM)

Start Time	Erbs Street West Eastbound					Erbs Street West Westbound					Erbsville Court Southbound					
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	Int. Total
12:45 PM	6	167	0	1	173	161	6	0	0	167	3	6	0	2	9	349
1:00 PM	6	101	0	0	107	135	6	0	0	141	16	8	0	2	24	272
1:15 PM	6	138	0	0	144	148	5	0	0	153	8	7	0	0	15	312
1:30 PM	2	124	0	0	126	153	5	0	0	158	4	5	0	1	9	293
Total	20	530	0	1	550	597	22	0	0	619	31	26	0	5	57	1226
Approach %	3.6	96.4	0.0	-	-	96.4	3.6	0.0	-	-	54.4	45.6	0.0	-	-	-
Total %	1.6	43.2	0.0	-	44.9	48.7	1.8	0.0	-	50.5	2.5	2.1	0.0	-	4.6	-
PHF	0.833	0.793	0.000	-	0.795	0.927	0.917	0.000	-	0.927	0.484	0.813	0.000	-	0.594	0.878
Lights	20	505	0	-	525	571	22	0	-	593	31	25	0	-	56	1174
% Lights	100.0	95.3	-	-	95.5	95.6	100.0	-	-	95.8	100.0	96.2	-	-	98.2	95.8
Mediums	0	23	0	-	23	26	0	0	-	26	0	1	0	-	1	50
% Mediums	0.0	4.3	-	-	4.2	4.4	0.0	-	-	4.2	0.0	3.8	-	-	1.8	4.1
Articulated Trucks	0	2	0	-	2	0	0	0	-	0	0	0	0	-	0	2
% Articulated Trucks	0.0	0.4	-	-	0.4	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.2
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	1	-	-	-	-	0	-	-	-	-	5	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	100.0	-	-

Paradigm Transportation Solutions Limited
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Count Name: Erb Street West & Erbsville Court
Site Code:
Start Date: 11/08/2018



Turning Movement Peak Hour Data Plot (12:45 PM)

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Count Name: Erb Street West & Erbsville Court
Site Code:
Start Date: 11/08/2018

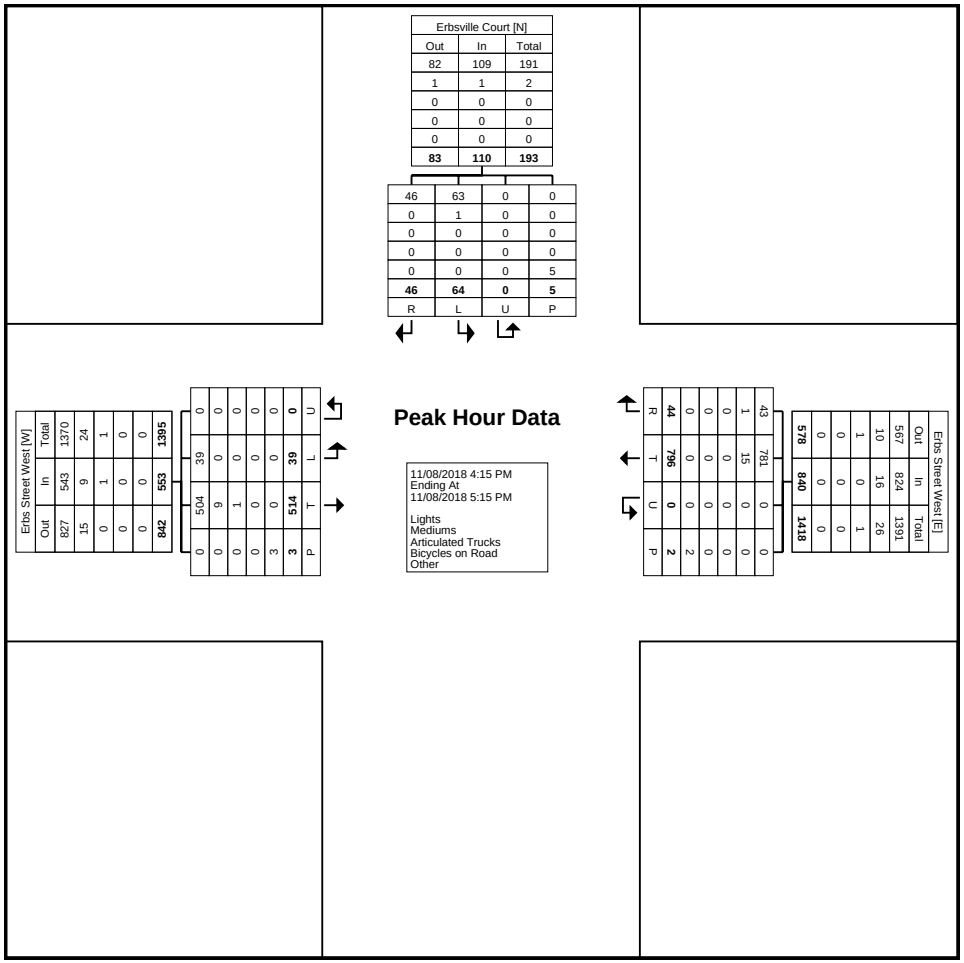
Turning Movement Peak Hour Data (4:15 PM)

Start Time	Erbs Street West Eastbound					Erbs Street West Westbound					Erbsville Court Southbound					
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	Int. Total
4:15 PM	6	129	0	0	135	218	15	0	0	233	20	12	0	0	32	400
4:30 PM	11	126	0	0	137	176	5	0	2	181	18	9	0	2	27	345
4:45 PM	13	133	0	2	146	201	10	0	0	211	13	15	0	1	28	385
5:00 PM	9	126	0	1	135	201	14	0	0	215	13	10	0	2	23	373
Total	39	514	0	3	553	796	44	0	2	840	64	46	0	5	110	1503
Approach %	7.1	92.9	0.0	-	-	94.8	5.2	0.0	-	-	58.2	41.8	0.0	-	-	-
Total %	2.6	34.2	0.0	-	36.8	53.0	2.9	0.0	-	55.9	4.3	3.1	0.0	-	7.3	-
PHF	0.750	0.966	0.000	-	0.947	0.913	0.733	0.000	-	0.901	0.800	0.767	0.000	-	0.859	0.939
Lights	39	504	0	-	543	781	43	0	-	824	63	46	0	-	109	1476
% Lights	100.0	98.1	-	-	98.2	98.1	97.7	-	-	98.1	98.4	100.0	-	-	99.1	98.2
Mediums	0	9	0	-	9	15	1	0	-	16	1	0	0	-	1	26
% Mediums	0.0	1.8	-	-	1.6	1.9	2.3	-	-	1.9	1.6	0.0	-	-	0.9	1.7
Articulated Trucks	0	1	0	-	1	0	0	0	-	0	0	0	0	-	0	1
% Articulated Trucks	0.0	0.2	-	-	0.2	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.1
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	3	-	-	-	-	2	-	-	-	-	5	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-

Paradigm Transportation Solutions Limited
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Count Name: Erb Street West & Erbsville Court
Site Code:
Start Date: 11/08/2018



Turning Movement Peak Hour Data Plot (4:15 PM)

Paradigm Transportation Solutions Limited
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Count Name: Erb Street West & Erbsville Court
Site Code:
Start Date: 11/08/2018

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Erb Street West & Wilmot Line - Saturday
Site Code:
Start Date: 11/10/2018

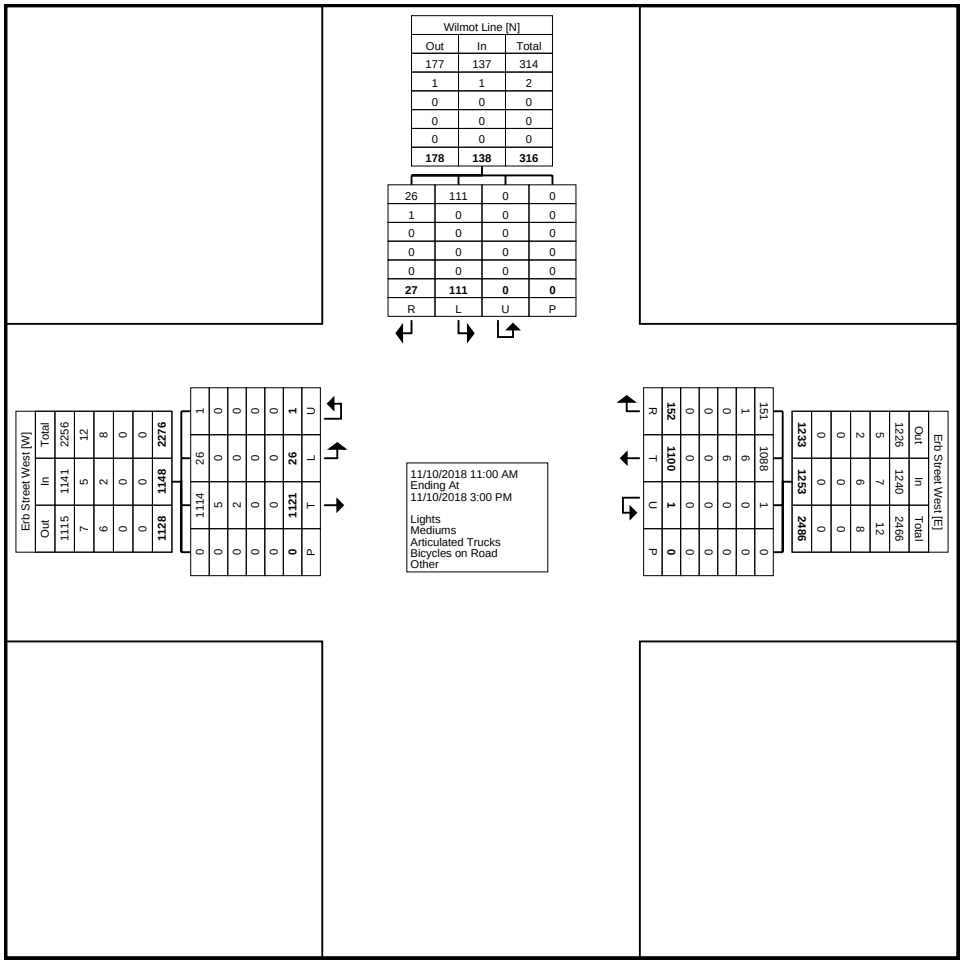
Turning Movement Data

Start Time	Erb Street West Eastbound					Erb Street West Westbound					Wilmot Line Southbound					Int. Total
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
11:00 AM	0	72	0	0	72	52	7	0	0	59	4	2	0	0	6	137
11:15 AM	1	76	0	0	77	67	8	1	0	76	7	0	0	0	7	160
11:30 AM	1	70	0	0	71	75	9	0	0	84	5	0	0	0	5	160
11:45 AM	1	82	0	0	83	71	16	0	0	87	8	4	0	0	12	182
Hourly Total	3	300	0	0	303	265	40	1	0	306	24	6	0	0	30	639
12:00 PM	3	77	1	0	81	65	6	0	0	71	7	4	0	0	11	163
12:15 PM	1	80	0	0	81	70	10	0	0	80	9	2	0	0	11	172
12:30 PM	3	72	0	0	75	56	4	0	0	60	5	3	0	0	8	143
12:45 PM	1	53	0	0	54	84	13	0	0	97	6	0	0	0	6	157
Hourly Total	8	282	1	0	291	275	33	0	0	308	27	9	0	0	36	635
1:00 PM	1	54	0	0	55	68	10	0	0	78	4	2	0	0	6	139
1:15 PM	4	79	0	0	83	67	7	0	0	74	10	0	0	0	10	167
1:30 PM	3	63	0	0	66	79	12	0	0	91	11	5	0	0	16	173
1:45 PM	0	77	0	0	77	70	15	0	0	85	6	2	0	0	8	170
Hourly Total	8	273	0	0	281	284	44	0	0	328	31	9	0	0	40	649
2:00 PM	3	62	0	0	65	64	9	0	0	73	9	0	0	0	9	147
2:15 PM	0	69	0	0	69	70	5	0	0	75	6	1	0	0	7	151
2:30 PM	2	64	0	0	66	69	10	0	0	79	9	0	0	0	9	154
2:45 PM	2	71	0	0	73	73	11	0	0	84	5	2	0	0	7	164
Hourly Total	7	266	0	0	273	276	35	0	0	311	29	3	0	0	32	616
Grand Total	26	1121	1	0	1148	1100	152	1	0	1253	111	27	0	0	138	2539
Approach %	2.3	97.6	0.1	-	-	87.8	12.1	0.1	-	-	80.4	19.6	0.0	-	-	-
Total %	1.0	44.2	0.0	-	45.2	43.3	6.0	0.0	-	49.4	4.4	1.1	0.0	-	5.4	-
Lights	26	1114	1	-	1141	1088	151	1	-	1240	111	26	0	-	137	2518
% Lights	100.0	99.4	100.0	-	99.4	98.9	99.3	100.0	-	99.0	100.0	96.3	-	-	99.3	99.2
Mediums	0	5	0	-	5	6	1	0	-	7	0	1	0	-	1	13
% Mediums	0.0	0.4	0.0	-	0.4	0.5	0.7	0.0	-	0.6	0.0	3.7	-	-	0.7	0.5
Articulated Trucks	0	2	0	-	2	6	0	0	-	6	0	0	0	-	0	8
% Articulated Trucks	0.0	0.2	0.0	-	0.2	0.5	0.0	0.0	-	0.5	0.0	0.0	-	-	0.0	0.3
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
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Count Name: Erb Street West & Wilmot Line - Saturday
Site Code:
Start Date: 11/10/2018



Turning Movement Data Plot

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519-896-3163 cbowness@ptsl.com

Count Name: Erb Street West & Wilmot Line - Saturday
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Start Date: 11/10/2018

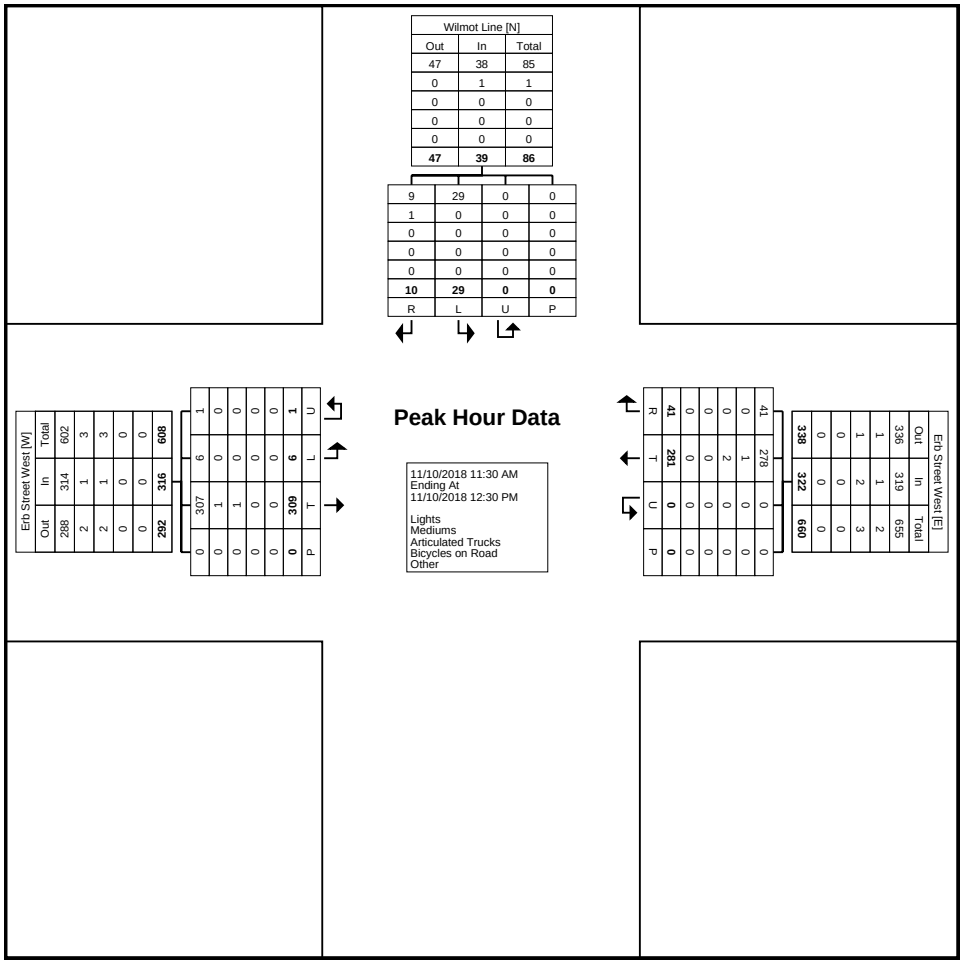
Turning Movement Peak Hour Data (11:30 AM)

Start Time	Erb Street West Eastbound					Erb Street West Westbound					Wilmot Line Southbound					
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	Int. Total
11:30 AM	1	70	0	0	71	75	9	0	0	84	5	0	0	0	5	160
11:45 AM	1	82	0	0	83	71	16	0	0	87	8	4	0	0	12	182
12:00 PM	3	77	1	0	81	65	6	0	0	71	7	4	0	0	11	163
12:15 PM	1	80	0	0	81	70	10	0	0	80	9	2	0	0	11	172
Total	6	309	1	0	316	281	41	0	0	322	29	10	0	0	39	677
Approach %	1.9	97.8	0.3	-	-	87.3	12.7	0.0	-	-	74.4	25.6	0.0	-	-	-
Total %	0.9	45.6	0.1	-	46.7	41.5	6.1	0.0	-	47.6	4.3	1.5	0.0	-	5.8	-
PHF	0.500	0.942	0.250	-	0.952	0.937	0.641	0.000	-	0.925	0.806	0.625	0.000	-	0.813	0.930
Lights	6	307	1	-	314	278	41	0	-	319	29	9	0	-	38	671
% Lights	100.0	99.4	100.0	-	99.4	98.9	100.0	-	-	99.1	100.0	90.0	-	-	97.4	99.1
Mediums	0	1	0	-	1	1	0	0	-	1	0	1	0	-	1	3
% Mediums	0.0	0.3	0.0	-	0.3	0.4	0.0	-	-	0.3	0.0	10.0	-	-	2.6	0.4
Articulated Trucks	0	1	0	-	1	2	0	0	-	2	0	0	0	-	0	3
% Articulated Trucks	0.0	0.3	0.0	-	0.3	0.7	0.0	-	-	0.6	0.0	0.0	-	-	0.0	0.4
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Erb Street West & Wilmot Line - Saturday
Site Code:
Start Date: 11/10/2018



Turning Movement Peak Hour Data Plot (11:30 AM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Erb Street West & Wilmot Line - Saturday
Site Code:
Start Date: 11/10/2018

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Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Erb Street West & Wilmot Line
Site Code:
Start Date: 11/08/2018

Turning Movement Data

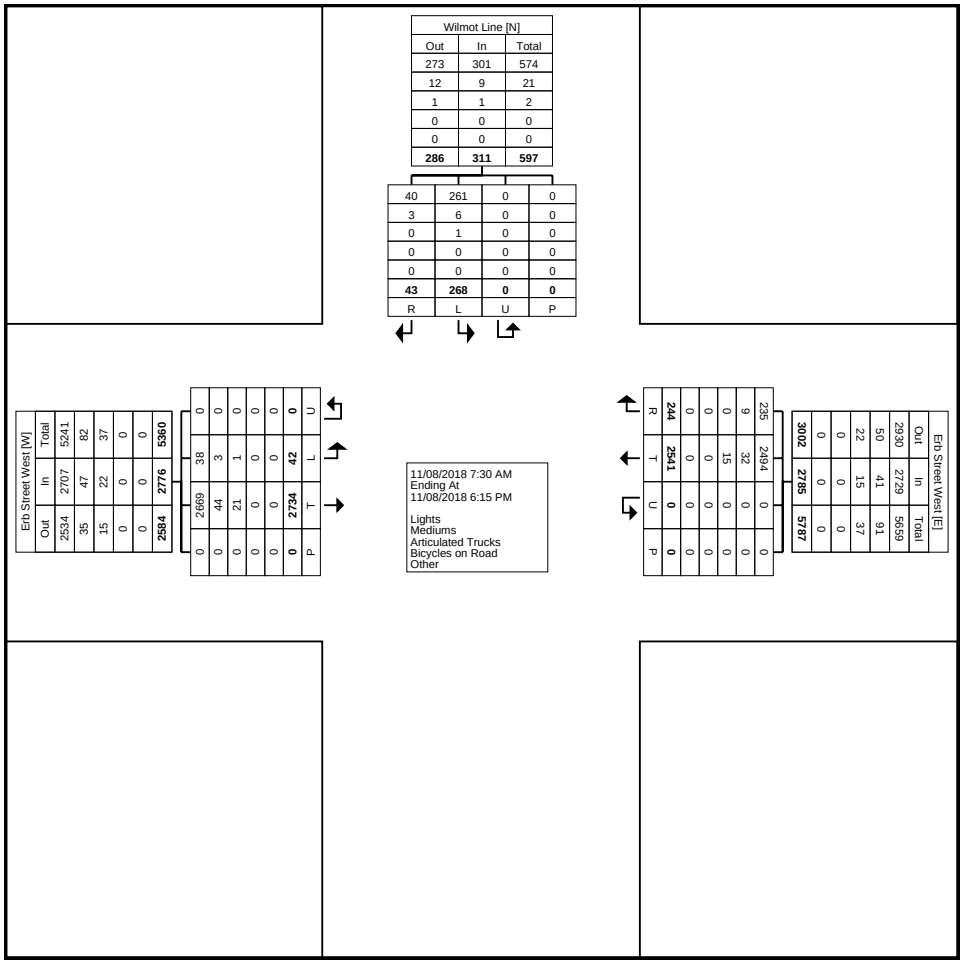
Start Time	Erb Street West Eastbound					Erb Street West Westbound					Wilmot Line Southbound					Int. Total
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
7:30 AM	2	121	0	0	123	68	3	0	0	71	12	4	0	0	16	210
7:45 AM	1	145	0	0	146	62	5	0	0	67	8	6	0	0	14	227
Hourly Total	3	266	0	0	269	130	8	0	0	138	20	10	0	0	30	437
8:00 AM	1	161	0	0	162	56	4	0	0	60	15	1	0	0	16	238
8:15 AM	3	149	0	0	152	48	4	0	0	52	11	0	0	0	11	215
8:30 AM	0	124	0	0	124	53	8	0	0	61	15	1	0	0	16	201
8:45 AM	0	106	0	0	106	35	3	0	0	38	10	2	0	0	12	156
Hourly Total	4	540	0	0	544	192	19	0	0	211	51	4	0	0	55	810
9:00 AM	1	98	0	0	99	26	3	0	0	29	10	1	0	0	11	139
9:15 AM	0	100	0	0	100	37	2	0	0	39	7	1	0	0	8	147
9:30 AM	1	89	0	0	90	39	3	0	0	42	6	1	0	0	7	139
9:45 AM	0	69	0	0	69	46	6	0	0	52	9	0	0	0	9	130
Hourly Total	2	356	0	0	358	148	14	0	0	162	32	3	0	0	35	555
10:00 AM	1	67	0	0	68	42	6	0	0	48	6	0	0	0	6	122
10:15 AM	2	74	0	0	76	46	2	0	0	48	12	0	0	0	12	136
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	3	141	0	0	144	88	8	0	0	96	18	0	0	0	18	258
12:00 PM	1	62	0	0	63	78	6	0	0	84	9	0	0	0	9	156
12:15 PM	0	72	0	0	72	78	7	0	0	85	5	0	0	0	5	162
12:30 PM	0	70	0	0	70	71	7	0	0	78	4	1	0	0	5	153
12:45 PM	1	65	0	0	66	76	5	0	0	81	6	0	0	0	6	153
Hourly Total	2	269	0	0	271	303	25	0	0	328	24	1	0	0	25	624
1:00 PM	1	37	0	0	38	64	5	0	0	69	1	2	0	0	3	110
1:15 PM	1	83	0	0	84	72	5	0	0	77	3	1	0	0	4	165
1:30 PM	0	55	0	0	55	76	10	0	0	86	7	1	0	0	8	149
1:45 PM	0	83	0	0	83	72	6	0	0	78	8	0	0	0	8	169
Hourly Total	2	258	0	0	260	284	26	0	0	310	19	4	0	0	23	593
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	2	59	0	0	61	88	6	0	0	94	5	2	0	0	7	162
3:15 PM	4	69	0	0	73	98	16	0	0	114	8	2	0	0	10	197
3:30 PM	3	69	0	0	72	93	5	0	0	98	4	2	0	0	6	176
3:45 PM	4	79	0	0	83	96	13	0	0	109	11	2	0	0	13	205
Hourly Total	13	276	0	0	289	375	40	0	0	415	28	8	0	0	36	740
4:00 PM	2	61	0	0	63	126	17	0	0	143	7	0	0	0	7	213
4:15 PM	3	79	0	0	82	123	9	0	0	132	9	2	0	0	11	225

4:30 PM	2	98	0	0	100	125	19	0	0	144	7	2	0	0	9	253
4:45 PM	1	65	0	0	66	143	15	0	0	158	12	2	0	0	14	238
Hourly Total	8	303	0	0	311	517	60	0	0	577	35	6	0	0	41	929
5:00 PM	1	91	0	0	92	142	12	0	0	154	13	3	0	0	16	262
5:15 PM	2	88	0	0	90	150	15	0	0	165	9	2	0	0	11	266
5:30 PM	0	82	0	0	82	119	4	0	0	123	10	2	0	0	12	217
5:45 PM	2	64	0	0	66	93	13	0	0	106	9	0	0	0	9	181
Hourly Total	5	325	0	0	330	504	44	0	0	548	41	7	0	0	48	926
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	42	2734	0	0	2776	2541	244	0	0	2785	268	43	0	0	311	5872
Approach %	1.5	98.5	0.0	-	-	91.2	8.8	0.0	-	-	86.2	13.8	0.0	-	-	-
Total %	0.7	46.6	0.0	-	47.3	43.3	4.2	0.0	-	47.4	4.6	0.7	0.0	-	5.3	-
Lights	38	2669	0	-	2707	2494	235	0	-	2729	261	40	0	-	301	5737
% Lights	90.5	97.6	-	-	97.5	98.2	96.3	-	-	98.0	97.4	93.0	-	-	96.8	97.7
Mediums	3	44	0	-	47	32	9	0	-	41	6	3	0	-	9	97
% Mediums	7.1	1.6	-	-	1.7	1.3	3.7	-	-	1.5	2.2	7.0	-	-	2.9	1.7
Articulated Trucks	1	21	0	-	22	15	0	0	-	15	1	0	0	-	1	38
% Articulated Trucks	2.4	0.8	-	-	0.8	0.6	0.0	-	-	0.5	0.4	0.0	-	-	0.3	0.6
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
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Count Name: Erb Street West & Wilmot Line
Site Code:
Start Date: 11/08/2018



Turning Movement Data Plot

Paradigm Transportation Solutions Limited
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Waterloo, Ontario, Canada N2J 1N8
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Count Name: Erb Street West & Wilmot Line
Site Code:
Start Date: 11/08/2018

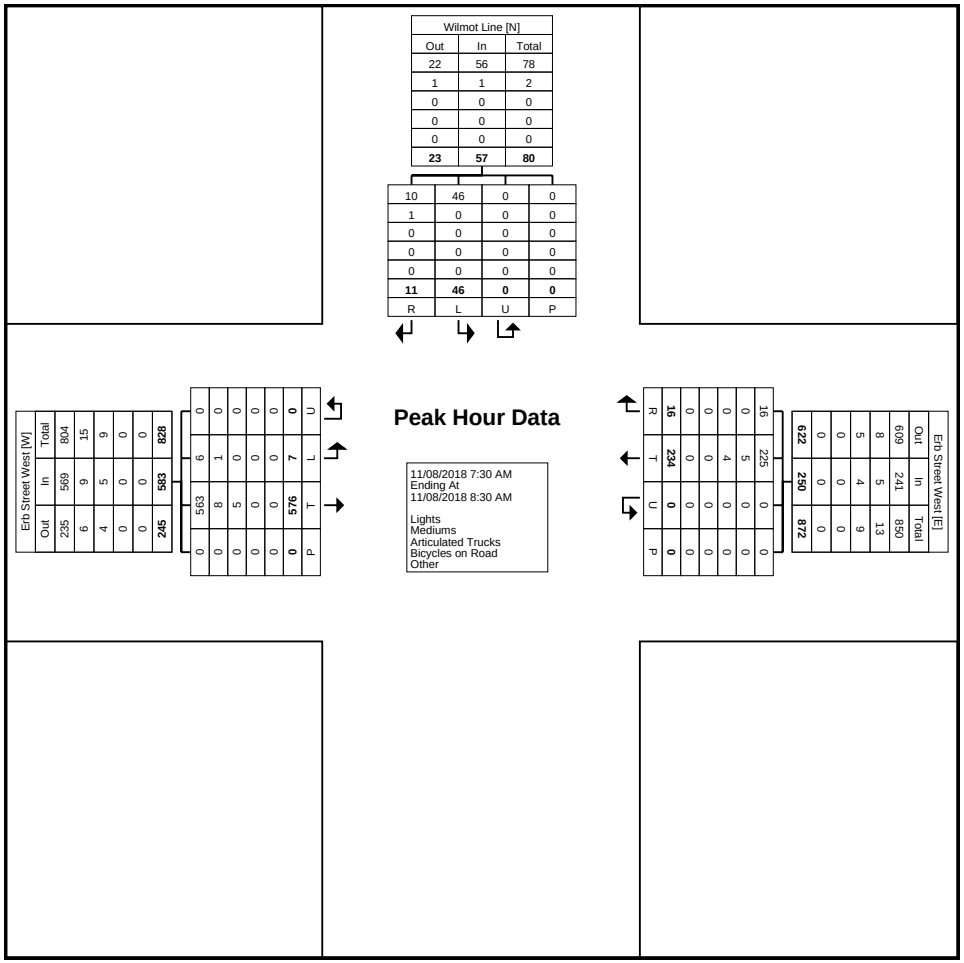
Turning Movement Peak Hour Data (7:30 AM)

Start Time	Erb Street West Eastbound					Erb Street West Westbound					Wilmot Line Southbound					
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	Int. Total
7:30 AM	2	121	0	0	123	68	3	0	0	71	12	4	0	0	16	210
7:45 AM	1	145	0	0	146	62	5	0	0	67	8	6	0	0	14	227
8:00 AM	1	161	0	0	162	56	4	0	0	60	15	1	0	0	16	238
8:15 AM	3	149	0	0	152	48	4	0	0	52	11	0	0	0	11	215
Total	7	576	0	0	583	234	16	0	0	250	46	11	0	0	57	890
Approach %	1.2	98.8	0.0	-	-	93.6	6.4	0.0	-	-	80.7	19.3	0.0	-	-	-
Total %	0.8	64.7	0.0	-	65.5	26.3	1.8	0.0	-	28.1	5.2	1.2	0.0	-	6.4	-
PHF	0.583	0.894	0.000	-	0.900	0.860	0.800	0.000	-	0.880	0.767	0.458	0.000	-	0.891	0.935
Lights	6	563	0	-	569	225	16	0	-	241	46	10	0	-	56	866
% Lights	85.7	97.7	-	-	97.6	96.2	100.0	-	-	96.4	100.0	90.9	-	-	98.2	97.3
Mediums	1	8	0	-	9	5	0	0	-	5	0	1	0	-	1	15
% Mediums	14.3	1.4	-	-	1.5	2.1	0.0	-	-	2.0	0.0	9.1	-	-	1.8	1.7
Articulated Trucks	0	5	0	-	5	4	0	0	-	4	0	0	0	-	0	9
% Articulated Trucks	0.0	0.9	-	-	0.9	1.7	0.0	-	-	1.6	0.0	0.0	-	-	0.0	1.0
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
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Waterloo, Ontario, Canada N2J 1N8
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Count Name: Erb Street West & Wilmot Line
Site Code:
Start Date: 11/08/2018



Turning Movement Peak Hour Data Plot (7:30 AM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

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519-896-3163 cbowness@ptsl.com

Count Name: Erb Street West & Wilmot Line
Site Code:
Start Date: 11/08/2018

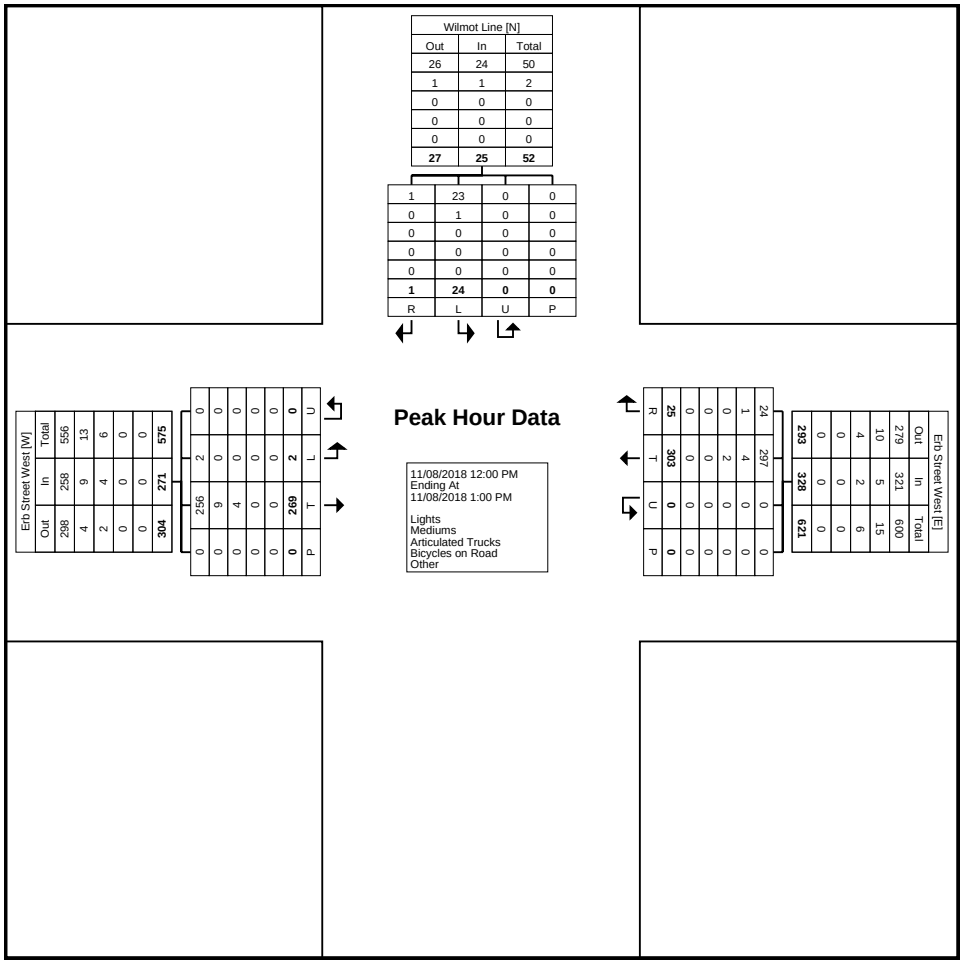
Turning Movement Peak Hour Data (12:00 PM)

Start Time	Erb Street West Eastbound					Erb Street West Westbound					Wilmot Line Southbound					
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	Int. Total
12:00 PM	1	62	0	0	63	78	6	0	0	84	9	0	0	0	9	156
12:15 PM	0	72	0	0	72	78	7	0	0	85	5	0	0	0	5	162
12:30 PM	0	70	0	0	70	71	7	0	0	78	4	1	0	0	5	153
12:45 PM	1	65	0	0	66	76	5	0	0	81	6	0	0	0	6	153
Total	2	269	0	0	271	303	25	0	0	328	24	1	0	0	25	624
Approach %	0.7	99.3	0.0	-	-	92.4	7.6	0.0	-	-	96.0	4.0	0.0	-	-	-
Total %	0.3	43.1	0.0	-	43.4	48.6	4.0	0.0	-	52.6	3.8	0.2	0.0	-	4.0	-
PHF	0.500	0.934	0.000	-	0.941	0.971	0.893	0.000	-	0.965	0.667	0.250	0.000	-	0.694	0.963
Lights	2	256	0	-	258	297	24	0	-	321	23	1	0	-	24	603
% Lights	100.0	95.2	-	-	95.2	98.0	96.0	-	-	97.9	95.8	100.0	-	-	96.0	96.6
Mediums	0	9	0	-	9	4	1	0	-	5	1	0	0	-	1	15
% Mediums	0.0	3.3	-	-	3.3	1.3	4.0	-	-	1.5	4.2	0.0	-	-	4.0	2.4
Articulated Trucks	0	4	0	-	4	2	0	0	-	2	0	0	0	-	0	6
% Articulated Trucks	0.0	1.5	-	-	1.5	0.7	0.0	-	-	0.6	0.0	0.0	-	-	0.0	1.0
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Count Name: Erb Street West & Wilmot Line
Site Code:
Start Date: 11/08/2018



Turning Movement Peak Hour Data Plot (12:00 PM)

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Count Name: Erb Street West & Wilmot Line
Site Code:
Start Date: 11/08/2018

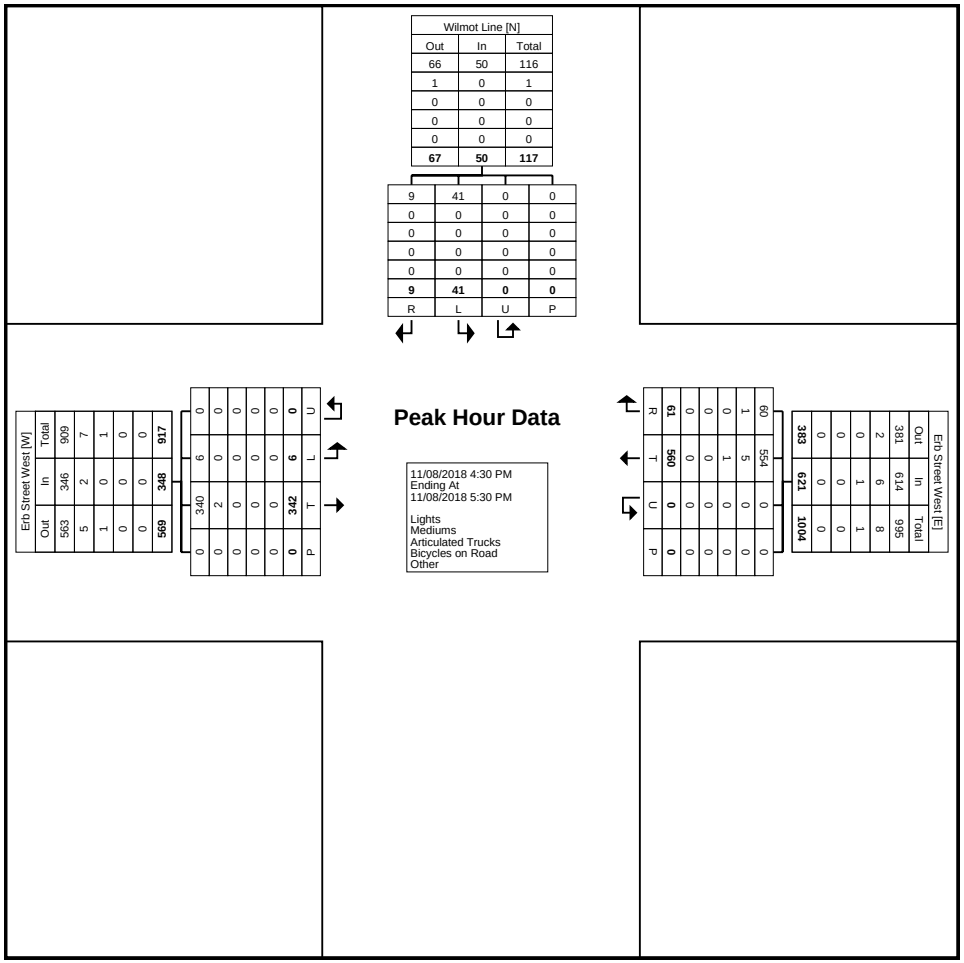
Turning Movement Peak Hour Data (4:30 PM)

Start Time	Erb Street West Eastbound					Erb Street West Westbound					Wilmot Line Southbound					
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	Int. Total
4:30 PM	2	98	0	0	100	125	19	0	0	144	7	2	0	0	9	253
4:45 PM	1	65	0	0	66	143	15	0	0	158	12	2	0	0	14	238
5:00 PM	1	91	0	0	92	142	12	0	0	154	13	3	0	0	16	262
5:15 PM	2	88	0	0	90	150	15	0	0	165	9	2	0	0	11	266
Total	6	342	0	0	348	560	61	0	0	621	41	9	0	0	50	1019
Approach %	1.7	98.3	0.0	-	-	90.2	9.8	0.0	-	-	82.0	18.0	0.0	-	-	-
Total %	0.6	33.6	0.0	-	34.2	55.0	6.0	0.0	-	60.9	4.0	0.9	0.0	-	4.9	-
PHF	0.750	0.872	0.000	-	0.870	0.933	0.803	0.000	-	0.941	0.788	0.750	0.000	-	0.781	0.958
Lights	6	340	0	-	346	554	60	0	-	614	41	9	0	-	50	1010
% Lights	100.0	99.4	-	-	99.4	98.9	98.4	-	-	98.9	100.0	100.0	-	-	100.0	99.1
Mediums	0	2	0	-	2	5	1	0	-	6	0	0	0	-	0	8
% Mediums	0.0	0.6	-	-	0.6	0.9	1.6	-	-	1.0	0.0	0.0	-	-	0.0	0.8
Articulated Trucks	0	0	0	-	0	1	0	0	-	1	0	0	0	-	0	1
% Articulated Trucks	0.0	0.0	-	-	0.0	0.2	0.0	-	-	0.2	0.0	0.0	-	-	0.0	0.1
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Turning Movement Peak Hour Data Plot (4:30 PM)

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519-896-3163 cbowness@ptsl.com

Count Name: Ira Needles Blvd & Boardwalk Entrance Middle - Saturday
Site Code:
Start Date: 11/10/2018

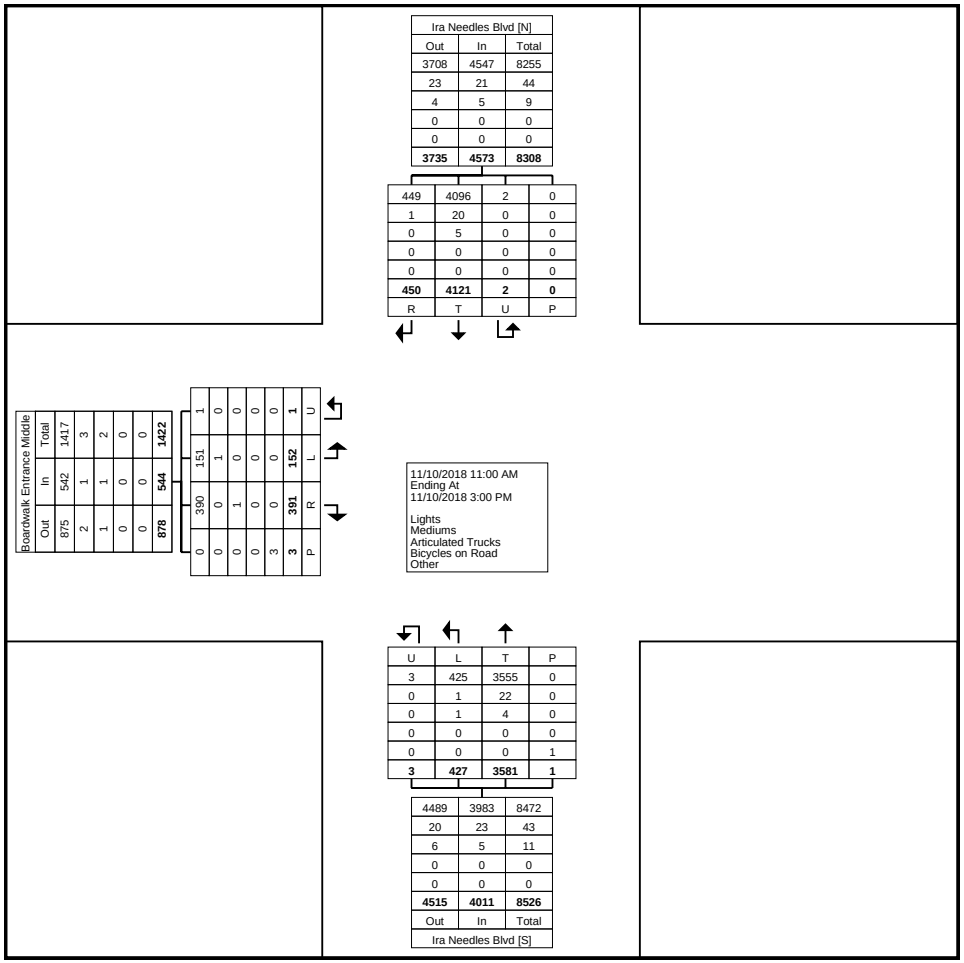
Turning Movement Data

Start Time	Boardwalk Entrance Middle Eastbound					Ira Needles Blvd Northbound					Ira Needles Blvd Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
11:00 AM	7	30	0	0	37	23	216	0	0	239	218	27	0	0	245	521
11:15 AM	6	21	0	1	27	26	199	0	0	225	257	21	0	0	278	530
11:30 AM	10	24	1	0	35	25	197	1	0	223	256	20	1	0	277	535
11:45 AM	7	24	0	0	31	33	200	0	0	233	276	18	0	0	294	558
Hourly Total	30	99	1	1	130	107	812	1	0	920	1007	86	1	0	1094	2144
12:00 PM	4	26	0	0	30	22	223	1	0	246	278	41	0	0	319	595
12:15 PM	5	25	0	1	30	34	253	0	0	287	240	23	0	0	263	580
12:30 PM	9	37	0	0	46	43	229	0	0	272	236	31	0	0	267	585
12:45 PM	19	15	0	0	34	33	212	0	0	245	238	35	0	0	273	552
Hourly Total	37	103	0	1	140	132	917	1	0	1050	992	130	0	0	1122	2312
1:00 PM	13	29	0	0	42	24	227	0	0	251	248	31	0	0	279	572
1:15 PM	5	30	0	0	35	28	256	1	0	285	256	22	0	0	278	598
1:30 PM	13	28	0	0	41	17	205	0	0	222	259	22	0	0	281	544
1:45 PM	9	17	0	0	26	32	220	0	0	252	278	30	0	0	308	586
Hourly Total	40	104	0	0	144	101	908	1	0	1010	1041	105	0	0	1146	2300
2:00 PM	10	18	0	0	28	21	227	0	1	248	280	31	1	0	312	588
2:15 PM	9	22	0	0	31	17	239	0	0	256	270	41	0	0	311	598
2:30 PM	15	21	0	0	36	21	232	0	0	253	261	30	0	0	291	580
2:45 PM	11	24	0	1	35	28	246	0	0	274	270	27	0	0	297	606
Hourly Total	45	85	0	1	130	87	944	0	1	1031	1081	129	1	0	1211	2372
Grand Total	152	391	1	3	544	427	3581	3	1	4011	4121	450	2	0	4573	9128
Approach %	27.9	71.9	0.2	-	-	10.6	89.3	0.1	-	-	90.1	9.8	0.0	-	-	-
Total %	1.7	4.3	0.0	-	6.0	4.7	39.2	0.0	-	43.9	45.1	4.9	0.0	-	50.1	-
Lights	151	390	1	-	542	425	3555	3	-	3983	4096	449	2	-	4547	9072
% Lights	99.3	99.7	100.0	-	99.6	99.5	99.3	100.0	-	99.3	99.4	99.8	100.0	-	99.4	99.4
Mediums	1	0	0	-	1	1	22	0	-	23	20	1	0	-	21	45
% Mediums	0.7	0.0	0.0	-	0.2	0.2	0.6	0.0	-	0.6	0.5	0.2	0.0	-	0.5	0.5
Articulated Trucks	0	1	0	-	1	1	4	0	-	5	5	0	0	-	5	11
% Articulated Trucks	0.0	0.3	0.0	-	0.2	0.2	0.1	0.0	-	0.1	0.1	0.0	0.0	-	0.1	0.1
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	1	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	33.3	-	-	-	-	0.0	-	-	-	-	-	-	-
Pedestrians	-	-	-	2	-	-	-	-	1	-	-	-	-	0	-	-
% Pedestrians	-	-	-	66.7	-	-	-	-	100.0	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
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Count Name: Ira Needles Blvd & Boardwalk Entrance Middle - Saturday
Site Code:
Start Date: 11/10/2018



Turning Movement Data Plot

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Count Name: Ira Needles Blvd & Boardwalk Entrance Middle - Saturday
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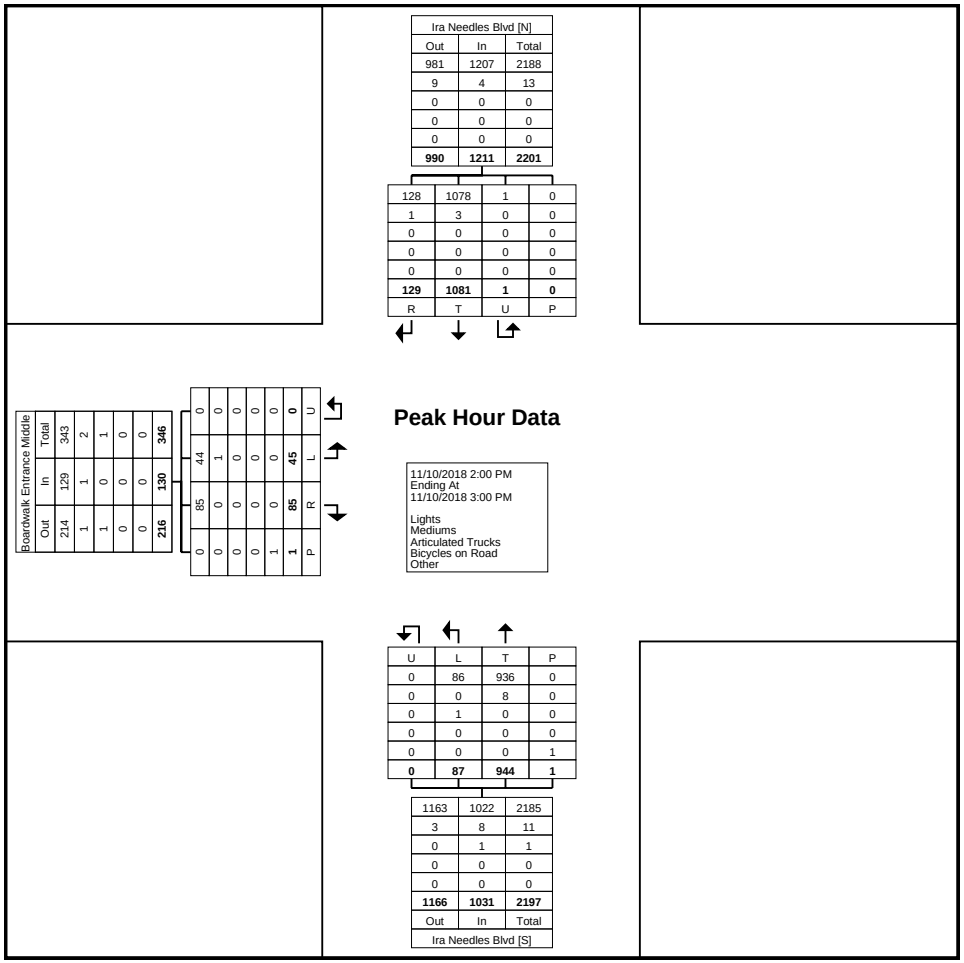
Turning Movement Peak Hour Data (2:00 PM)

Start Time	Boardwalk Entrance Middle Eastbound					Ira Needles Blvd Northbound					Ira Needles Blvd Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
2:00 PM	10	18	0	0	28	21	227	0	1	248	280	31	1	0	312	588
2:15 PM	9	22	0	0	31	17	239	0	0	256	270	41	0	0	311	598
2:30 PM	15	21	0	0	36	21	232	0	0	253	261	30	0	0	291	580
2:45 PM	11	24	0	1	35	28	246	0	0	274	270	27	0	0	297	606
Total	45	85	0	1	130	87	944	0	1	1031	1081	129	1	0	1211	2372
Approach %	34.6	65.4	0.0	-	-	8.4	91.6	0.0	-	-	89.3	10.7	0.1	-	-	-
Total %	1.9	3.6	0.0	-	5.5	3.7	39.8	0.0	-	43.5	45.6	5.4	0.0	-	51.1	-
PHF	0.750	0.885	0.000	-	0.903	0.777	0.959	0.000	-	0.941	0.965	0.787	0.250	-	0.970	0.979
Lights	44	85	0	-	129	86	936	0	-	1022	1078	128	1	-	1207	2358
% Lights	97.8	100.0	-	-	99.2	98.9	99.2	-	-	99.1	99.7	99.2	100.0	-	99.7	99.4
Mediums	1	0	0	-	1	0	8	0	-	8	3	1	0	-	4	13
% Mediums	2.2	0.0	-	-	0.8	0.0	0.8	-	-	0.8	0.3	0.8	0.0	-	0.3	0.5
Articulated Trucks	0	0	0	-	0	1	0	0	-	1	0	0	0	-	0	1
% Articulated Trucks	0.0	0.0	-	-	0.0	1.1	0.0	-	-	0.1	0.0	0.0	0.0	-	0.0	0.0
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	1	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	100.0	-	-	-	-	0.0	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	1	-	-	-	-	0	-	-
% Pedestrians	-	-	-	0.0	-	-	-	-	100.0	-	-	-	-	-	-	-

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Site Code:
Start Date: 11/10/2018



Turning Movement Peak Hour Data Plot (2:00 PM)

Paradigm Transportation Solutions Limited
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Count Name: Ira Needles Blvd & Boardwalk Entrance Middle - Saturday
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Turning Movement Data

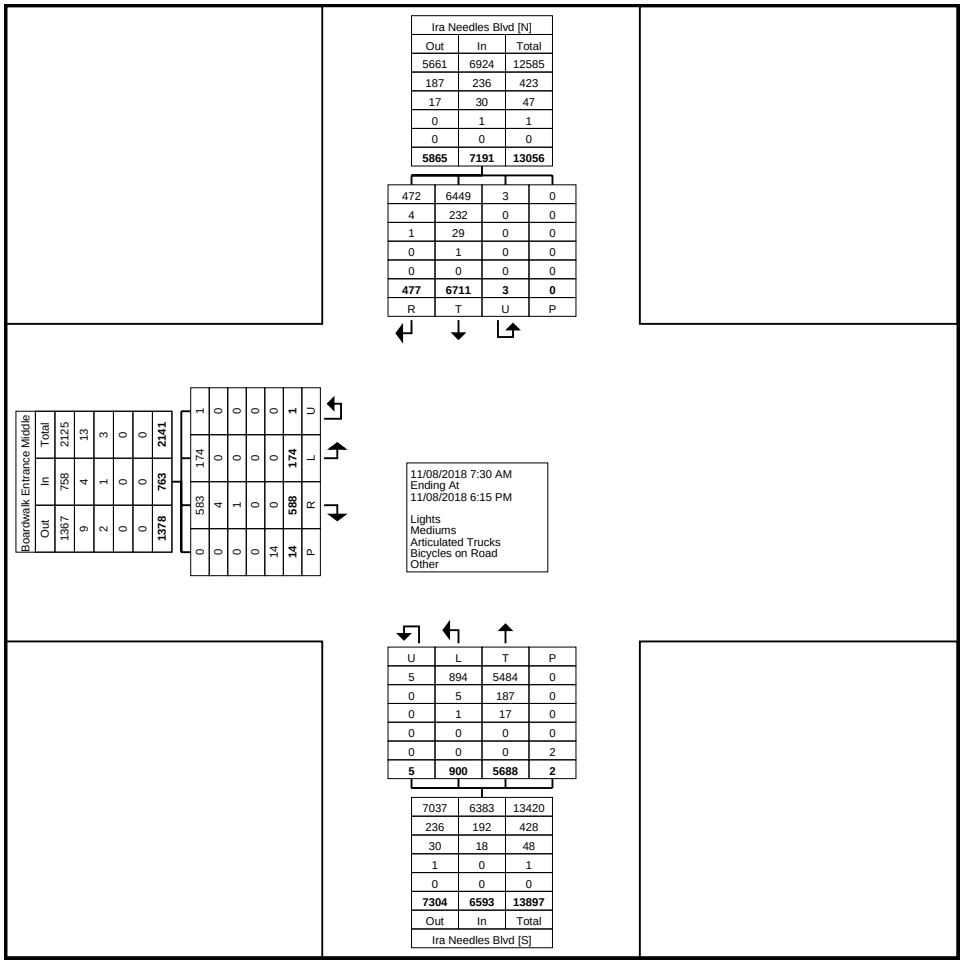
Start Time	Boardwalk Entrance Middle Eastbound					Ira Needles Blvd Northbound					Ira Needles Blvd Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	
7:30 AM	3	13	0	0	16	18	120	0	0	138	208	3	0	0	211	365
7:45 AM	4	6	0	0	10	24	163	0	0	187	193	3	0	0	196	393
Hourly Total	7	19	0	0	26	42	283	0	0	325	401	6	0	0	407	758
8:00 AM	1	6	0	0	7	24	186	0	0	210	217	8	0	0	225	442
8:15 AM	2	9	0	0	11	23	178	0	0	201	209	6	0	0	215	427
8:30 AM	3	5	0	0	8	20	193	0	0	213	254	15	0	0	269	490
8:45 AM	5	15	0	0	20	47	184	0	0	231	184	14	0	0	198	449
Hourly Total	11	35	0	0	46	114	741	0	0	855	864	43	0	0	907	1808
9:00 AM	2	14	0	0	16	28	140	1	0	169	179	11	0	0	190	375
9:15 AM	8	12	0	0	20	32	134	0	0	166	178	16	0	0	194	380
9:30 AM	5	11	0	1	16	32	135	0	0	167	148	9	0	0	157	340
9:45 AM	8	16	1	0	25	31	141	0	0	172	174	9	0	0	183	380
Hourly Total	23	53	1	1	77	123	550	1	0	674	679	45	0	0	724	1475
10:00 AM	4	27	0	2	31	30	116	0	0	146	147	13	0	0	160	337
10:15 AM	6	21	0	0	27	42	154	0	0	196	168	18	0	0	186	409
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	10	48	0	2	58	72	270	0	0	342	315	31	0	0	346	746
12:00 PM	4	23	0	2	27	25	156	1	0	182	182	22	0	0	204	413
12:15 PM	3	17	0	0	20	29	167	1	0	197	210	10	0	0	220	437
12:30 PM	5	18	0	1	23	23	153	0	0	176	187	20	1	0	208	407
12:45 PM	10	24	0	0	34	24	172	0	0	196	183	20	0	0	203	433
Hourly Total	22	82	0	3	104	101	648	2	0	751	762	72	1	0	835	1690
1:00 PM	5	16	0	0	21	22	141	0	0	163	159	16	1	0	176	360
1:15 PM	15	12	0	1	27	28	167	0	0	195	178	20	0	0	198	420
1:30 PM	5	16	0	0	21	27	153	0	0	180	178	16	0	0	194	395
1:45 PM	6	18	0	0	24	33	148	0	0	181	200	18	0	0	218	423
Hourly Total	31	62	0	1	93	110	609	0	0	719	715	70	1	0	786	1598
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	10	15	0	0	25	21	190	1	0	212	211	13	1	0	225	462
3:15 PM	7	20	0	1	27	27	196	1	0	224	207	16	0	0	223	474
3:30 PM	7	23	0	1	30	28	180	0	0	208	216	16	0	0	232	470
3:45 PM	3	29	0	0	32	34	228	0	0	262	230	9	0	0	239	533
Hourly Total	27	87	0	2	114	110	794	2	0	906	864	54	1	0	919	1939
4:00 PM	5	20	0	1	25	25	219	0	0	244	228	17	0	0	245	514
4:15 PM	6	14	0	1	20	28	232	0	0	260	257	12	0	0	269	549
4:30 PM	8	18	0	1	26	26	223	0	0	249	289	18	0	0	307	582
4:45 PM	3	29	0	1	32	27	232	0	1	259	285	18	0	0	303	594

Hourly Total	22	81	0	4	103	106	906	0	1	1012	1059	65	0	0	1124	2239
5:00 PM	3	37	0	1	40	25	222	0	0	247	291	24	0	0	315	602
5:15 PM	6	32	0	0	38	42	214	0	1	256	252	30	0	0	282	576
5:30 PM	6	26	0	0	32	23	223	0	0	246	281	14	0	0	295	573
5:45 PM	6	26	0	0	32	32	227	0	0	259	228	23	0	0	251	542
Hourly Total	21	121	0	1	142	122	886	0	1	1008	1052	91	0	0	1143	2293
6:00 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
Grand Total	174	588	1	14	763	900	5688	5	2	6593	6711	477	3	0	7191	14547
Approach %	22.8	77.1	0.1	-	-	13.7	86.3	0.1	-	-	93.3	6.6	0.0	-	-	-
Total %	1.2	4.0	0.0	-	5.2	6.2	39.1	0.0	-	45.3	46.1	3.3	0.0	-	49.4	-
Lights	174	583	1	-	758	894	5484	5	-	6383	6449	472	3	-	6924	14065
% Lights	100.0	99.1	100.0	-	99.3	99.3	96.4	100.0	-	96.8	96.1	99.0	100.0	-	96.3	96.7
Mediums	0	4	0	-	4	5	187	0	-	192	232	4	0	-	236	432
% Mediums	0.0	0.7	0.0	-	0.5	0.6	3.3	0.0	-	2.9	3.5	0.8	0.0	-	3.3	3.0
Articulated Trucks	0	1	0	-	1	1	17	0	-	18	29	1	0	-	30	49
% Articulated Trucks	0.0	0.2	0.0	-	0.1	0.1	0.3	0.0	-	0.3	0.4	0.2	0.0	-	0.4	0.3
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	1	0	0	-	1	1
% Bicycles on Road	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	-	-	-
Pedestrians	-	-	-	14	-	-	-	-	2	-	-	-	-	0	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	-	-	-

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Site Code:
Start Date: 11/08/2018



Turning Movement Data Plot

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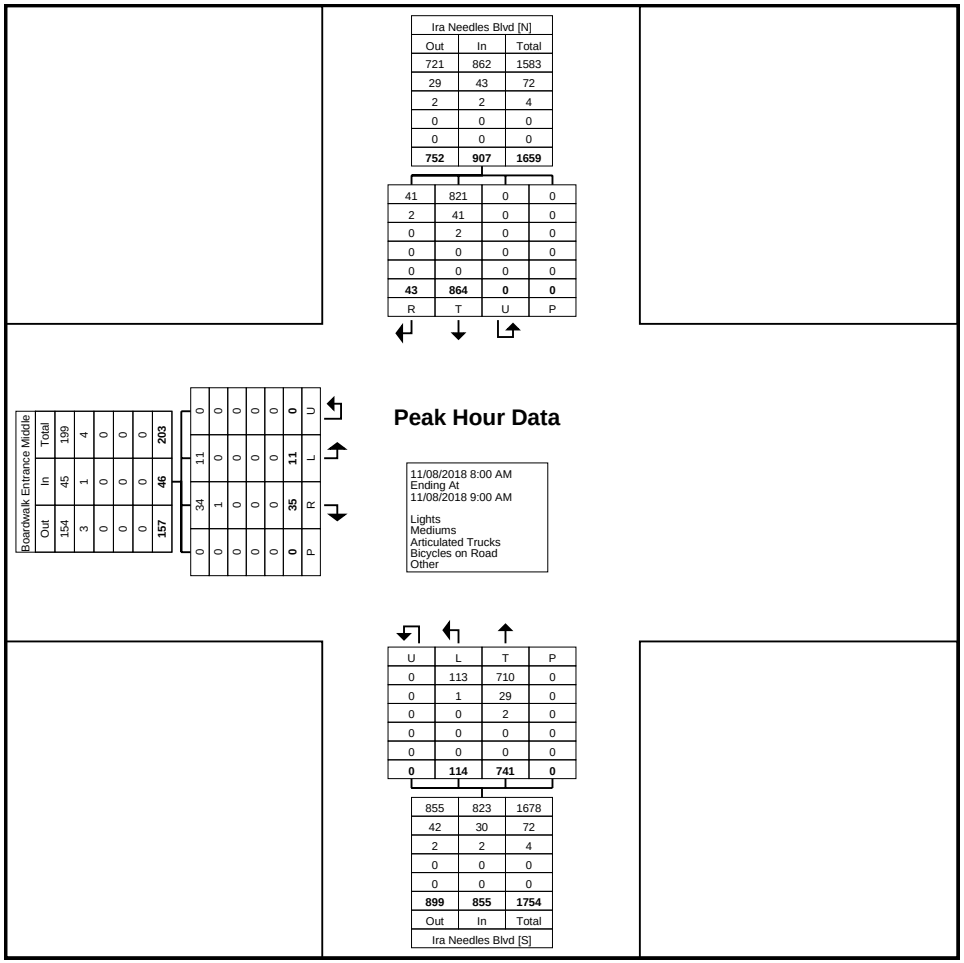
Turning Movement Peak Hour Data (8:00 AM)

Start Time	Boardwalk Entrance Middle Eastbound					Ira Needles Blvd Northbound					Ira Needles Blvd Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
8:00 AM	1	6	0	0	7	24	186	0	0	210	217	8	0	0	225	442
8:15 AM	2	9	0	0	11	23	178	0	0	201	209	6	0	0	215	427
8:30 AM	3	5	0	0	8	20	193	0	0	213	254	15	0	0	269	490
8:45 AM	5	15	0	0	20	47	184	0	0	231	184	14	0	0	198	449
Total	11	35	0	0	46	114	741	0	0	855	864	43	0	0	907	1808
Approach %	23.9	76.1	0.0	-	-	13.3	86.7	0.0	-	-	95.3	4.7	0.0	-	-	-
Total %	0.6	1.9	0.0	-	2.5	6.3	41.0	0.0	-	47.3	47.8	2.4	0.0	-	50.2	-
PHF	0.550	0.583	0.000	-	0.575	0.606	0.960	0.000	-	0.925	0.850	0.717	0.000	-	0.843	0.922
Lights	11	34	0	-	45	113	710	0	-	823	821	41	0	-	862	1730
% Lights	100.0	97.1	-	-	97.8	99.1	95.8	-	-	96.3	95.0	95.3	-	-	95.0	95.7
Mediums	0	1	0	-	1	1	29	0	-	30	41	2	0	-	43	74
% Mediums	0.0	2.9	-	-	2.2	0.9	3.9	-	-	3.5	4.7	4.7	-	-	4.7	4.1
Articulated Trucks	0	0	0	-	0	0	2	0	-	2	2	0	0	-	2	4
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.3	-	-	0.2	0.2	0.0	-	-	0.2	0.2
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Turning Movement Peak Hour Data Plot (8:00 AM)

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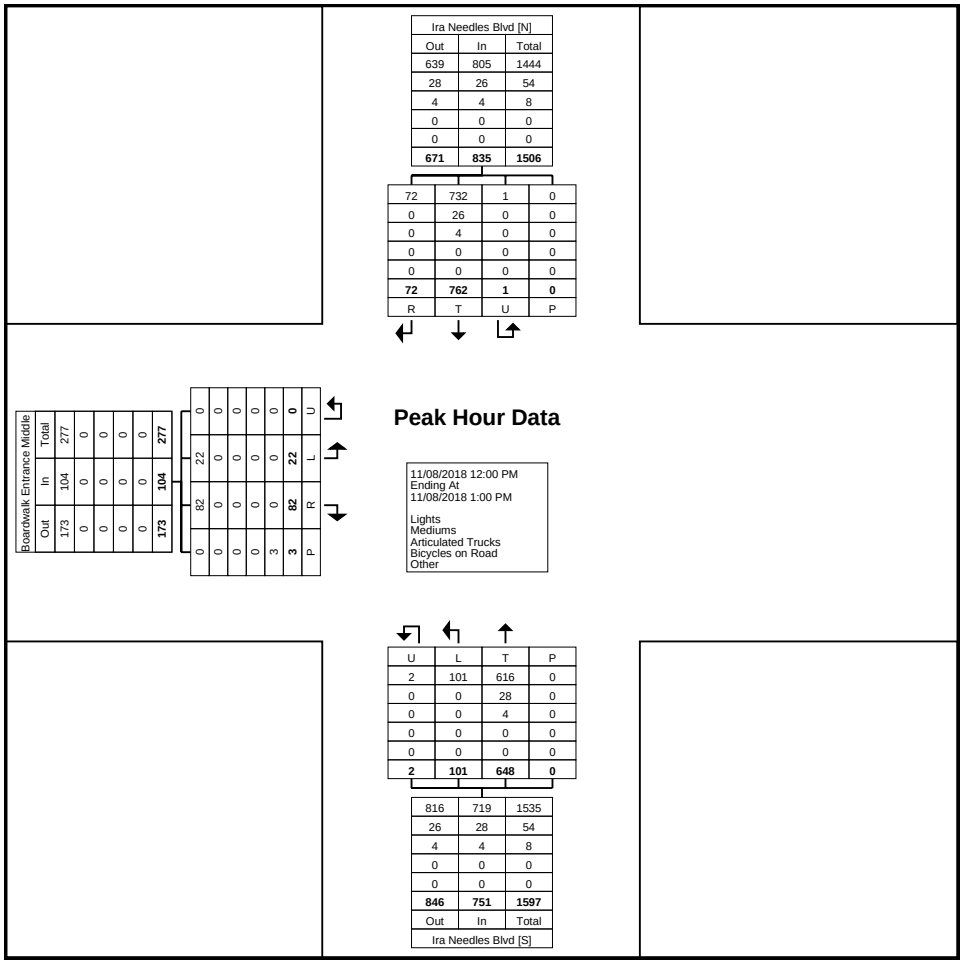
Turning Movement Peak Hour Data (12:00 PM)

Start Time	Boardwalk Entrance Middle Eastbound					Ira Needles Blvd Northbound					Ira Needles Blvd Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
12:00 PM	4	23	0	2	27	25	156	1	0	182	182	22	0	0	204	413
12:15 PM	3	17	0	0	20	29	167	1	0	197	210	10	0	0	220	437
12:30 PM	5	18	0	1	23	23	153	0	0	176	187	20	1	0	208	407
12:45 PM	10	24	0	0	34	24	172	0	0	196	183	20	0	0	203	433
Total	22	82	0	3	104	101	648	2	0	751	762	72	1	0	835	1690
Approach %	21.2	78.8	0.0	-	-	13.4	86.3	0.3	-	-	91.3	8.6	0.1	-	-	-
Total %	1.3	4.9	0.0	-	6.2	6.0	38.3	0.1	-	44.4	45.1	4.3	0.1	-	49.4	-
PHF	0.550	0.854	0.000	-	0.765	0.871	0.942	0.500	-	0.953	0.907	0.818	0.250	-	0.949	0.967
Lights	22	82	0	-	104	101	616	2	-	719	732	72	1	-	805	1628
% Lights	100.0	100.0	-	-	100.0	100.0	95.1	100.0	-	95.7	96.1	100.0	100.0	-	96.4	96.3
Mediums	0	0	0	-	0	0	28	0	-	28	26	0	0	-	26	54
% Mediums	0.0	0.0	-	-	0.0	0.0	4.3	0.0	-	3.7	3.4	0.0	0.0	-	3.1	3.2
Articulated Trucks	0	0	0	-	0	0	4	0	-	4	4	0	0	-	4	8
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.6	0.0	-	0.5	0.5	0.0	0.0	-	0.5	0.5
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	3	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Ira Needles Blvd & Boardwalk Entrance Middle
Site Code:
Start Date: 11/08/2018



Turning Movement Peak Hour Data Plot (12:00 PM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
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Count Name: Ira Needles Blvd & Boardwalk Entrance Middle
Site Code:
Start Date: 11/08/2018

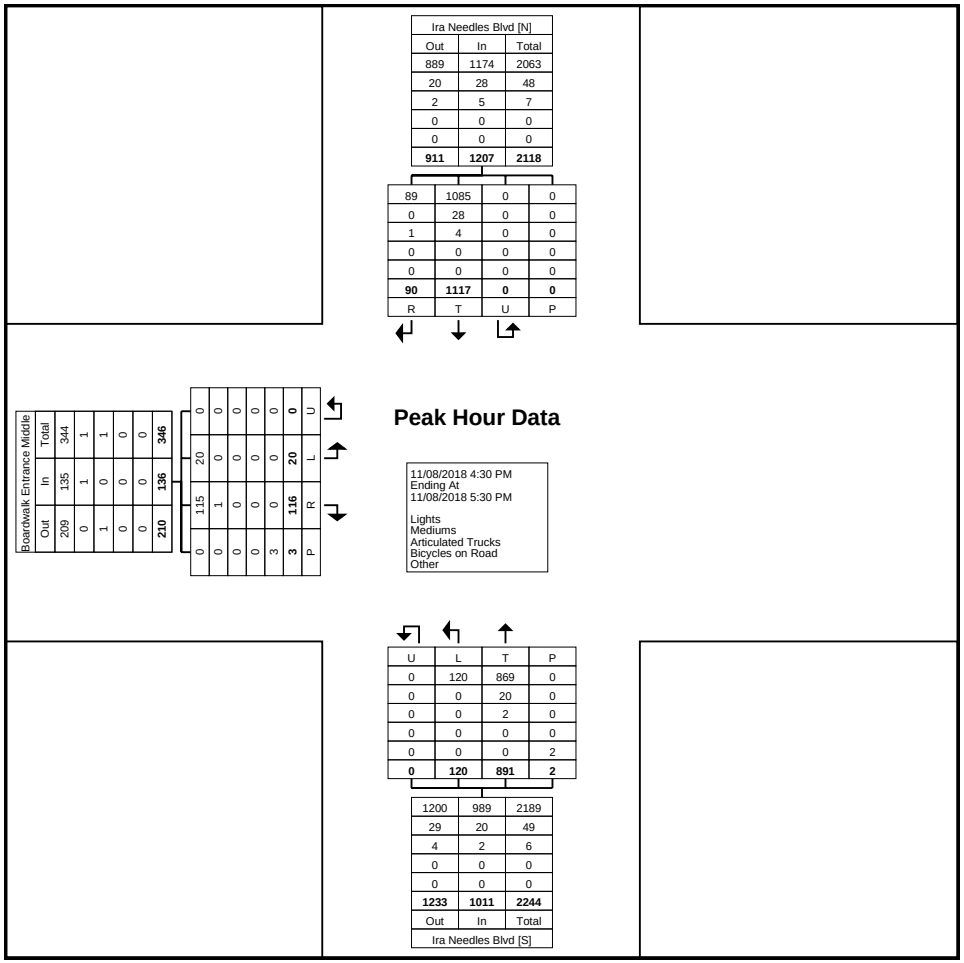
Turning Movement Peak Hour Data (4:30 PM)

Start Time	Boardwalk Entrance Middle Eastbound					Ira Needles Blvd Northbound					Ira Needles Blvd Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
4:30 PM	8	18	0	1	26	26	223	0	0	249	289	18	0	0	307	582
4:45 PM	3	29	0	1	32	27	232	0	1	259	285	18	0	0	303	594
5:00 PM	3	37	0	1	40	25	222	0	0	247	291	24	0	0	315	602
5:15 PM	6	32	0	0	38	42	214	0	1	256	252	30	0	0	282	576
Total	20	116	0	3	136	120	891	0	2	1011	1117	90	0	0	1207	2354
Approach %	14.7	85.3	0.0	-	-	11.9	88.1	0.0	-	-	92.5	7.5	0.0	-	-	-
Total %	0.8	4.9	0.0	-	5.8	5.1	37.9	0.0	-	42.9	47.5	3.8	0.0	-	51.3	-
PHF	0.625	0.784	0.000	-	0.850	0.714	0.960	0.000	-	0.976	0.960	0.750	0.000	-	0.958	0.978
Lights	20	115	0	-	135	120	869	0	-	989	1085	89	0	-	1174	2298
% Lights	100.0	99.1	-	-	99.3	100.0	97.5	-	-	97.8	97.1	98.9	-	-	97.3	97.6
Mediums	0	1	0	-	1	0	20	0	-	20	28	0	0	-	28	49
% Mediums	0.0	0.9	-	-	0.7	0.0	2.2	-	-	2.0	2.5	0.0	-	-	2.3	2.1
Articulated Trucks	0	0	0	-	0	0	2	0	-	2	4	1	0	-	5	7
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.2	-	-	0.2	0.4	1.1	-	-	0.4	0.3
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	-	-	-
Pedestrians	-	-	-	3	-	-	-	-	2	-	-	-	-	0	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
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Count Name: Ira Needles Blvd & Boardwalk Entrance Middle
Site Code:
Start Date: 11/08/2018



Turning Movement Peak Hour Data Plot (4:30 PM)

Paradigm Transportation Solutions Limited
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Count Name: Ira Needles Blvd & Boardwalk Entrance Middle
Site Code:
Start Date: 11/08/2018

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Count Name: Ira Needles Blvd & Boardwalk Entrance North
Site Code:
Start Date: 11/08/2018

Turning Movement Data

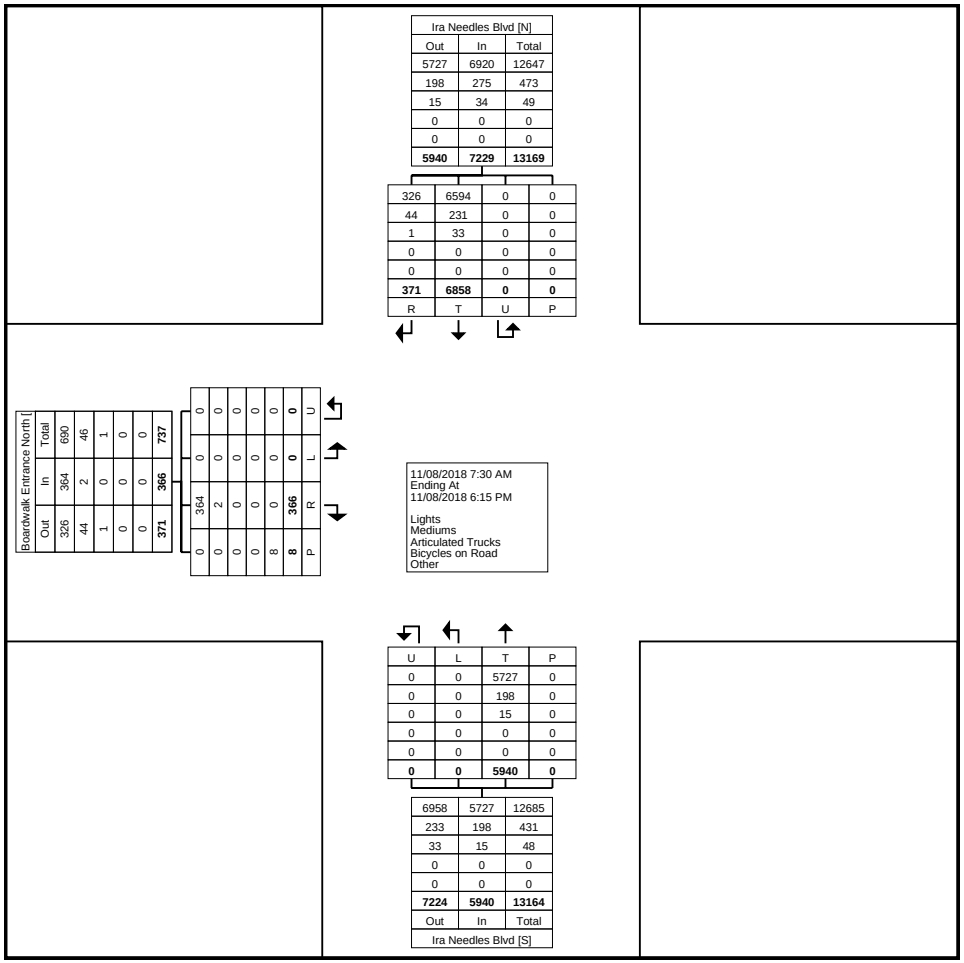
Start Time	Boardwalk Entrance North Eastbound					Ira Needles Blvd Northbound					Ira Needles Blvd Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	
7:30 AM	0	4	0	0	4	0	134	0	0	134	206	6	0	0	212	350
7:45 AM	0	2	0	1	2	0	162	0	0	162	189	5	0	0	194	358
Hourly Total	0	6	0	1	6	0	296	0	0	296	395	11	0	0	406	708
8:00 AM	0	3	0	0	3	0	200	0	0	200	229	4	0	0	233	436
8:15 AM	0	3	0	0	3	0	186	0	0	186	211	12	0	0	223	412
8:30 AM	0	4	0	0	4	0	191	0	0	191	259	8	0	0	267	462
8:45 AM	0	8	0	0	8	0	190	0	0	190	193	12	0	0	205	403
Hourly Total	0	18	0	0	18	0	767	0	0	767	892	36	0	0	928	1713
9:00 AM	0	12	0	0	12	0	139	0	0	139	174	5	0	0	179	330
9:15 AM	0	6	0	0	6	0	141	0	0	141	185	13	0	0	198	345
9:30 AM	0	9	0	0	9	0	145	0	0	145	152	13	0	0	165	319
9:45 AM	0	15	0	0	15	0	155	0	0	155	164	19	0	0	183	353
Hourly Total	0	42	0	0	42	0	580	0	0	580	675	50	0	0	725	1347
10:00 AM	0	8	0	0	8	0	118	0	0	118	152	11	0	0	163	289
10:15 AM	0	14	0	0	14	0	151	0	0	151	170	13	0	0	183	348
10:30 AM	0	0	0	0	0	0	1	0	0	1	1	0	0	0	1	2
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	22	0	0	22	0	270	0	0	270	323	24	0	0	347	639
12:00 PM	0	16	0	0	16	0	172	0	0	172	191	13	0	0	204	392
12:15 PM	0	14	0	0	14	0	182	0	0	182	213	8	0	0	221	417
12:30 PM	0	9	0	0	9	0	171	0	0	171	202	9	0	0	211	391
12:45 PM	0	8	0	0	8	0	181	0	0	181	194	26	0	0	220	409
Hourly Total	0	47	0	0	47	0	706	0	0	706	800	56	0	0	856	1609
1:00 PM	0	12	0	0	12	0	154	0	0	154	167	7	0	0	174	340
1:15 PM	0	7	0	1	7	0	183	0	0	183	188	15	0	0	203	393
1:30 PM	0	21	0	0	21	0	155	0	0	155	181	14	0	0	195	371
1:45 PM	0	10	0	0	10	0	154	0	0	154	212	16	0	0	228	392
Hourly Total	0	50	0	1	50	0	646	0	0	646	748	52	0	0	800	1496
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	0	19	0	0	19	0	205	0	0	205	216	16	0	0	232	456
3:15 PM	0	20	0	0	20	0	204	0	0	204	210	10	0	0	220	444
3:30 PM	0	14	0	0	14	0	194	0	0	194	224	18	0	0	242	450
3:45 PM	0	15	0	0	15	0	226	0	0	226	224	18	0	0	242	483
Hourly Total	0	68	0	0	68	0	829	0	0	829	874	62	0	0	936	1833
4:00 PM	0	16	0	0	16	0	224	0	0	224	236	11	0	0	247	487
4:15 PM	0	14	0	0	14	0	241	0	0	241	256	16	0	0	272	527

4:30 PM	0	17	0	1	17	0	231	0	0	231	290	6	0	0	296	544
4:45 PM	0	14	0	1	14	0	232	0	0	232	294	7	0	0	301	547
Hourly Total	0	61	0	2	61	0	928	0	0	928	1076	40	0	0	1116	2105
5:00 PM	0	16	0	3	16	0	223	0	0	223	290	10	0	0	300	539
5:15 PM	0	13	0	0	13	0	224	0	0	224	280	7	0	0	287	524
5:30 PM	0	10	0	1	10	0	231	0	0	231	278	11	0	0	289	530
5:45 PM	0	13	0	0	13	0	239	0	0	239	227	12	0	0	239	491
Hourly Total	0	52	0	4	52	0	917	0	0	917	1075	40	0	0	1115	2084
6:00 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
Grand Total	0	366	0	8	366	0	5940	0	0	5940	6858	371	0	0	7229	13535
Approach %	0.0	100.0	0.0	-	-	0.0	100.0	0.0	-	-	94.9	5.1	0.0	-	-	-
Total %	0.0	2.7	0.0	-	2.7	0.0	43.9	0.0	-	43.9	50.7	2.7	0.0	-	53.4	-
Lights	0	364	0	-	364	0	5727	0	-	5727	6594	326	0	-	6920	13011
% Lights	-	99.5	-	-	99.5	-	96.4	-	-	96.4	96.2	87.9	-	-	95.7	96.1
Mediums	0	2	0	-	2	0	198	0	-	198	231	44	0	-	275	475
% Mediums	-	0.5	-	-	0.5	-	3.3	-	-	3.3	3.4	11.9	-	-	3.8	3.5
Articulated Trucks	0	0	0	-	0	0	15	0	-	15	33	1	0	-	34	49
% Articulated Trucks	-	0.0	-	-	0.0	-	0.3	-	-	0.3	0.5	0.3	-	-	0.5	0.4
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	-	0.0	-	-	0.0	-	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	8	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
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Count Name: Ira Needles Blvd & Boardwalk Entrance North
Site Code:
Start Date: 11/08/2018



Turning Movement Data Plot

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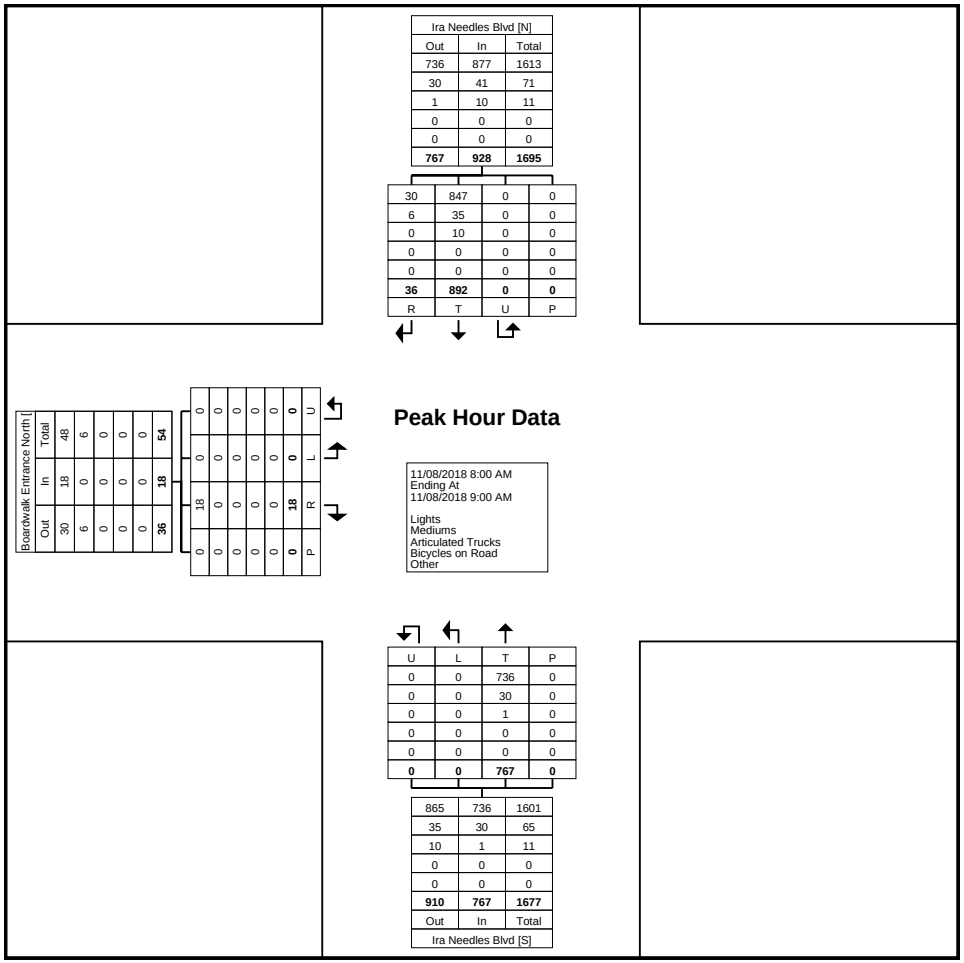
Turning Movement Peak Hour Data (8:00 AM)

Start Time	Boardwalk Entrance North Eastbound					Ira Needles Blvd Northbound					Ira Needles Blvd Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
8:00 AM	0	3	0	0	3	0	200	0	0	200	229	4	0	0	233	436
8:15 AM	0	3	0	0	3	0	186	0	0	186	211	12	0	0	223	412
8:30 AM	0	4	0	0	4	0	191	0	0	191	259	8	0	0	267	462
8:45 AM	0	8	0	0	8	0	190	0	0	190	193	12	0	0	205	403
Total	0	18	0	0	18	0	767	0	0	767	892	36	0	0	928	1713
Approach %	0.0	100.0	0.0	-	-	0.0	100.0	0.0	-	-	96.1	3.9	0.0	-	-	-
Total %	0.0	1.1	0.0	-	1.1	0.0	44.8	0.0	-	44.8	52.1	2.1	0.0	-	54.2	-
PHF	0.000	0.563	0.000	-	0.563	0.000	0.959	0.000	-	0.959	0.861	0.750	0.000	-	0.869	0.927
Lights	0	18	0	-	18	0	736	0	-	736	847	30	0	-	877	1631
% Lights	-	100.0	-	-	100.0	-	96.0	-	-	96.0	95.0	83.3	-	-	94.5	95.2
Mediums	0	0	0	-	0	0	30	0	-	30	35	6	0	-	41	71
% Mediums	-	0.0	-	-	0.0	-	3.9	-	-	3.9	3.9	16.7	-	-	4.4	4.1
Articulated Trucks	0	0	0	-	0	0	1	0	-	1	10	0	0	-	10	11
% Articulated Trucks	-	0.0	-	-	0.0	-	0.1	-	-	0.1	1.1	0.0	-	-	1.1	0.6
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	-	0.0	-	-	0.0	-	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Count Name: Ira Needles Blvd & Boardwalk Entrance North
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Start Date: 11/08/2018



Turning Movement Peak Hour Data Plot (8:00 AM)

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Count Name: Ira Needles Blvd & Boardwalk Entrance North
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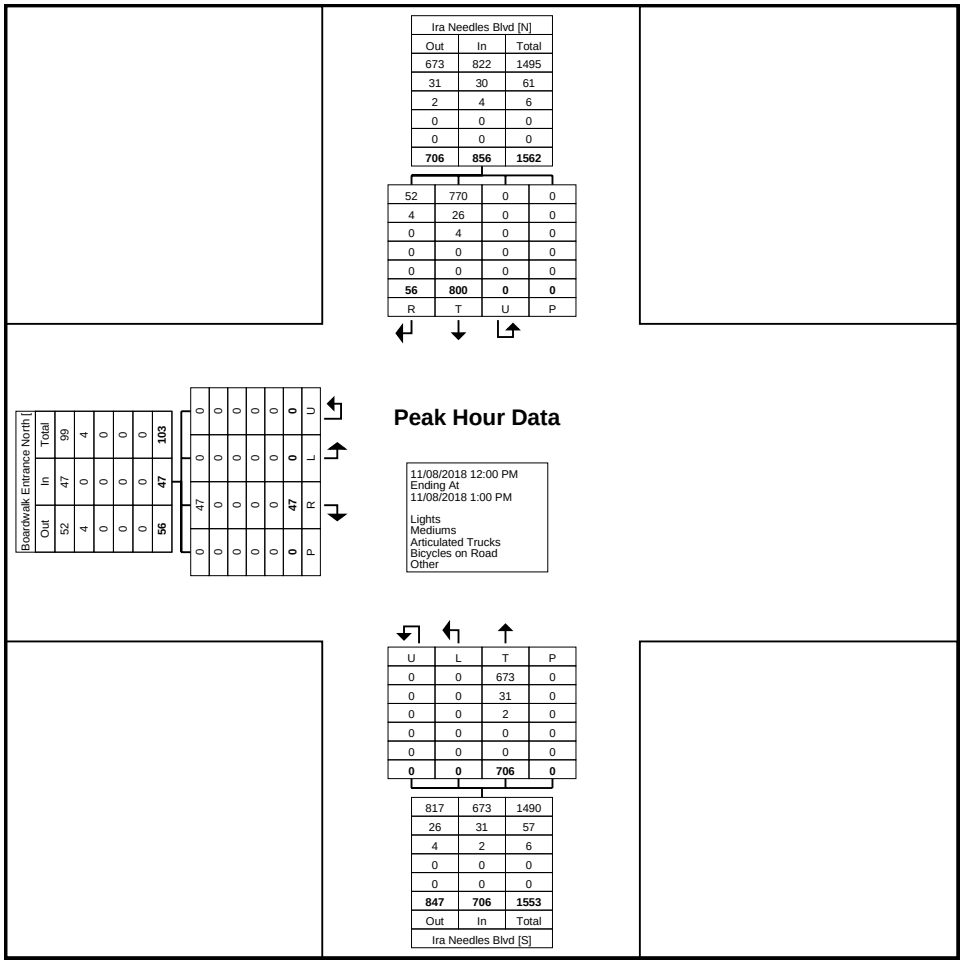
Turning Movement Peak Hour Data (12:00 PM)

Start Time	Boardwalk Entrance North Eastbound					Ira Needles Blvd Northbound					Ira Needles Blvd Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
12:00 PM	0	16	0	0	16	0	172	0	0	172	191	13	0	0	204	392
12:15 PM	0	14	0	0	14	0	182	0	0	182	213	8	0	0	221	417
12:30 PM	0	9	0	0	9	0	171	0	0	171	202	9	0	0	211	391
12:45 PM	0	8	0	0	8	0	181	0	0	181	194	26	0	0	220	409
Total	0	47	0	0	47	0	706	0	0	706	800	56	0	0	856	1609
Approach %	0.0	100.0	0.0	-	-	0.0	100.0	0.0	-	-	93.5	6.5	0.0	-	-	-
Total %	0.0	2.9	0.0	-	2.9	0.0	43.9	0.0	-	43.9	49.7	3.5	0.0	-	53.2	-
PHF	0.000	0.734	0.000	-	0.734	0.000	0.970	0.000	-	0.970	0.939	0.538	0.000	-	0.968	0.965
Lights	0	47	0	-	47	0	673	0	-	673	770	52	0	-	822	1542
% Lights	-	100.0	-	-	100.0	-	95.3	-	-	95.3	96.3	92.9	-	-	96.0	95.8
Mediums	0	0	0	-	0	0	31	0	-	31	26	4	0	-	30	61
% Mediums	-	0.0	-	-	0.0	-	4.4	-	-	4.4	3.3	7.1	-	-	3.5	3.8
Articulated Trucks	0	0	0	-	0	0	2	0	-	2	4	0	0	-	4	6
% Articulated Trucks	-	0.0	-	-	0.0	-	0.3	-	-	0.3	0.5	0.0	-	-	0.5	0.4
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	-	0.0	-	-	0.0	-	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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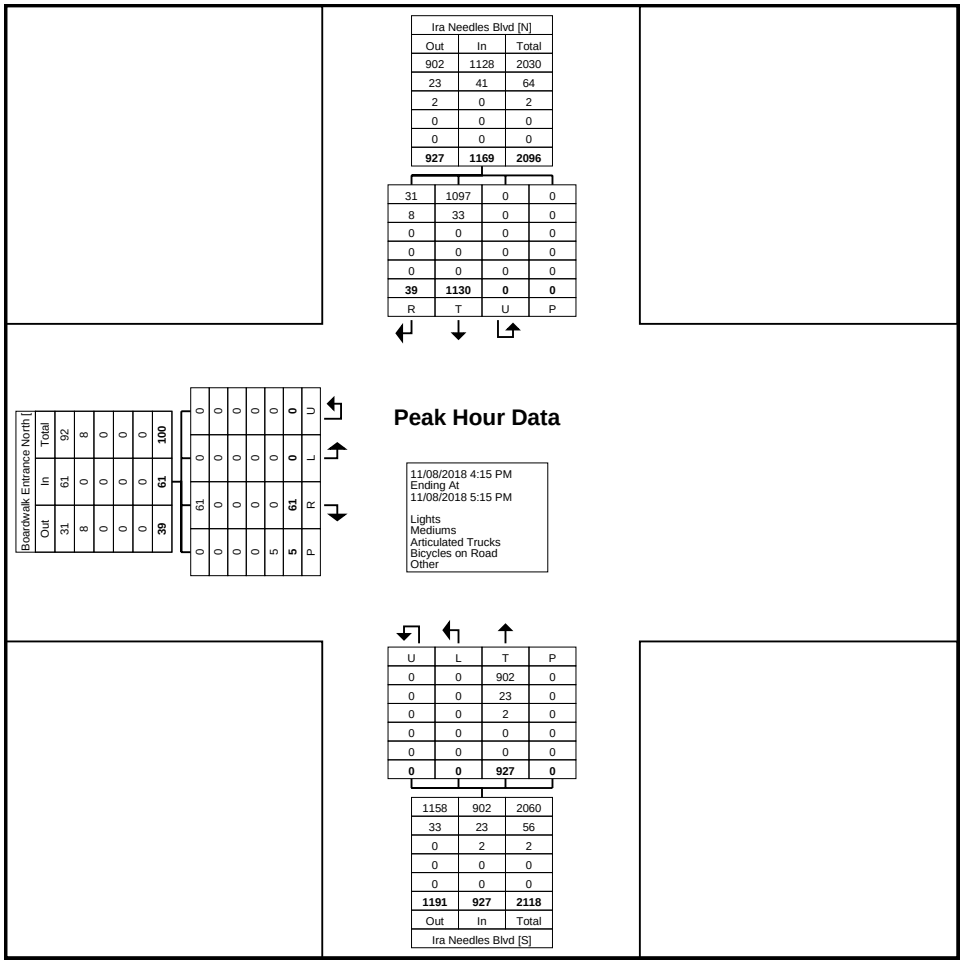
Turning Movement Peak Hour Data (4:15 PM)

Start Time	Boardwalk Entrance North Eastbound					Ira Needles Blvd Northbound					Ira Needles Blvd Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
4:15 PM	0	14	0	0	14	0	241	0	0	241	256	16	0	0	272	527
4:30 PM	0	17	0	1	17	0	231	0	0	231	290	6	0	0	296	544
4:45 PM	0	14	0	1	14	0	232	0	0	232	294	7	0	0	301	547
5:00 PM	0	16	0	3	16	0	223	0	0	223	290	10	0	0	300	539
Total	0	61	0	5	61	0	927	0	0	927	1130	39	0	0	1169	2157
Approach %	0.0	100.0	0.0	-	-	0.0	100.0	0.0	-	-	96.7	3.3	0.0	-	-	-
Total %	0.0	2.8	0.0	-	2.8	0.0	43.0	0.0	-	43.0	52.4	1.8	0.0	-	54.2	-
PHF	0.000	0.897	0.000	-	0.897	0.000	0.962	0.000	-	0.962	0.961	0.609	0.000	-	0.971	0.986
Lights	0	61	0	-	61	0	902	0	-	902	1097	31	0	-	1128	2091
% Lights	-	100.0	-	-	100.0	-	97.3	-	-	97.3	97.1	79.5	-	-	96.5	96.9
Mediums	0	0	0	-	0	0	23	0	-	23	33	8	0	-	41	64
% Mediums	-	0.0	-	-	0.0	-	2.5	-	-	2.5	2.9	20.5	-	-	3.5	3.0
Articulated Trucks	0	0	0	-	0	0	2	0	-	2	0	0	0	-	0	2
% Articulated Trucks	-	0.0	-	-	0.0	-	0.2	-	-	0.2	0.0	0.0	-	-	0.0	0.1
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	-	0.0	-	-	0.0	-	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	5	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Ira Needles Blvd & Boardwalk Entrance North
Site Code:
Start Date: 11/08/2018



Turning Movement Peak Hour Data Plot (4:15 PM)

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22 King Street South, Suite 300

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Count Name: Ira Needles Blvd & Boardwalk Entrance North
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Count Name: Ira Needles Blvd & Boardwalk Entrance South
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Start Date: 11/08/2018

Turning Movement Data

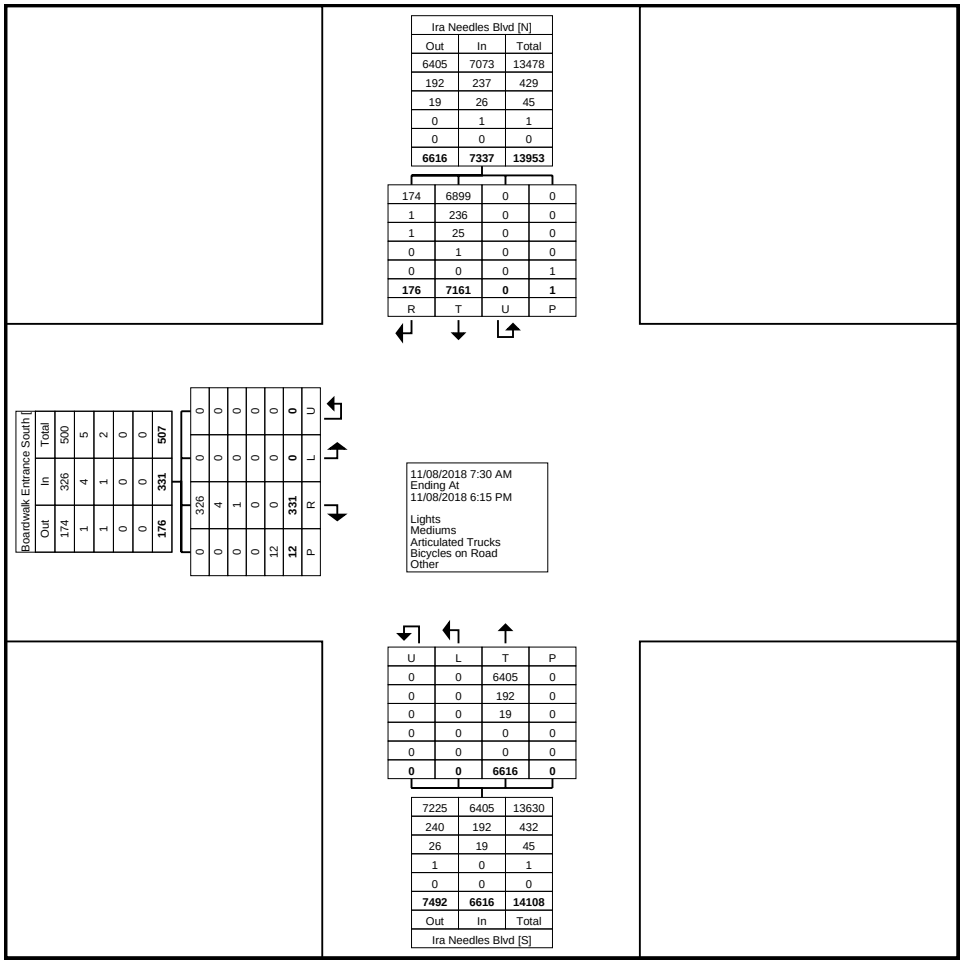
Start Time	Boardwalk Entrance South Eastbound					Ira Needles Blvd Northbound					Ira Needles Blvd Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	
7:30 AM	0	0	0	0	0	0	145	0	0	145	225	1	0	0	226	371
7:45 AM	0	1	0	0	1	0	185	0	0	185	193	3	0	0	196	382
Hourly Total	0	1	0	0	1	0	330	0	0	330	418	4	0	0	422	753
8:00 AM	0	2	0	0	2	0	222	0	0	222	224	1	0	0	225	449
8:15 AM	0	2	0	1	2	0	207	0	0	207	216	2	0	0	218	427
8:30 AM	0	1	0	0	1	0	208	0	0	208	253	4	0	0	257	466
8:45 AM	0	3	0	1	3	0	232	0	0	232	194	5	0	0	199	434
Hourly Total	0	8	0	2	8	0	869	0	0	869	887	12	0	0	899	1776
9:00 AM	0	6	0	0	6	0	158	0	0	158	191	6	0	0	197	361
9:15 AM	0	6	0	0	6	0	166	0	0	166	179	8	0	0	187	359
9:30 AM	0	7	0	1	7	0	173	0	0	173	157	3	0	0	160	340
9:45 AM	0	6	0	0	6	0	173	0	0	173	183	6	0	0	189	368
Hourly Total	0	25	0	1	25	0	670	0	0	670	710	23	0	0	733	1428
10:00 AM	0	7	0	1	7	0	149	0	0	149	174	2	0	0	176	332
10:15 AM	0	7	0	0	7	0	186	0	0	186	183	6	0	0	189	382
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	14	0	1	14	0	335	0	0	335	357	8	0	0	365	714
12:00 PM	0	11	0	0	11	0	193	0	0	193	199	5	0	0	204	408
12:15 PM	0	15	0	0	15	0	209	0	0	209	220	10	0	0	230	454
12:30 PM	0	19	0	1	19	0	185	0	0	185	196	8	0	0	204	408
12:45 PM	0	19	0	0	19	0	197	0	0	197	206	7	0	0	213	429
Hourly Total	0	64	0	1	64	0	784	0	0	784	821	30	0	0	851	1699
1:00 PM	0	14	0	0	14	0	174	0	0	174	171	3	0	0	174	362
1:15 PM	0	10	0	1	10	0	193	0	0	193	187	3	0	0	190	393
1:30 PM	0	16	0	1	16	0	178	0	0	178	190	6	0	0	196	390
1:45 PM	0	12	0	1	12	0	180	0	0	180	218	7	0	0	225	417
Hourly Total	0	52	0	3	52	0	725	0	0	725	766	19	0	0	785	1562
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	0	13	0	0	13	0	211	0	0	211	219	9	0	0	228	452
3:15 PM	0	11	0	0	11	0	223	0	0	223	232	4	0	0	236	470
3:30 PM	0	7	0	1	7	0	221	0	0	221	240	8	0	0	248	476
3:45 PM	0	19	0	2	19	0	256	0	0	256	252	6	0	1	258	533
Hourly Total	0	50	0	3	50	0	911	0	0	911	943	27	0	1	970	1931
4:00 PM	0	8	0	0	8	0	246	0	0	246	250	1	0	0	251	505
4:15 PM	0	10	0	0	10	0	259	0	0	259	262	3	0	0	265	534

4:30 PM	0	9	0	0	9	0	254	0	0	254	293	9	0	0	302	565
4:45 PM	0	20	0	0	20	0	255	0	0	255	302	7	0	0	309	584
Hourly Total	0	47	0	0	47	0	1014	0	0	1014	1107	20	0	0	1127	2188
5:00 PM	0	19	0	0	19	0	241	0	0	241	321	8	0	0	329	589
5:15 PM	0	19	0	1	19	0	253	0	0	253	284	8	0	0	292	564
5:30 PM	0	15	0	0	15	0	237	0	0	237	294	11	0	0	305	557
5:45 PM	0	17	0	0	17	0	246	0	0	246	252	6	0	0	258	521
Hourly Total	0	70	0	1	70	0	977	0	0	977	1151	33	0	0	1184	2231
6:00 PM	0	0	0	0	0	0	1	0	0	1	1	0	0	0	1	2
Grand Total	0	331	0	12	331	0	6616	0	0	6616	7161	176	0	1	7337	14284
Approach %	0.0	100.0	0.0	-	-	0.0	100.0	0.0	-	-	97.6	2.4	0.0	-	-	-
Total %	0.0	2.3	0.0	-	2.3	0.0	46.3	0.0	-	46.3	50.1	1.2	0.0	-	51.4	-
Lights	0	326	0	-	326	0	6405	0	-	6405	6899	174	0	-	7073	13804
% Lights	-	98.5	-	-	98.5	-	96.8	-	-	96.8	96.3	98.9	-	-	96.4	96.6
Mediums	0	4	0	-	4	0	192	0	-	192	236	1	0	-	237	433
% Mediums	-	1.2	-	-	1.2	-	2.9	-	-	2.9	3.3	0.6	-	-	3.2	3.0
Articulated Trucks	0	1	0	-	1	0	19	0	-	19	25	1	0	-	26	46
% Articulated Trucks	-	0.3	-	-	0.3	-	0.3	-	-	0.3	0.3	0.6	-	-	0.4	0.3
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	1	0	0	-	1	1
% Bicycles on Road	-	0.0	-	-	0.0	-	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	1	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	8.3	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	11	-	-	-	-	0	-	-	-	-	1	-	-
% Pedestrians	-	-	-	91.7	-	-	-	-	-	-	-	-	-	100.0	-	-

Paradigm Transportation Solutions Limited
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Count Name: Ira Needles Blvd & Boardwalk Entrance South
Site Code:
Start Date: 11/08/2018



Turning Movement Data Plot

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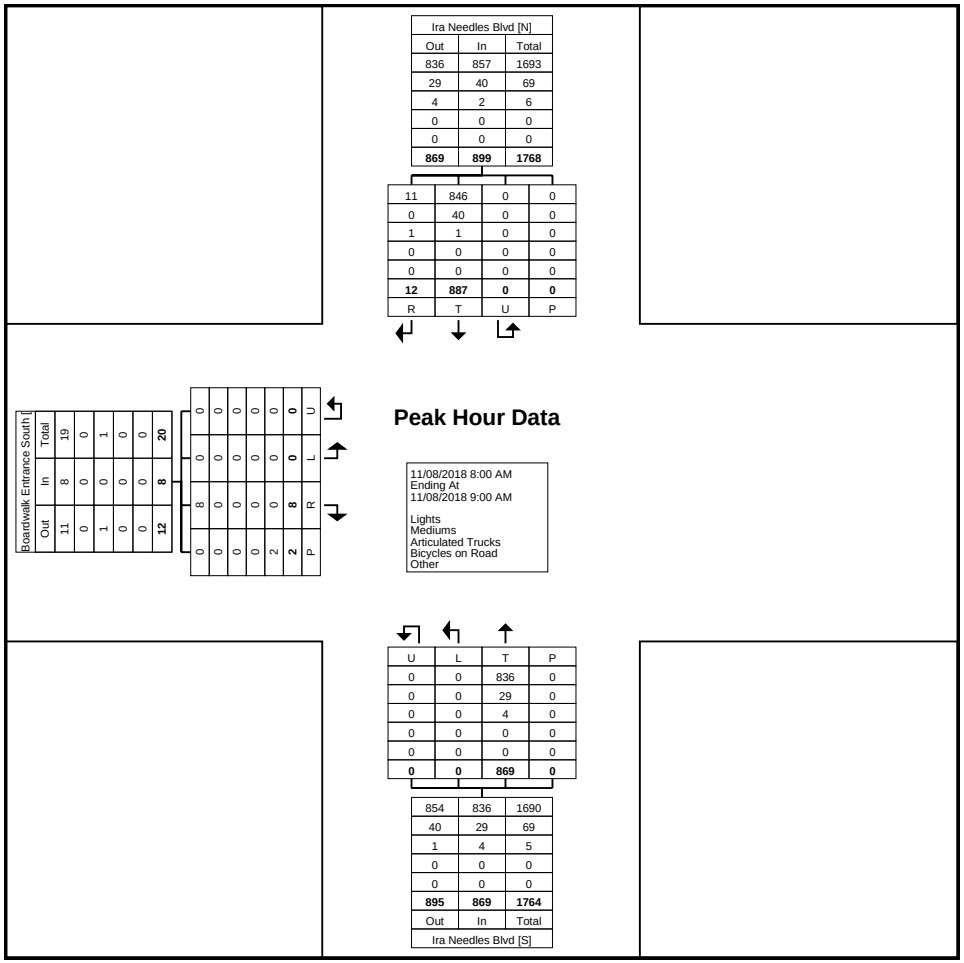
Turning Movement Peak Hour Data (8:00 AM)

Start Time	Boardwalk Entrance South Eastbound					Ira Needles Blvd Northbound					Ira Needles Blvd Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
8:00 AM	0	2	0	0	2	0	222	0	0	222	224	1	0	0	225	449
8:15 AM	0	2	0	1	2	0	207	0	0	207	216	2	0	0	218	427
8:30 AM	0	1	0	0	1	0	208	0	0	208	253	4	0	0	257	466
8:45 AM	0	3	0	1	3	0	232	0	0	232	194	5	0	0	199	434
Total	0	8	0	2	8	0	869	0	0	869	887	12	0	0	899	1776
Approach %	0.0	100.0	0.0	-	-	0.0	100.0	0.0	-	-	98.7	1.3	0.0	-	-	-
Total %	0.0	0.5	0.0	-	0.5	0.0	48.9	0.0	-	48.9	49.9	0.7	0.0	-	50.6	-
PHF	0.000	0.667	0.000	-	0.667	0.000	0.936	0.000	-	0.936	0.876	0.600	0.000	-	0.875	0.953
Lights	0	8	0	-	8	0	836	0	-	836	846	11	0	-	857	1701
% Lights	-	100.0	-	-	100.0	-	96.2	-	-	96.2	95.4	91.7	-	-	95.3	95.8
Mediums	0	0	0	-	0	0	29	0	-	29	40	0	0	-	40	69
% Mediums	-	0.0	-	-	0.0	-	3.3	-	-	3.3	4.5	0.0	-	-	4.4	3.9
Articulated Trucks	0	0	0	-	0	0	4	0	-	4	1	1	0	-	2	6
% Articulated Trucks	-	0.0	-	-	0.0	-	0.5	-	-	0.5	0.1	8.3	-	-	0.2	0.3
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	-	0.0	-	-	0.0	-	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	1	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	50.0	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	1	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	50.0	-	-	-	-	-	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
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Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Ira Needles Blvd & Boardwalk Entrance South
Site Code:
Start Date: 11/08/2018



Turning Movement Peak Hour Data Plot (8:00 AM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Ira Needles Blvd & Boardwalk Entrance South
Site Code:
Start Date: 11/08/2018

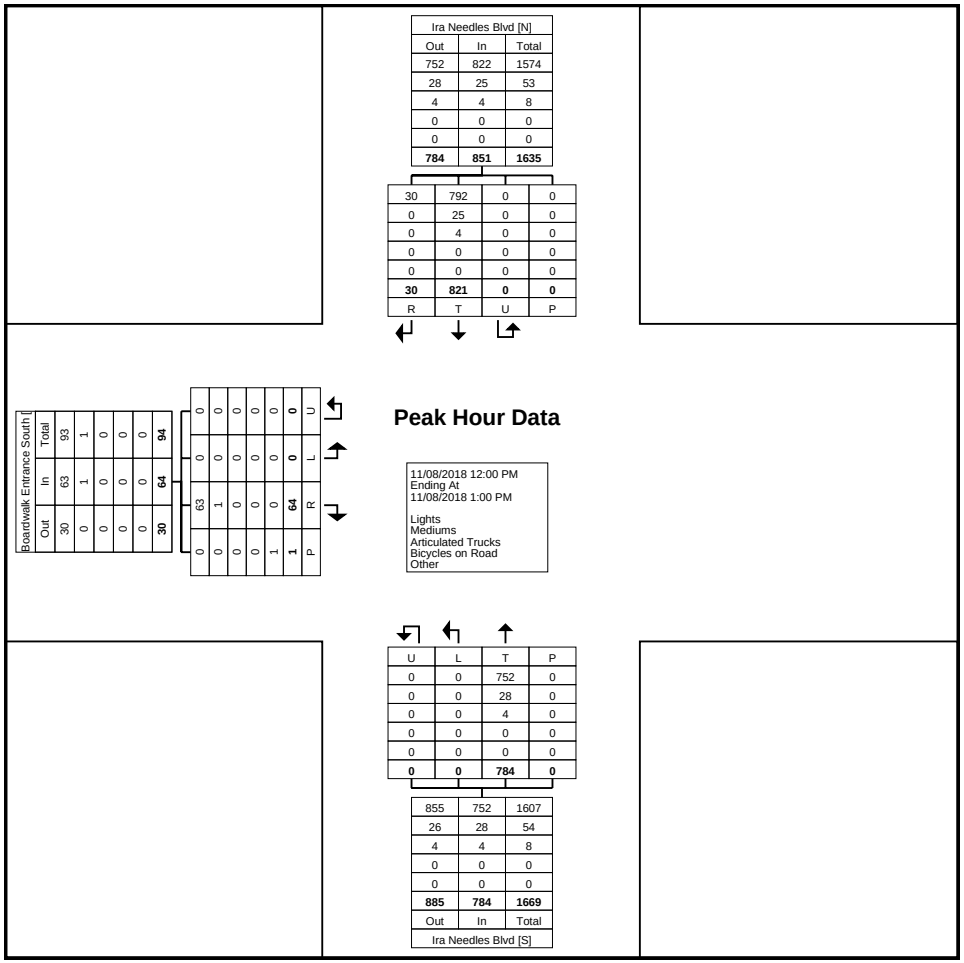
Turning Movement Peak Hour Data (12:00 PM)

Start Time	Boardwalk Entrance South Eastbound					Ira Needles Blvd Northbound					Ira Needles Blvd Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
12:00 PM	0	11	0	0	11	0	193	0	0	193	199	5	0	0	204	408
12:15 PM	0	15	0	0	15	0	209	0	0	209	220	10	0	0	230	454
12:30 PM	0	19	0	1	19	0	185	0	0	185	196	8	0	0	204	408
12:45 PM	0	19	0	0	19	0	197	0	0	197	206	7	0	0	213	429
Total	0	64	0	1	64	0	784	0	0	784	821	30	0	0	851	1699
Approach %	0.0	100.0	0.0	-	-	0.0	100.0	0.0	-	-	96.5	3.5	0.0	-	-	-
Total %	0.0	3.8	0.0	-	3.8	0.0	46.1	0.0	-	46.1	48.3	1.8	0.0	-	50.1	-
PHF	0.000	0.842	0.000	-	0.842	0.000	0.938	0.000	-	0.938	0.933	0.750	0.000	-	0.925	0.936
Lights	0	63	0	-	63	0	752	0	-	752	792	30	0	-	822	1637
% Lights	-	98.4	-	-	98.4	-	95.9	-	-	95.9	96.5	100.0	-	-	96.6	96.4
Mediums	0	1	0	-	1	0	28	0	-	28	25	0	0	-	25	54
% Mediums	-	1.6	-	-	1.6	-	3.6	-	-	3.6	3.0	0.0	-	-	2.9	3.2
Articulated Trucks	0	0	0	-	0	0	4	0	-	4	4	0	0	-	4	8
% Articulated Trucks	-	0.0	-	-	0.0	-	0.5	-	-	0.5	0.5	0.0	-	-	0.5	0.5
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	-	0.0	-	-	0.0	-	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	1	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-

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Count Name: Ira Needles Blvd & Boardwalk Entrance South
Site Code:
Start Date: 11/08/2018



Turning Movement Peak Hour Data Plot (12:00 PM)

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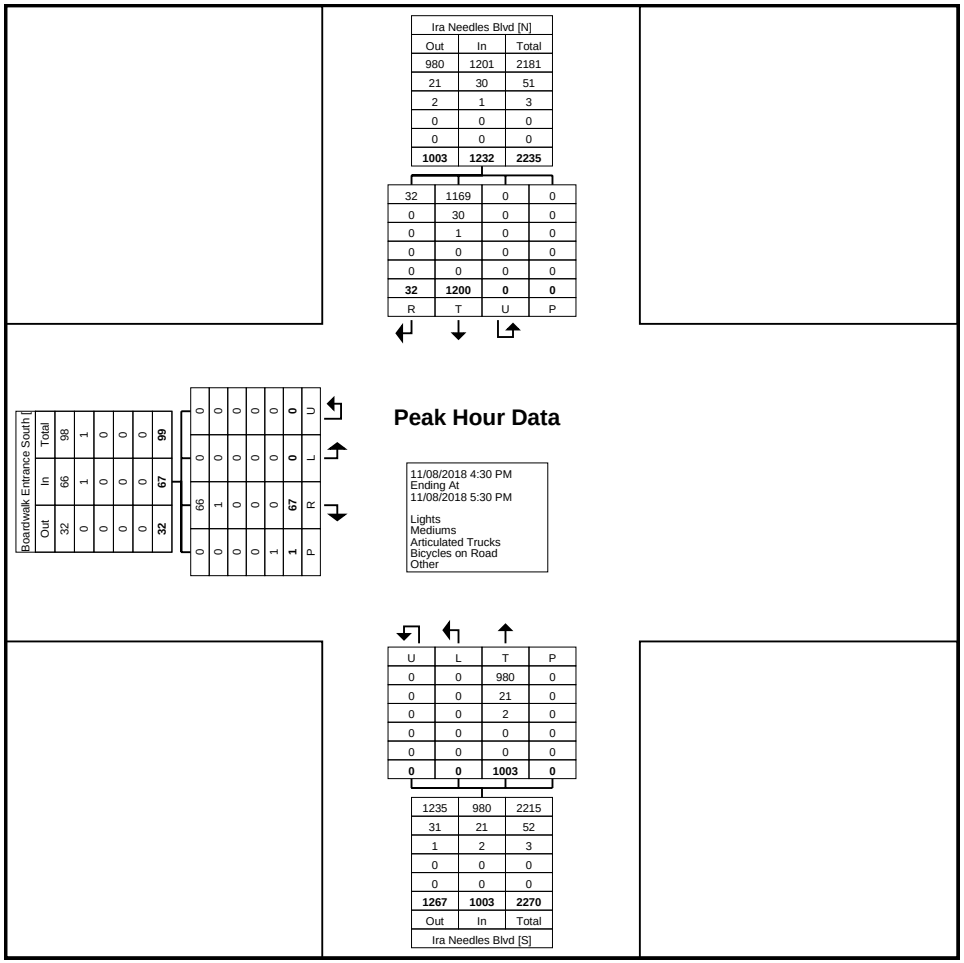
Turning Movement Peak Hour Data (4:30 PM)

Start Time	Boardwalk Entrance South Eastbound					Ira Needles Blvd Northbound					Ira Needles Blvd Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
4:30 PM	0	9	0	0	9	0	254	0	0	254	293	9	0	0	302	565
4:45 PM	0	20	0	0	20	0	255	0	0	255	302	7	0	0	309	584
5:00 PM	0	19	0	0	19	0	241	0	0	241	321	8	0	0	329	589
5:15 PM	0	19	0	1	19	0	253	0	0	253	284	8	0	0	292	564
Total	0	67	0	1	67	0	1003	0	0	1003	1200	32	0	0	1232	2302
Approach %	0.0	100.0	0.0	-	-	0.0	100.0	0.0	-	-	97.4	2.6	0.0	-	-	-
Total %	0.0	2.9	0.0	-	2.9	0.0	43.6	0.0	-	43.6	52.1	1.4	0.0	-	53.5	-
PHF	0.000	0.838	0.000	-	0.838	0.000	0.983	0.000	-	0.983	0.935	0.889	0.000	-	0.936	0.977
Lights	0	66	0	-	66	0	980	0	-	980	1169	32	0	-	1201	2247
% Lights	-	98.5	-	-	98.5	-	97.7	-	-	97.7	97.4	100.0	-	-	97.5	97.6
Mediums	0	1	0	-	1	0	21	0	-	21	30	0	0	-	30	52
% Mediums	-	1.5	-	-	1.5	-	2.1	-	-	2.1	2.5	0.0	-	-	2.4	2.3
Articulated Trucks	0	0	0	-	0	0	2	0	-	2	1	0	0	-	1	3
% Articulated Trucks	-	0.0	-	-	0.0	-	0.2	-	-	0.2	0.1	0.0	-	-	0.1	0.1
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	-	0.0	-	-	0.0	-	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	1	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-

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Count Name: Ira Needles Blvd & Boardwalk Entrance South
Site Code:
Start Date: 11/08/2018



Turning Movement Peak Hour Data Plot (4:30 PM)

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Site Code:
Start Date: 11/08/2018

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Count Name: Ira Needles Blvd & Boardwalk Entrance South
Site Code:
Start Date: 11/10/2018

Turning Movement Data

Start Time	Boardwalk Entrance South Eastbound					Ira Needles Blvd Northbound					Ira Needles Blvd Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	
11:00 AM	0	11	0	0	11	0	239	0	0	239	246	6	0	0	252	502
11:15 AM	0	12	0	2	12	0	216	0	0	216	269	10	0	0	279	507
11:30 AM	0	15	0	0	15	0	220	0	0	220	276	5	0	0	281	516
11:45 AM	0	9	0	3	9	0	231	0	0	231	291	10	0	0	301	541
Hourly Total	0	47	0	5	47	0	906	0	0	906	1082	31	0	0	1113	2066
12:00 PM	0	19	0	0	19	0	249	0	0	249	297	10	0	0	307	575
12:15 PM	0	11	0	1	11	0	289	0	0	289	266	12	0	0	278	578
12:30 PM	0	18	0	0	18	0	271	0	0	271	275	7	0	0	282	571
12:45 PM	0	16	0	0	16	0	244	0	0	244	246	11	0	0	257	517
Hourly Total	0	64	0	1	64	0	1053	0	0	1053	1084	40	0	0	1124	2241
1:00 PM	0	21	0	0	21	0	256	0	0	256	278	4	0	0	282	559
1:15 PM	0	15	0	0	15	0	285	0	0	285	268	15	0	0	283	583
1:30 PM	0	21	0	0	21	0	221	0	0	221	277	14	0	0	291	533
1:45 PM	0	17	0	0	17	0	248	0	0	248	279	15	0	0	294	559
Hourly Total	0	74	0	0	74	0	1010	0	0	1010	1102	48	0	0	1150	2234
2:00 PM	0	12	0	0	12	0	253	0	0	253	296	5	0	0	301	566
2:15 PM	0	25	0	0	25	0	259	0	0	259	277	19	0	0	296	580
2:30 PM	0	12	0	0	12	0	251	0	0	251	259	16	0	0	275	538
2:45 PM	0	16	0	0	16	0	273	0	0	273	281	11	0	0	292	581
Hourly Total	0	65	0	0	65	0	1036	0	0	1036	1113	51	0	0	1164	2265
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	250	0	6	250	0	4005	0	0	4005	4381	170	0	0	4551	8806
Approach %	0.0	100.0	0.0	-	-	0.0	100.0	0.0	-	-	96.3	3.7	0.0	-	-	-
Total %	0.0	2.8	0.0	-	2.8	0.0	45.5	0.0	-	45.5	49.8	1.9	0.0	-	51.7	-
Lights	0	250	0	-	250	0	3981	0	-	3981	4352	170	0	-	4522	8753
% Lights	-	100.0	-	-	100.0	-	99.4	-	-	99.4	99.3	100.0	-	-	99.4	99.4
Mediums	0	0	0	-	0	0	21	0	-	21	23	0	0	-	23	44
% Mediums	-	0.0	-	-	0.0	-	0.5	-	-	0.5	0.5	0.0	-	-	0.5	0.5
Articulated Trucks	0	0	0	-	0	0	3	0	-	3	6	0	0	-	6	9
% Articulated Trucks	-	0.0	-	-	0.0	-	0.1	-	-	0.1	0.1	0.0	-	-	0.1	0.1
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	-	0.0	-	-	0.0	-	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	6	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Ira Needles Blvd & Boardwalk Entrance South
Site Code:
Start Date: 11/10/2018
Page No: 2

Ira Needles Blvd [N]

Out	In	Total
3981	4522	8503
21	23	44
3	6	9
0	0	0
0	0	0
4005	**4551**	**8556**

R	T	U	P
170	4352	0	0
0	23	0	0
0	6	0	0
0	0	0	0
0	0	0	0
170	**4381**	**0**	**0**

Boardwalk Entrance South [W]

Out	In	Total
170	250	420
0	0	0
0	0	0
0	0	0
0	0	0
170	**250**	**420**

U	L	R	P
0	0	250	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	6
0	**0**	**250**	**6**

11/10/2018 11:00 AM
Ending At
11/10/2018 3:15 PM

Lights
Mediums
Articulated Trucks
Bicycles on Road
Other

U	L	T	P
0	0	3981	0
0	0	21	0
0	0	3	0
0	0	0	0
0	0	0	0
0	**0**	**4005**	**0**

Out	In	Total
4602	3981	8583
23	21	44
6	3	9
0	0	0
0	0	0
4631	**4005**	**8636**

Ira Needles Blvd [S]

Turning Movement Data Plot

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Ira Needles Blvd & Boardwalk Entrance South
Site Code:
Start Date: 11/10/2018

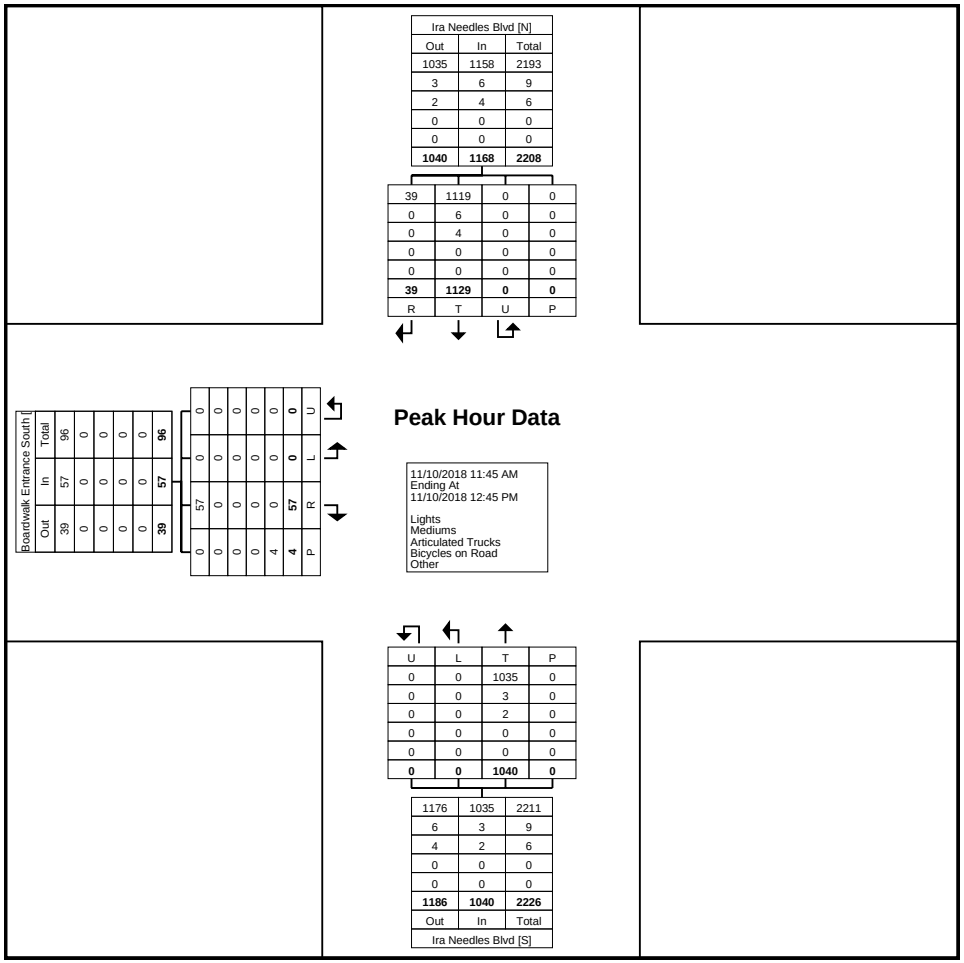
Turning Movement Peak Hour Data (11:45 AM)

Start Time	Boardwalk Entrance South Eastbound					Ira Needles Blvd Northbound					Ira Needles Blvd Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
11:45 AM	0	9	0	3	9	0	231	0	0	231	291	10	0	0	301	541
12:00 PM	0	19	0	0	19	0	249	0	0	249	297	10	0	0	307	575
12:15 PM	0	11	0	1	11	0	289	0	0	289	266	12	0	0	278	578
12:30 PM	0	18	0	0	18	0	271	0	0	271	275	7	0	0	282	571
Total	0	57	0	4	57	0	1040	0	0	1040	1129	39	0	0	1168	2265
Approach %	0.0	100.0	0.0	-	-	0.0	100.0	0.0	-	-	96.7	3.3	0.0	-	-	-
Total %	0.0	2.5	0.0	-	2.5	0.0	45.9	0.0	-	45.9	49.8	1.7	0.0	-	51.6	-
PHF	0.000	0.750	0.000	-	0.750	0.000	0.900	0.000	-	0.900	0.950	0.813	0.000	-	0.951	0.980
Lights	0	57	0	-	57	0	1035	0	-	1035	1119	39	0	-	1158	2250
% Lights	-	100.0	-	-	100.0	-	99.5	-	-	99.5	99.1	100.0	-	-	99.1	99.3
Mediums	0	0	0	-	0	0	3	0	-	3	6	0	0	-	6	9
% Mediums	-	0.0	-	-	0.0	-	0.3	-	-	0.3	0.5	0.0	-	-	0.5	0.4
Articulated Trucks	0	0	0	-	0	0	2	0	-	2	4	0	0	-	4	6
% Articulated Trucks	-	0.0	-	-	0.0	-	0.2	-	-	0.2	0.4	0.0	-	-	0.3	0.3
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	-	0.0	-	-	0.0	-	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	4	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
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Count Name: Ira Needles Blvd & Boardwalk Entrance South
Site Code:
Start Date: 11/10/2018



Turning Movement Peak Hour Data Plot (11:45 AM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Ira Needles Blvd & Boardwalk Entrance South
Site Code:
Start Date: 11/10/2018

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Iran Needles Blvd & Boardwalk Entrance North - Saturday
Site Code:
Start Date: 11/10/2018

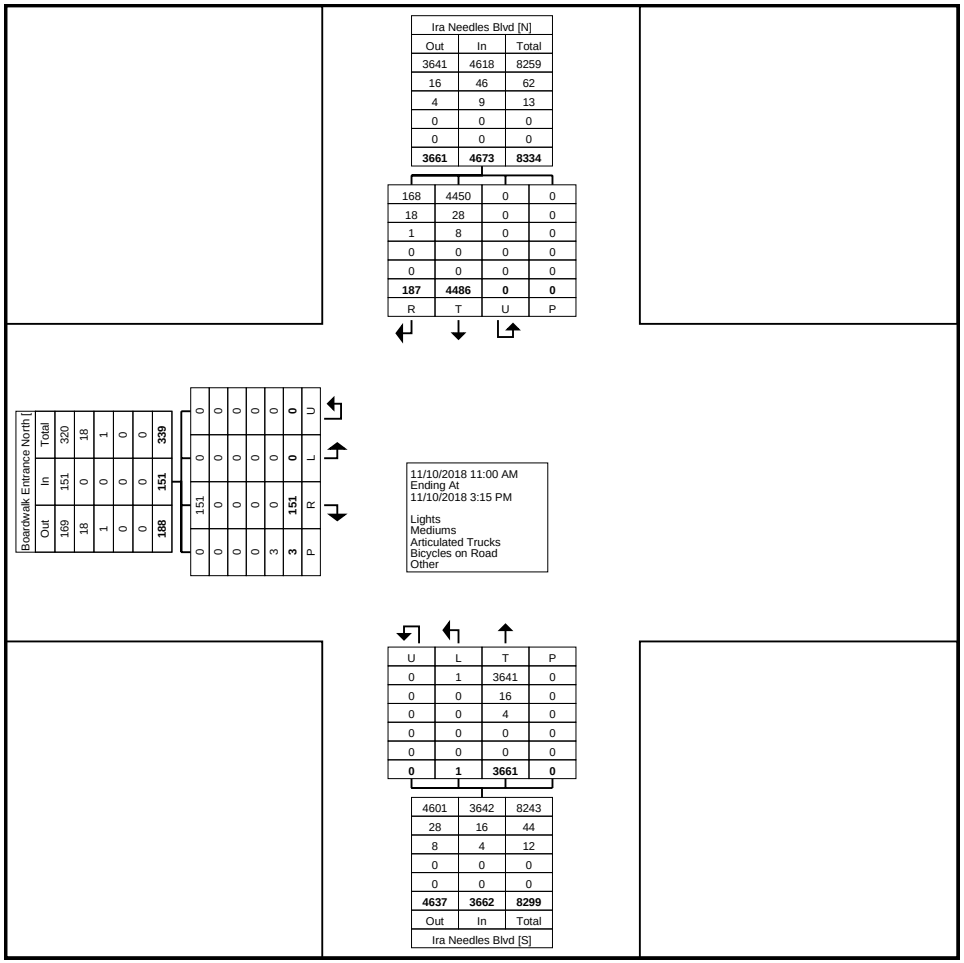
Turning Movement Data

Start Time	Boardwalk Entrance North Eastbound					Ira Needles Blvd Northbound					Ira Needles Blvd Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	
11:00 AM	0	3	0	0	3	0	229	0	0	229	238	10	0	0	248	480
11:15 AM	0	6	0	1	6	0	206	0	0	206	289	10	0	0	299	511
11:30 AM	0	6	0	0	6	0	212	0	0	212	272	8	0	0	280	498
11:45 AM	0	7	0	0	7	0	216	0	0	216	288	14	0	0	302	525
Hourly Total	0	22	0	1	22	0	863	0	0	863	1087	42	0	0	1129	2014
12:00 PM	0	11	0	0	11	0	227	0	0	227	311	18	0	0	329	567
12:15 PM	0	13	0	1	13	0	260	0	0	260	256	5	0	0	261	534
12:30 PM	0	15	0	0	15	0	237	0	0	237	268	17	0	0	285	537
12:45 PM	0	10	0	0	10	0	227	0	0	227	270	10	0	0	280	517
Hourly Total	0	49	0	1	49	0	951	0	0	951	1105	50	0	0	1155	2155
1:00 PM	0	8	0	0	8	0	233	0	0	233	268	13	0	0	281	522
1:15 PM	0	15	0	0	15	0	262	0	0	262	255	8	0	0	263	540
1:30 PM	0	5	0	0	5	0	214	0	0	214	278	9	0	0	287	506
1:45 PM	0	11	0	0	11	0	223	0	0	223	297	14	0	0	311	545
Hourly Total	0	39	0	0	39	0	932	0	0	932	1098	44	0	0	1142	2113
2:00 PM	0	8	0	0	8	1	227	0	0	228	305	18	0	0	323	559
2:15 PM	0	12	0	0	12	0	240	0	0	240	308	9	0	0	317	569
2:30 PM	0	8	0	0	8	0	215	0	0	215	299	15	0	0	314	537
2:45 PM	0	13	0	1	13	0	232	0	0	232	284	9	0	0	293	538
Hourly Total	0	41	0	1	41	1	914	0	0	915	1196	51	0	0	1247	2203
3:00 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
Grand Total	0	151	0	3	151	1	3661	0	0	3662	4486	187	0	0	4673	8486
Approach %	0.0	100.0	0.0	-	-	0.0	100.0	0.0	-	-	96.0	4.0	0.0	-	-	-
Total %	0.0	1.8	0.0	-	1.8	0.0	43.1	0.0	-	43.2	52.9	2.2	0.0	-	55.1	-
Lights	0	151	0	-	151	1	3641	0	-	3642	4450	168	0	-	4618	8411
% Lights	-	100.0	-	-	100.0	100.0	99.5	-	-	99.5	99.2	89.8	-	-	98.8	99.1
Mediums	0	0	0	-	0	0	16	0	-	16	28	18	0	-	46	62
% Mediums	-	0.0	-	-	0.0	0.0	0.4	-	-	0.4	0.6	9.6	-	-	1.0	0.7
Articulated Trucks	0	0	0	-	0	0	4	0	-	4	8	1	0	-	9	13
% Articulated Trucks	-	0.0	-	-	0.0	0.0	0.1	-	-	0.1	0.2	0.5	-	-	0.2	0.2
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	-	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	1	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	33.3	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	2	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	66.7	-	-	-	-	-	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Iran Needles Blvd & Boardwalk Entrance North - Saturday
Site Code:
Start Date: 11/10/2018



Turning Movement Data Plot

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Iran Needles Blvd & Boardwalk Entrance North - Saturday
Site Code:
Start Date: 11/10/2018

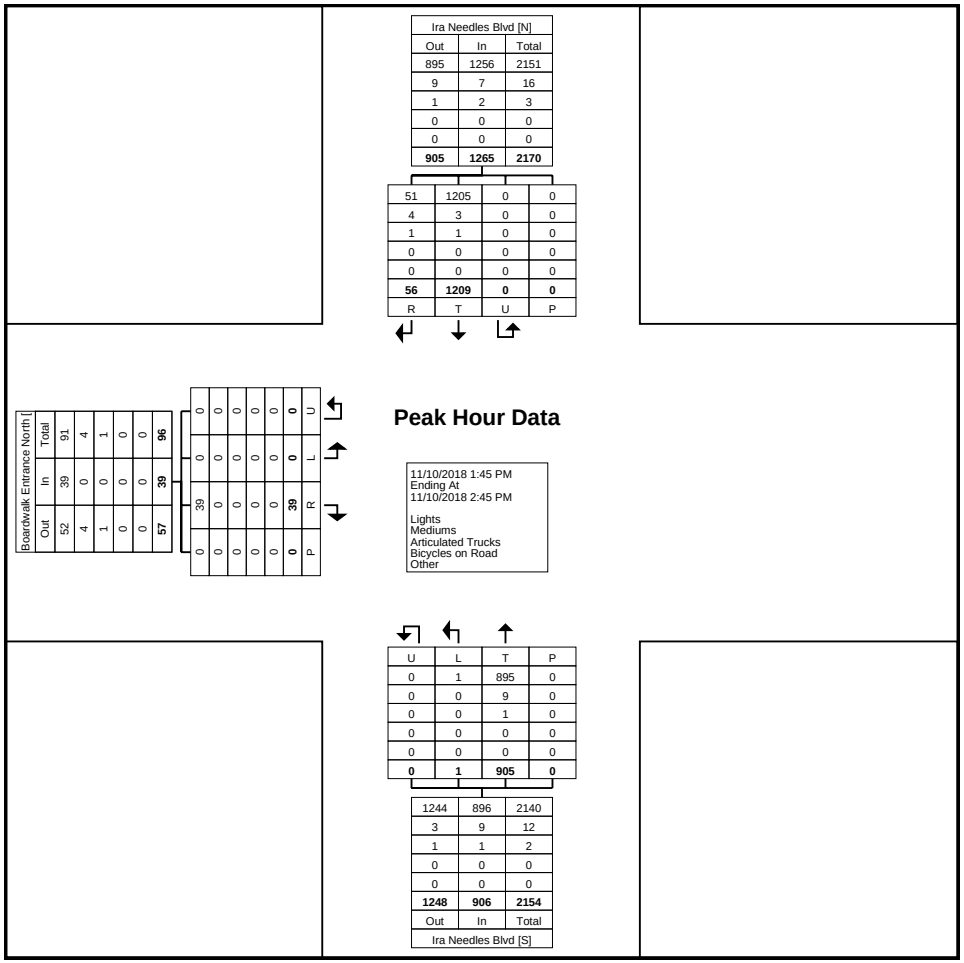
Turning Movement Peak Hour Data (1:45 PM)

Start Time	Boardwalk Entrance North Eastbound					Ira Needles Blvd Northbound					Ira Needles Blvd Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
1:45 PM	0	11	0	0	11	0	223	0	0	223	297	14	0	0	311	545
2:00 PM	0	8	0	0	8	1	227	0	0	228	305	18	0	0	323	559
2:15 PM	0	12	0	0	12	0	240	0	0	240	308	9	0	0	317	569
2:30 PM	0	8	0	0	8	0	215	0	0	215	299	15	0	0	314	537
Total	0	39	0	0	39	1	905	0	0	906	1209	56	0	0	1265	2210
Approach %	0.0	100.0	0.0	-	-	0.1	99.9	0.0	-	-	95.6	4.4	0.0	-	-	-
Total %	0.0	1.8	0.0	-	1.8	0.0	41.0	0.0	-	41.0	54.7	2.5	0.0	-	57.2	-
PHF	0.000	0.813	0.000	-	0.813	0.250	0.943	0.000	-	0.944	0.981	0.778	0.000	-	0.979	0.971
Lights	0	39	0	-	39	1	895	0	-	896	1205	51	0	-	1256	2191
% Lights	-	100.0	-	-	100.0	100.0	98.9	-	-	98.9	99.7	91.1	-	-	99.3	99.1
Mediums	0	0	0	-	0	0	9	0	-	9	3	4	0	-	7	16
% Mediums	-	0.0	-	-	0.0	0.0	1.0	-	-	1.0	0.2	7.1	-	-	0.6	0.7
Articulated Trucks	0	0	0	-	0	0	1	0	-	1	1	1	0	-	2	3
% Articulated Trucks	-	0.0	-	-	0.0	0.0	0.1	-	-	0.1	0.1	1.8	-	-	0.2	0.1
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	-	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Iran Needles Blvd & Boardwalk Entrance North - Saturday
Site Code:
Start Date: 11/10/2018



Turning Movement Peak Hour Data Plot (1:45 PM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

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Count Name: Iran Needles Blvd & Boardwalk Entrance North - Saturday
Site Code:
Start Date: 11/10/2018

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Keats Way & Erbsville Road - Saturday
Site Code:
Start Date: 11/10/2018

Turning Movement Data

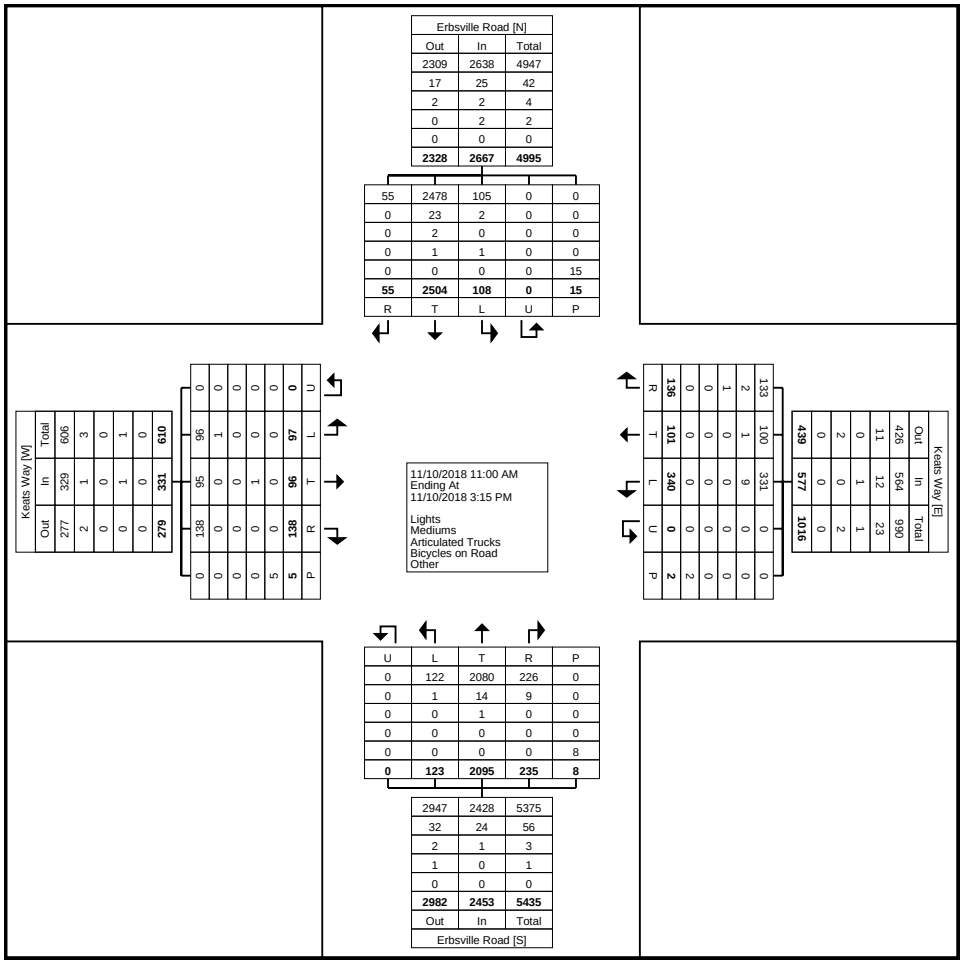
Start Time	Keats Way Eastbound						Keats Way Westbound						Erbsville Road Northbound						Erbsville Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
11:00 AM	6	13	11	0	0	30	23	15	8	0	0	46	7	128	14	0	1	149	6	149	2	0	0	157	382
11:15 AM	5	5	8	0	0	18	19	7	9	0	1	35	4	115	10	0	0	129	7	159	3	0	0	169	351
11:30 AM	12	4	7	0	0	23	16	3	6	0	0	25	9	134	11	0	1	154	0	166	4	0	1	170	372
11:45 AM	7	8	5	0	1	20	16	6	7	0	0	29	4	91	19	0	1	114	5	172	2	0	0	179	342
Hourly Total	30	30	31	0	1	91	74	31	30	0	1	135	24	468	54	0	3	546	18	646	11	0	1	675	1447
12:00 PM	7	4	5	0	0	16	19	8	13	0	0	40	9	120	11	0	0	140	9	159	8	0	1	176	372
12:15 PM	2	7	3	0	1	12	21	5	12	0	0	38	11	123	15	0	1	149	5	135	0	0	0	140	339
12:30 PM	11	7	7	0	1	25	23	8	7	0	0	38	6	128	14	0	0	148	8	161	6	0	0	175	386
12:45 PM	6	2	11	0	0	19	22	2	9	0	0	33	4	110	11	0	1	125	7	155	4	0	2	166	343
Hourly Total	26	20	26	0	2	72	85	23	41	0	0	149	30	481	51	0	2	562	29	610	18	0	3	657	1440
1:00 PM	2	2	11	0	0	15	22	7	10	0	0	39	9	141	11	0	0	161	5	145	5	0	1	155	370
1:15 PM	4	7	12	0	0	23	23	5	4	0	0	32	11	148	16	0	0	175	7	135	1	0	0	143	373
1:30 PM	8	11	10	0	0	29	20	2	8	0	0	30	10	149	15	0	0	174	6	180	2	0	3	188	421
1:45 PM	9	6	12	0	1	27	25	3	6	0	0	34	3	122	21	0	1	146	9	146	6	0	0	161	368
Hourly Total	23	26	45	0	1	94	90	17	28	0	0	135	33	560	63	0	1	656	27	606	14	0	4	647	1532
2:00 PM	4	2	10	0	1	16	20	7	10	0	0	37	9	143	16	0	0	168	6	169	4	0	3	179	400
2:15 PM	4	8	6	0	0	18	31	9	13	0	1	53	6	156	7	0	1	169	8	153	3	0	1	164	404
2:30 PM	6	5	9	0	0	20	18	8	4	0	0	30	9	137	22	0	0	168	6	170	3	0	0	179	397
2:45 PM	4	5	11	0	0	20	22	6	10	0	0	38	12	150	22	0	1	184	14	148	2	0	3	164	406
Hourly Total	18	20	36	0	1	74	91	30	37	0	1	158	36	586	67	0	2	689	34	640	12	0	7	686	1607
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	2
Grand Total	97	96	138	0	5	331	340	101	136	0	2	577	123	2095	235	0	8	2453	108	2504	55	0	15	2667	6028
Approach %	29.3	29.0	41.7	0.0	-	-	58.9	17.5	23.6	0.0	-	-	5.0	85.4	9.6	0.0	-	-	4.0	93.9	2.1	0.0	-	-	-
Total %	1.6	1.6	2.3	0.0	-	5.5	5.6	1.7	2.3	0.0	-	9.6	2.0	34.8	3.9	0.0	-	40.7	1.8	41.5	0.9	0.0	-	44.2	-
Lights	96	95	138	0	-	329	331	100	133	0	-	564	122	2080	226	0	-	2428	105	2478	55	0	-	2638	5959
% Lights	99.0	99.0	100.0	-	-	99.4	97.4	99.0	97.8	-	-	97.7	99.2	99.3	96.2	-	-	99.0	97.2	99.0	100.0	-	-	98.9	98.9
Mediums	1	0	0	0	-	1	9	1	2	0	-	12	1	14	9	0	-	24	2	23	0	0	-	25	62
% Mediums	1.0	0.0	0.0	-	-	0.3	2.6	1.0	1.5	-	-	2.1	0.8	0.7	3.8	-	-	1.0	1.9	0.9	0.0	-	-	0.9	1.0
Articulated Trucks	0	0	0	0	-	0	0	0	1	0	-	1	0	1	0	0	-	1	0	2	0	0	-	2	4
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.7	-	-	0.2	0.0	0.0	0.0	-	-	0.0	0.0	0.1	0.0	-	-	0.1	0.1
Bicycles on Road	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	1	1	0	0	-	2	3
% Bicycles on Road	0.0	1.0	0.0	-	-	0.3	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.9	0.0	0.0	-	-	0.1	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	5	-	-	-	-	-	2	-	-	-	-	-	8	-	-	-	-	-	15	-	-

% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Keats Way & Erbsville Road - Saturday
Site Code:
Start Date: 11/10/2018



Turning Movement Data Plot

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Count Name: Keats Way & Erbsville Road - Saturday
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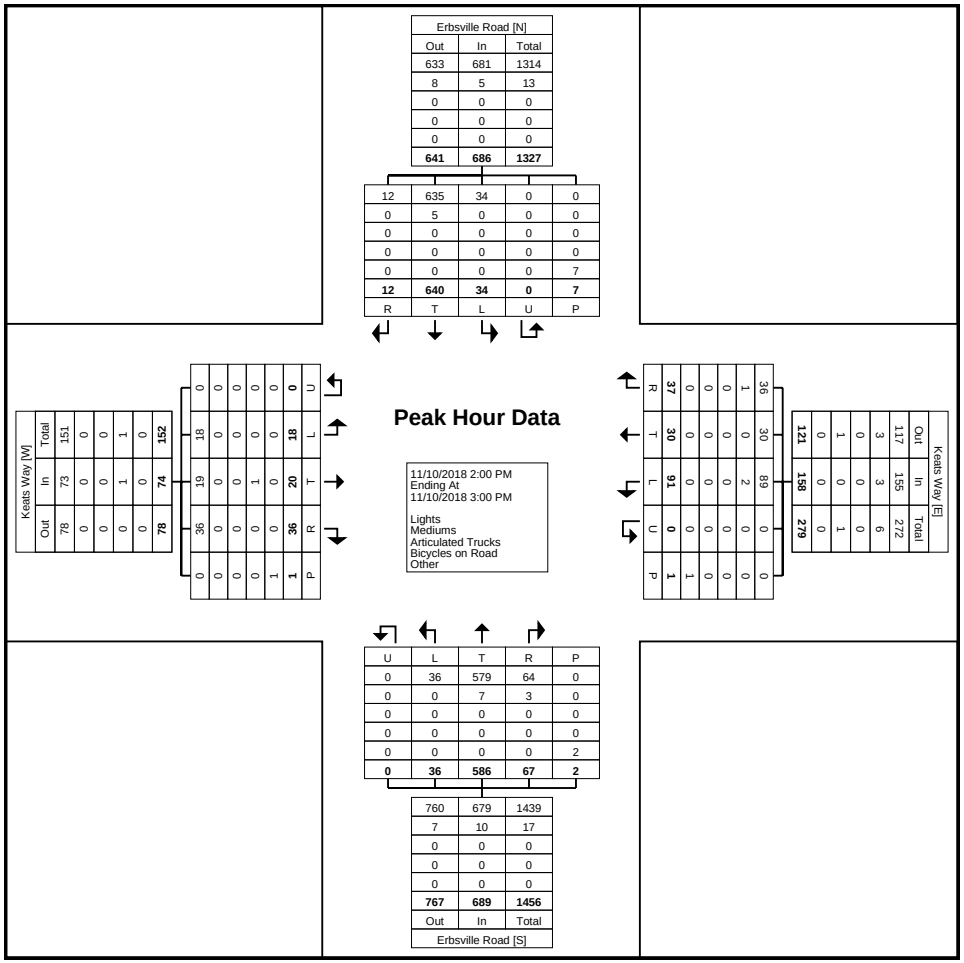
Turning Movement Peak Hour Data (2:00 PM)

Start Time	Keats Way Eastbound						Keats Way Westbound						Erbsville Road Northbound						Erbsville Road Southbound						
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Int. Total
2:00 PM	4	2	10	0	1	16	20	7	10	0	0	37	9	143	16	0	0	168	6	169	4	0	3	179	400
2:15 PM	4	8	6	0	0	18	31	9	13	0	1	53	6	156	7	0	1	169	8	153	3	0	1	164	404
2:30 PM	6	5	9	0	0	20	18	8	4	0	0	30	9	137	22	0	0	168	6	170	3	0	0	179	397
2:45 PM	4	5	11	0	0	20	22	6	10	0	0	38	12	150	22	0	1	184	14	148	2	0	3	164	406
Total	18	20	36	0	1	74	91	30	37	0	1	158	36	586	67	0	2	689	34	640	12	0	7	686	1607
Approach %	24.3	27.0	48.6	0.0	-	-	57.6	19.0	23.4	0.0	-	-	5.2	85.1	9.7	0.0	-	-	5.0	93.3	1.7	0.0	-	-	-
Total %	1.1	1.2	2.2	0.0	-	4.6	5.7	1.9	2.3	0.0	-	9.8	2.2	36.5	4.2	0.0	-	42.9	2.1	39.8	0.7	0.0	-	42.7	-
PHF	0.750	0.625	0.818	0.000	-	0.925	0.734	0.833	0.712	0.000	-	0.745	0.750	0.939	0.761	0.000	-	0.936	0.607	0.941	0.750	0.000	-	0.958	0.990
Lights	18	19	36	0	-	73	89	30	36	0	-	155	36	579	64	0	-	679	34	635	12	0	-	681	1588
% Lights	100.0	95.0	100.0	-	-	98.6	97.8	100.0	97.3	-	-	98.1	100.0	98.8	95.5	-	-	98.5	100.0	99.2	100.0	-	-	99.3	98.8
Mediums	0	0	0	0	-	0	2	0	1	0	-	3	0	7	3	0	-	10	0	5	0	0	-	5	18
% Mediums	0.0	0.0	0.0	-	-	0.0	2.2	0.0	2.7	-	-	1.9	0.0	1.2	4.5	-	-	1.5	0.0	0.8	0.0	-	-	0.7	1.1
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1
% Bicycles on Road	0.0	5.0	0.0	-	-	1.4	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.1
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	7	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

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Count Name: Keats Way & Erbsville Road - Saturday
Site Code:
Start Date: 11/10/2018



Turning Movement Peak Hour Data Plot (2:00 PM)

Paradigm Transportation Solutions Limited
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Count Name: Keats Way & Erbsville Road - Saturday
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Count Name: Keatsway Drive & Erbsville Road
Site Code:
Start Date: 11/08/2018

Turning Movement Data

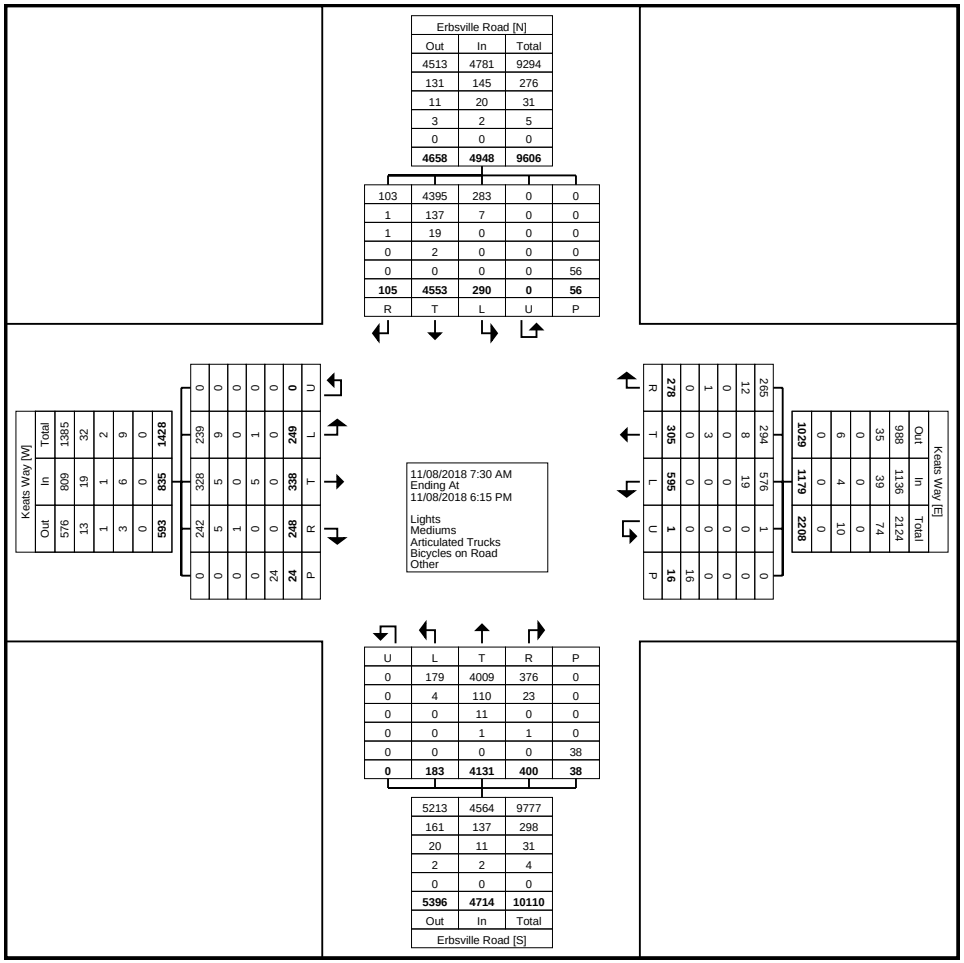
Start Time	Keats Way Eastbound						Keats Way Westbound						Erbsville Road Northbound						Erbsville Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:30 AM	6	13	10	0	0	29	18	5	5	0	0	28	0	125	7	0	4	132	6	112	4	0	2	122	311
7:45 AM	12	13	6	0	0	31	32	5	10	0	1	47	3	137	13	0	3	153	5	123	1	0	1	129	360
Hourly Total	18	26	16	0	0	60	50	10	15	0	1	75	3	262	20	0	7	285	11	235	5	0	3	251	671
8:00 AM	21	21	15	0	1	57	11	5	19	0	1	35	8	174	15	0	7	197	11	119	5	0	1	135	424
8:15 AM	16	25	11	0	0	52	18	7	11	0	0	36	2	174	10	0	0	186	9	140	4	0	1	153	427
8:30 AM	17	32	14	0	0	63	16	7	8	0	1	31	2	157	10	0	0	169	14	154	3	0	2	171	434
8:45 AM	14	15	16	0	0	45	15	3	4	0	0	22	6	154	19	0	0	179	12	116	1	0	0	129	375
Hourly Total	68	93	56	0	1	217	60	22	42	0	2	124	18	659	54	0	7	731	46	529	13	0	4	588	1660
9:00 AM	8	15	12	0	4	35	23	5	9	0	0	37	2	127	11	0	4	140	10	101	4	0	2	115	327
9:15 AM	7	10	3	0	0	20	17	3	1	0	2	21	9	108	1	0	1	118	8	139	0	0	3	147	306
9:30 AM	5	8	5	0	5	18	13	3	8	0	1	24	5	93	7	0	4	105	4	107	4	0	0	115	262
9:45 AM	7	7	9	0	0	23	16	1	9	0	0	26	4	100	12	0	0	116	9	126	4	0	1	139	304
Hourly Total	27	40	29	0	9	96	69	12	27	0	3	108	20	428	31	0	9	479	31	473	12	0	6	516	1199
10:00 AM	6	6	3	0	3	15	13	7	3	0	0	23	4	80	2	0	2	86	9	110	2	0	0	121	245
10:15 AM	5	4	5	0	0	14	18	3	3	0	0	24	4	89	10	0	0	103	6	121	1	0	2	128	269
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	11	10	8	0	3	29	31	10	6	0	0	47	8	169	12	0	2	189	15	231	3	0	2	249	514
12:00 PM	5	8	5	0	0	18	6	8	7	0	2	21	2	121	9	0	3	132	10	106	6	0	4	122	293
12:15 PM	2	5	6	0	1	13	10	5	1	0	1	16	4	111	15	0	0	130	11	128	4	0	1	143	302
12:30 PM	5	10	3	0	0	18	18	4	5	0	1	27	5	123	9	0	0	137	7	127	2	0	0	136	318
12:45 PM	3	1	2	0	0	6	20	4	6	0	0	30	3	117	8	0	0	128	7	120	3	0	0	130	294
Hourly Total	15	24	16	0	1	55	54	21	19	0	4	94	14	472	41	0	3	527	35	481	15	0	5	531	1207
1:00 PM	1	8	2	0	0	11	20	8	6	1	0	35	5	91	12	0	0	108	8	116	0	0	0	124	278
1:15 PM	6	2	6	0	0	14	19	2	9	0	1	30	5	111	13	0	0	129	5	113	3	0	3	121	294
1:30 PM	6	4	5	0	1	15	16	2	8	0	0	26	2	109	13	0	1	124	5	119	3	0	4	127	292
1:45 PM	0	9	3	0	0	12	11	3	5	0	0	19	2	107	13	0	0	122	4	112	0	0	2	116	269
Hourly Total	13	23	16	0	1	52	66	15	28	1	1	110	14	418	51	0	1	483	22	460	6	0	9	488	1133
2:00 PM	0	1	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	1	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2
3:00 PM	9	14	9	0	1	32	15	7	10	0	2	32	5	123	7	0	1	135	12	130	11	0	2	153	352
3:15 PM	4	16	6	0	0	26	20	11	7	0	0	38	10	113	23	0	0	146	11	139	2	0	4	152	362
3:30 PM	11	13	3	0	1	27	22	14	12	0	0	48	4	120	16	0	2	140	8	146	2	0	1	156	371
3:45 PM	10	2	8	0	0	20	16	20	10	0	0	46	10	133	13	0	0	156	15	168	2	0	1	185	407
Hourly Total	34	45	26	0	2	105	73	52	39	0	2	164	29	489	59	0	3	577	46	583	17	0	8	646	1492
4:00 PM	7	8	7	0	1	22	23	8	15	0	0	46	12	158	16	0	0	186	20	173	9	0	1	202	456

4:15 PM	9	9	12	0	3	30	14	23	11	0	3	48	13	142	16	0	2	171	12	179	4	0	3	195	444
4:30 PM	7	9	7	0	1	23	26	19	9	0	0	54	7	159	17	0	1	183	11	202	4	0	0	217	477
4:45 PM	7	16	10	0	2	33	24	16	16	0	0	56	8	146	17	0	0	171	5	200	6	0	4	211	471
Hourly Total	30	42	36	0	7	108	87	66	51	0	3	204	40	605	66	0	3	711	48	754	23	0	8	825	1848
5:00 PM	9	11	5	0	0	25	30	27	9	0	0	66	8	154	14	0	2	176	9	225	1	0	2	235	502
5:15 PM	14	7	10	0	0	31	38	24	18	0	0	80	10	152	17	0	0	179	10	216	2	0	4	228	518
5:30 PM	4	8	15	0	0	27	17	24	9	0	0	50	8	160	15	0	0	183	7	180	3	0	1	190	450
5:45 PM	5	8	15	0	0	28	20	21	15	0	0	56	11	163	20	0	1	194	10	186	5	0	4	201	479
Hourly Total	32	34	45	0	0	111	105	96	51	0	0	252	37	629	66	0	3	732	36	807	11	0	11	854	1949
6:00 PM	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Grand Total	249	338	248	0	24	835	595	305	278	1	16	1179	183	4131	400	0	38	4714	290	4553	105	0	56	4948	11676
Approach %	29.8	40.5	29.7	0.0	-	-	50.5	25.9	23.6	0.1	-	-	3.9	87.6	8.5	0.0	-	-	5.9	92.0	2.1	0.0	-	-	-
Total %	2.1	2.9	2.1	0.0	-	7.2	5.1	2.6	2.4	0.0	-	10.1	1.6	35.4	3.4	0.0	-	40.4	2.5	39.0	0.9	0.0	-	42.4	-
Lights	239	328	242	0	-	809	576	294	265	1	-	1136	179	4009	376	0	-	4564	283	4395	103	0	-	4781	11290
% Lights	96.0	97.0	97.6	-	-	96.9	96.8	96.4	95.3	100.0	-	96.4	97.8	97.0	94.0	-	-	96.8	97.6	96.5	98.1	-	-	96.6	96.7
Mediums	9	5	5	0	-	19	19	8	12	0	-	39	4	110	23	0	-	137	7	137	1	0	-	145	340
% Mediums	3.6	1.5	2.0	-	-	2.3	3.2	2.6	4.3	0.0	-	3.3	2.2	2.7	5.8	-	-	2.9	2.4	3.0	1.0	-	-	2.9	2.9
Articulated Trucks	0	0	1	0	-	1	0	0	0	0	-	0	0	11	0	0	-	11	0	19	1	0	-	20	32
% Articulated Trucks	0.0	0.0	0.4	-	-	0.1	0.0	0.0	0.0	0.0	-	0.0	0.0	0.3	0.0	-	-	0.2	0.0	0.4	1.0	-	-	0.4	0.3
Bicycles on Road	1	5	0	0	-	6	0	3	1	0	-	4	0	1	1	0	-	2	0	2	0	0	-	2	14
% Bicycles on Road	0.4	1.5	0.0	-	-	0.7	0.0	1.0	0.4	0.0	-	0.3	0.0	0.0	0.3	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.1
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	4.2	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	1.8	-	-
Pedestrians	-	-	-	-	23	-	-	-	-	-	16	-	-	-	-	-	38	-	-	-	-	-	55	-	-
% Pedestrians	-	-	-	-	95.8	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	98.2	-	-

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Count Name: Keatsway Drive & Erbsville Road
Site Code:
Start Date: 11/08/2018



Turning Movement Data Plot

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Count Name: Keatsway Drive & Erbsville Road
Site Code:
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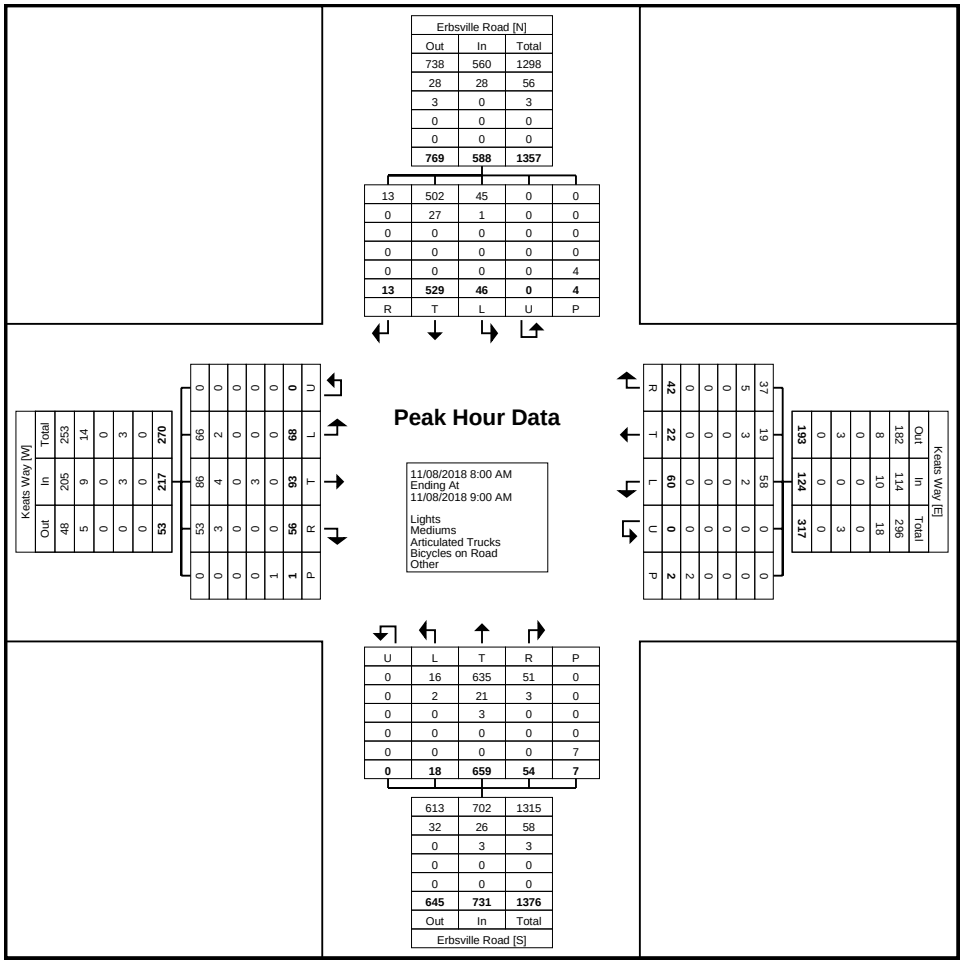
Turning Movement Peak Hour Data (8:00 AM)

Start Time	Keats Way Eastbound						Keats Way Westbound						Erbsville Road Northbound						Erbsville Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
8:00 AM	21	21	15	0	1	57	11	5	19	0	1	35	8	174	15	0	7	197	11	119	5	0	1	135	424
8:15 AM	16	25	11	0	0	52	18	7	11	0	0	36	2	174	10	0	0	186	9	140	4	0	1	153	427
8:30 AM	17	32	14	0	0	63	16	7	8	0	1	31	2	157	10	0	0	169	14	154	3	0	2	171	434
8:45 AM	14	15	16	0	0	45	15	3	4	0	0	22	6	154	19	0	0	179	12	116	1	0	0	129	375
Total	68	93	56	0	1	217	60	22	42	0	2	124	18	659	54	0	7	731	46	529	13	0	4	588	1660
Approach %	31.3	42.9	25.8	0.0	-	-	48.4	17.7	33.9	0.0	-	-	2.5	90.2	7.4	0.0	-	-	7.8	90.0	2.2	0.0	-	-	-
Total %	4.1	5.6	3.4	0.0	-	13.1	3.6	1.3	2.5	0.0	-	7.5	1.1	39.7	3.3	0.0	-	44.0	2.8	31.9	0.8	0.0	-	35.4	-
PHF	0.810	0.727	0.875	0.000	-	0.861	0.833	0.786	0.553	0.000	-	0.861	0.563	0.947	0.711	0.000	-	0.928	0.821	0.859	0.650	0.000	-	0.860	0.956
Lights	66	86	53	0	-	205	58	19	37	0	-	114	16	635	51	0	-	702	45	502	13	0	-	560	1581
% Lights	97.1	92.5	94.6	-	-	94.5	96.7	86.4	88.1	-	-	91.9	88.9	96.4	94.4	-	-	96.0	97.8	94.9	100.0	-	-	95.2	95.2
Mediums	2	4	3	0	-	9	2	3	5	0	-	10	2	21	3	0	-	26	1	27	0	0	-	28	73
% Mediums	2.9	4.3	5.4	-	-	4.1	3.3	13.6	11.9	-	-	8.1	11.1	3.2	5.6	-	-	3.6	2.2	5.1	0.0	-	-	4.8	4.4
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	3	0	0	-	3	0	0	0	0	-	0	3
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.5	0.0	-	-	0.4	0.0	0.0	0.0	-	-	0.0	0.2
Bicycles on Road	0	3	0	0	-	3	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	3
% Bicycles on Road	0.0	3.2	0.0	-	-	1.4	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.2
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	7	-	-	-	-	-	4	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Keatsway Drive & Erbsville Road
Site Code:
Start Date: 11/08/2018



Turning Movement Peak Hour Data Plot (8:00 AM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Keatsway Drive & Erbsville Road
Site Code:
Start Date: 11/08/2018

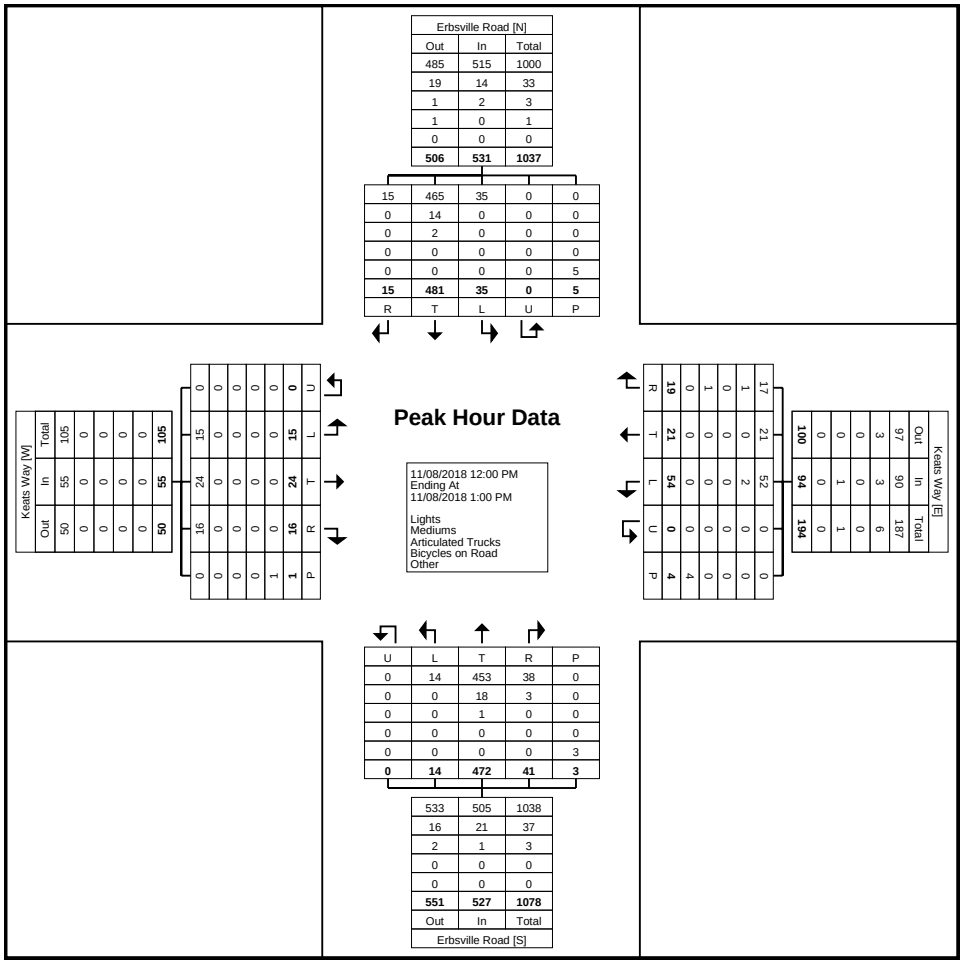
Turning Movement Peak Hour Data (12:00 PM)

Start Time	Keats Way Eastbound						Keats Way Westbound						Erbsville Road Northbound						Erbsville Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
12:00 PM	5	8	5	0	0	18	6	8	7	0	2	21	2	121	9	0	3	132	10	106	6	0	4	122	293
12:15 PM	2	5	6	0	1	13	10	5	1	0	1	16	4	111	15	0	0	130	11	128	4	0	1	143	302
12:30 PM	5	10	3	0	0	18	18	4	5	0	1	27	5	123	9	0	0	137	7	127	2	0	0	136	318
12:45 PM	3	1	2	0	0	6	20	4	6	0	0	30	3	117	8	0	0	128	7	120	3	0	0	130	294
Total	15	24	16	0	1	55	54	21	19	0	4	94	14	472	41	0	3	527	35	481	15	0	5	531	1207
Approach %	27.3	43.6	29.1	0.0	-	-	57.4	22.3	20.2	0.0	-	-	2.7	89.6	7.8	0.0	-	-	6.6	90.6	2.8	0.0	-	-	-
Total %	1.2	2.0	1.3	0.0	-	4.6	4.5	1.7	1.6	0.0	-	7.8	1.2	39.1	3.4	0.0	-	43.7	2.9	39.9	1.2	0.0	-	44.0	-
PHF	0.750	0.600	0.667	0.000	-	0.764	0.675	0.656	0.679	0.000	-	0.783	0.700	0.959	0.683	0.000	-	0.962	0.795	0.939	0.625	0.000	-	0.928	0.949
Lights	15	24	16	0	-	55	52	21	17	0	-	90	14	453	38	0	-	505	35	465	15	0	-	515	1165
% Lights	100.0	100.0	100.0	-	-	100.0	96.3	100.0	89.5	-	-	95.7	100.0	96.0	92.7	-	-	95.8	100.0	96.7	100.0	-	-	97.0	96.5
Mediums	0	0	0	0	-	0	2	0	1	0	-	3	0	18	3	0	-	21	0	14	0	0	-	14	38
% Mediums	0.0	0.0	0.0	-	-	0.0	3.7	0.0	5.3	-	-	3.2	0.0	3.8	7.3	-	-	4.0	0.0	2.9	0.0	-	-	2.6	3.1
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	0	2	0	0	-	2	3
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.2	0.0	-	-	0.2	0.0	0.4	0.0	-	-	0.4	0.2
Bicycles on Road	0	0	0	0	-	0	0	0	1	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	1
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	5.3	-	-	1.1	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.1
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	4	-	-	-	-	-	3	-	-	-	-	-	5	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

Paradigm Transportation Solutions Limited
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Count Name: Keatsway Drive & Erbsville Road
Site Code:
Start Date: 11/08/2018



Turning Movement Peak Hour Data Plot (12:00 PM)

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Count Name: Keatsway Drive & Erbsville Road
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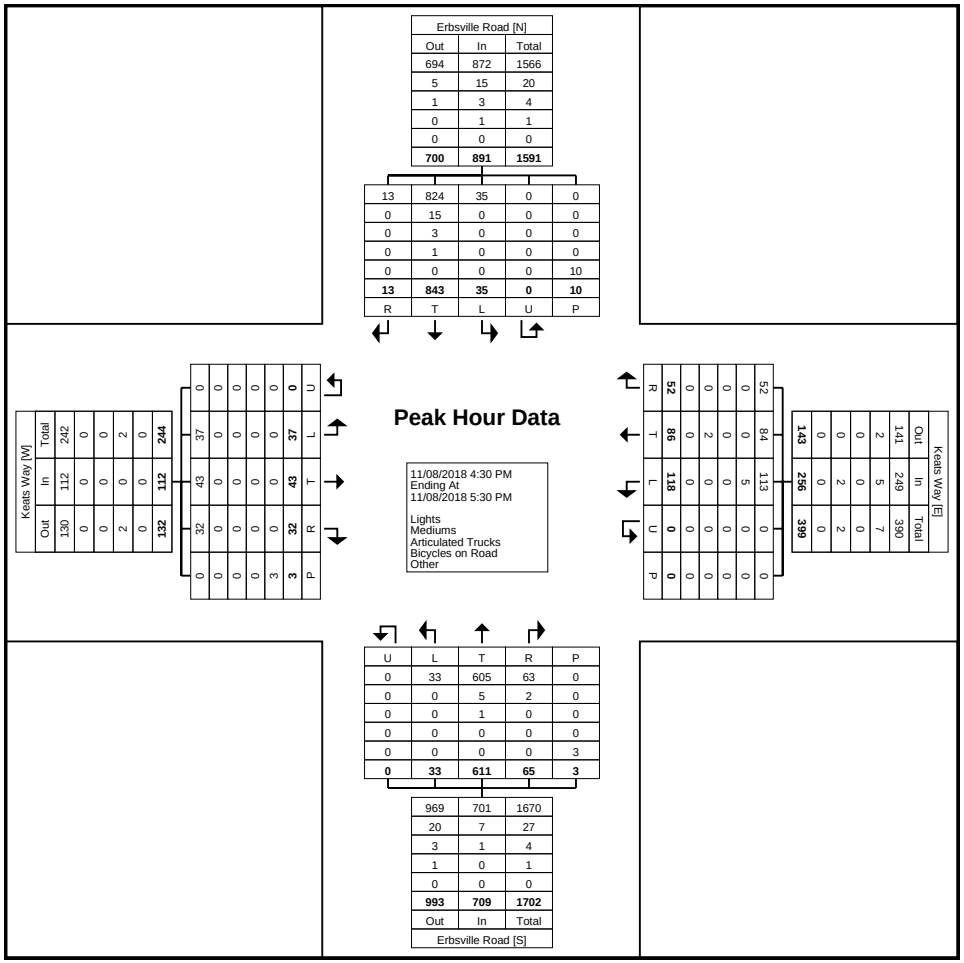
Turning Movement Peak Hour Data (4:30 PM)

Start Time	Keats Way Eastbound						Keats Way Westbound						Erbsville Road Northbound						Erbsville Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:30 PM	7	9	7	0	1	23	26	19	9	0	0	54	7	159	17	0	1	183	11	202	4	0	0	217	477
4:45 PM	7	16	10	0	2	33	24	16	16	0	0	56	8	146	17	0	0	171	5	200	6	0	4	211	471
5:00 PM	9	11	5	0	0	25	30	27	9	0	0	66	8	154	14	0	2	176	9	225	1	0	2	235	502
5:15 PM	14	7	10	0	0	31	38	24	18	0	0	80	10	152	17	0	0	179	10	216	2	0	4	228	518
Total	37	43	32	0	3	112	118	86	52	0	0	256	33	611	65	0	3	709	35	843	13	0	10	891	1968
Approach %	33.0	38.4	28.6	0.0	-	-	46.1	33.6	20.3	0.0	-	-	4.7	86.2	9.2	0.0	-	-	3.9	94.6	1.5	0.0	-	-	-
Total %	1.9	2.2	1.6	0.0	-	5.7	6.0	4.4	2.6	0.0	-	13.0	1.7	31.0	3.3	0.0	-	36.0	1.8	42.8	0.7	0.0	-	45.3	-
PHF	0.661	0.672	0.800	0.000	-	0.848	0.776	0.796	0.722	0.000	-	0.800	0.825	0.961	0.956	0.000	-	0.969	0.795	0.937	0.542	0.000	-	0.948	0.950
Lights	37	43	32	0	-	112	113	84	52	0	-	249	33	605	63	0	-	701	35	824	13	0	-	872	1934
% Lights	100.0	100.0	100.0	-	-	100.0	95.8	97.7	100.0	-	-	97.3	100.0	99.0	96.9	-	-	98.9	100.0	97.7	100.0	-	-	97.9	98.3
Mediums	0	0	0	0	-	0	5	0	0	0	-	5	0	5	2	0	-	7	0	15	0	0	-	15	27
% Mediums	0.0	0.0	0.0	-	-	0.0	4.2	0.0	0.0	-	-	2.0	0.0	0.8	3.1	-	-	1.0	0.0	1.8	0.0	-	-	1.7	1.4
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	0	3	0	0	-	3	4
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.2	0.0	-	-	0.1	0.0	0.4	0.0	-	-	0.3	0.2
Bicycles on Road	0	0	0	0	-	0	0	2	0	0	-	2	0	0	0	0	-	0	0	1	0	0	-	1	3
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	2.3	0.0	-	-	0.8	0.0	0.0	0.0	-	-	0.0	0.0	0.1	0.0	-	-	0.1	0.2
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	3	-	-	-	-	-	0	-	-	-	-	-	3	-	-	-	-	-	10	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
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Count Name: Keatsway Drive & Erbsville Road
Site Code:
Start Date: 11/08/2018



Turning Movement Peak Hour Data Plot (4:30 PM)

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Count Name: Keatsway Drive & Erbsville Road
Site Code:
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22 King Street South, Suite 300

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519-896-3163 cbowness@ptsl.com

Count Name: West Hill Drive & Ira Needles Blvd
Site Code:
Start Date: 11/08/2018

Turning Movement Data

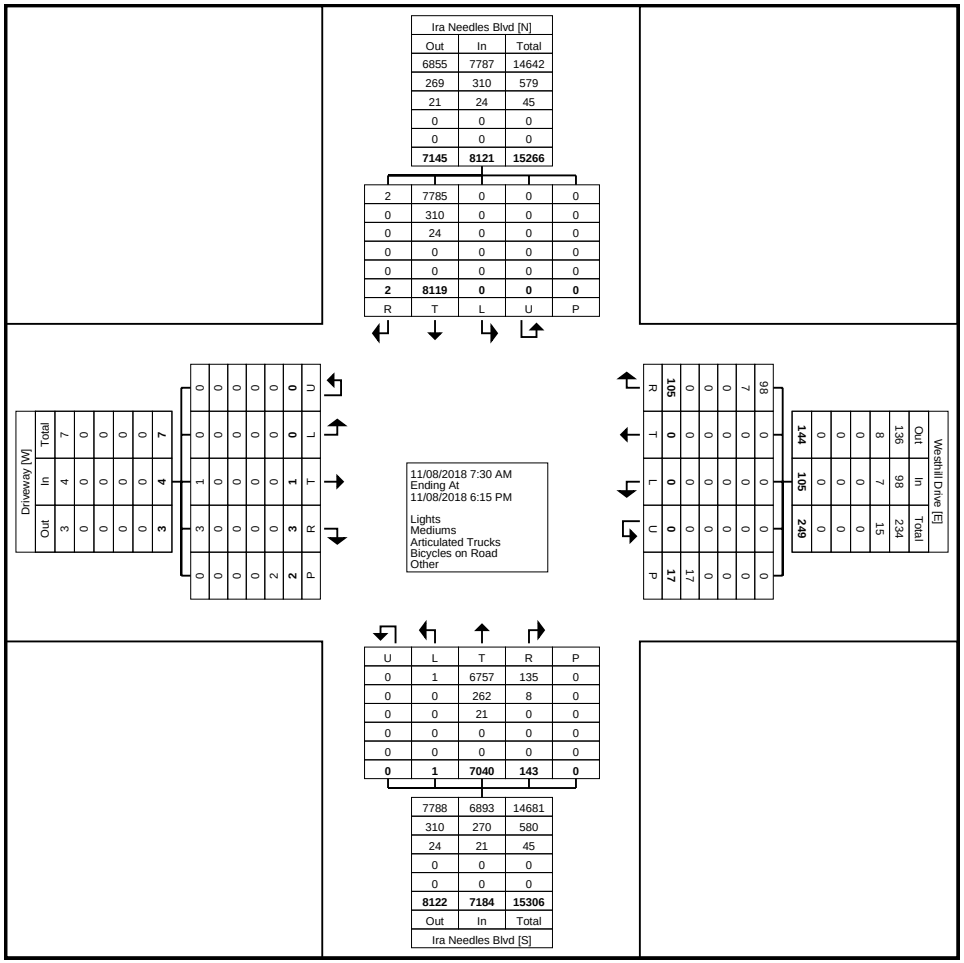
Start Time	Driveway Eastbound						Westhill Drive Westbound						Ira Needles Blvd Northbound						Ira Needles Blvd Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	141	2	0	0	143	0	210	0	0	0	210	353
7:45 AM	0	0	0	0	0	0	0	0	2	0	1	2	0	189	3	0	0	192	0	214	0	0	0	214	408
Hourly Total	0	0	0	0	0	0	0	0	2	0	1	2	0	330	5	0	0	335	0	424	0	0	0	424	761
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	228	4	0	0	232	0	233	0	0	0	233	465
8:15 AM	0	0	0	0	0	0	0	0	1	0	2	1	0	210	3	0	0	213	0	229	0	0	0	229	443
8:30 AM	0	0	0	0	0	0	0	0	1	0	0	1	0	206	2	0	0	208	0	294	0	0	0	294	503
8:45 AM	0	0	0	0	0	0	0	0	2	0	0	2	0	212	3	0	0	215	0	252	0	0	0	252	469
Hourly Total	0	0	0	0	0	0	0	0	4	0	2	4	0	856	12	0	0	868	0	1008	0	0	0	1008	1880
9:00 AM	0	0	0	0	0	0	0	0	2	0	0	2	0	177	4	0	0	181	0	192	0	0	0	192	375
9:15 AM	0	1	0	0	0	1	0	0	2	0	1	2	0	156	8	0	0	164	0	231	1	0	0	232	399
9:30 AM	0	0	0	0	0	0	0	0	7	0	3	7	0	177	0	0	0	177	0	198	0	0	0	198	382
9:45 AM	0	0	0	0	0	0	0	0	4	0	0	4	0	189	4	0	0	193	0	201	0	0	0	201	398
Hourly Total	0	1	0	0	0	1	0	0	15	0	4	15	0	699	16	0	0	715	0	822	1	0	0	823	1554
10:00 AM	0	0	0	0	0	0	0	0	3	0	0	3	0	153	2	0	0	155	0	182	0	0	0	182	340
10:15 AM	0	0	0	0	0	0	0	0	3	0	0	3	0	186	5	0	0	191	0	219	0	0	0	219	413
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	6	0	0	6	0	339	7	0	0	346	0	401	0	0	0	401	753
12:00 PM	0	0	1	0	0	1	0	0	5	0	0	5	0	208	8	0	0	216	0	247	0	0	0	247	469
12:15 PM	0	0	0	0	0	0	0	0	2	0	0	2	0	233	9	0	0	242	0	249	0	0	0	249	493
12:30 PM	0	0	0	0	0	0	0	0	5	0	0	5	0	197	8	0	0	205	0	233	0	0	0	233	443
12:45 PM	0	0	0	0	0	0	0	0	5	0	0	5	0	228	3	0	0	231	0	237	0	0	0	237	473
Hourly Total	0	0	1	0	0	1	0	0	17	0	0	17	0	866	28	0	0	894	0	966	0	0	0	966	1878
1:00 PM	0	0	0	0	1	0	0	0	1	0	0	1	0	189	8	0	0	197	0	209	0	0	0	209	407
1:15 PM	0	0	0	0	0	0	0	0	2	0	1	2	0	238	4	0	0	242	0	244	0	0	0	244	488
1:30 PM	0	0	0	0	0	0	0	0	5	0	0	5	0	206	6	0	0	212	0	225	0	0	0	225	442
1:45 PM	0	0	0	0	0	0	0	0	6	0	1	6	0	204	5	0	0	209	0	258	0	0	0	258	473
Hourly Total	0	0	0	0	1	0	0	0	14	0	2	14	0	837	23	0	0	860	0	936	0	0	0	936	1810
2:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	2
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	2
3:00 PM	0	0	0	0	1	0	0	0	2	0	1	2	1	218	8	0	0	227	0	256	0	0	0	256	485
3:15 PM	0	0	0	0	0	0	0	0	7	0	1	7	0	246	5	0	0	251	0	258	0	0	0	258	516
3:30 PM	0	0	0	0	0	0	0	0	2	0	0	2	0	220	5	0	0	225	0	271	0	0	0	271	498
3:45 PM	0	0	1	0	0	1	0	0	6	0	0	6	0	266	6	0	0	272	0	271	1	0	0	272	551
Hourly Total	0	0	1	0	1	1	0	0	17	0	2	17	1	950	24	0	0	975	0	1056	1	0	0	1057	2050
4:00 PM	0	0	0	0	0	0	0	0	5	0	1	5	0	280	6	0	0	286	0	267	0	0	0	267	558

4:15 PM	0	0	0	0	0	0	0	0	4	0	0	4	0	276	5	0	0	281	0	285	0	0	0	285	570
4:30 PM	0	0	0	0	0	0	0	0	12	0	0	12	0	266	8	0	0	274	0	339	0	0	0	339	625
4:45 PM	0	0	0	0	0	0	0	0	2	0	1	2	0	280	1	0	0	281	0	351	0	0	0	351	634
Hourly Total	0	0	0	0	0	0	0	0	23	0	2	23	0	1102	20	0	0	1122	0	1242	0	0	0	1242	2387
5:00 PM	0	0	0	0	0	0	0	0	2	0	1	2	0	254	1	0	0	255	0	350	0	0	0	350	607
5:15 PM	0	0	1	0	0	1	0	0	1	0	1	1	0	281	3	0	0	284	0	319	0	0	0	319	605
5:30 PM	0	0	0	0	0	0	0	0	3	0	2	3	0	247	3	0	0	250	0	322	0	0	0	322	575
5:45 PM	0	0	0	0	0	0	0	0	1	0	0	1	0	277	1	0	0	278	0	273	0	0	0	273	552
Hourly Total	0	0	1	0	0	1	0	0	7	0	4	7	0	1059	8	0	0	1067	0	1264	0	0	0	1264	2339
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	1	3	0	2	4	0	0	105	0	17	105	1	7040	143	0	0	7184	0	8119	2	0	0	8121	15414
Approach %	0.0	25.0	75.0	0.0	-	-	0.0	0.0	100.0	0.0	-	-	0.0	98.0	2.0	0.0	-	-	0.0	100.0	0.0	0.0	-	-	-
Total %	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.7	0.0	-	0.7	0.0	45.7	0.9	0.0	-	46.6	0.0	52.7	0.0	0.0	-	52.7	-
Lights	0	1	3	0	-	4	0	0	98	0	-	98	1	6757	135	0	-	6893	0	7785	2	0	-	7787	14782
% Lights	-	100.0	100.0	-	-	100.0	-	-	93.3	-	-	93.3	100.0	96.0	94.4	-	-	95.9	-	95.9	100.0	-	-	95.9	95.9
Mediums	0	0	0	0	-	0	0	0	7	0	-	7	0	262	8	0	-	270	0	310	0	0	-	310	587
% Mediums	-	0.0	0.0	-	-	0.0	-	-	6.7	-	-	6.7	0.0	3.7	5.6	-	-	3.8	-	3.8	0.0	-	-	3.8	3.8
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	21	0	0	-	21	0	24	0	0	-	24	45
% Articulated Trucks	-	0.0	0.0	-	-	0.0	-	-	0.0	-	-	0.0	0.0	0.3	0.0	-	-	0.3	-	0.3	0.0	-	-	0.3	0.3
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	-	0.0	0.0	-	-	0.0	-	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	-	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	5.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	2	-	-	-	-	-	16	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	94.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: West Hill Drive & Ira Needles Blvd
Site Code:
Start Date: 11/08/2018



Turning Movement Data Plot

Paradigm Transportation Solutions Limited
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Count Name: West Hill Drive & Ira Needles Blvd
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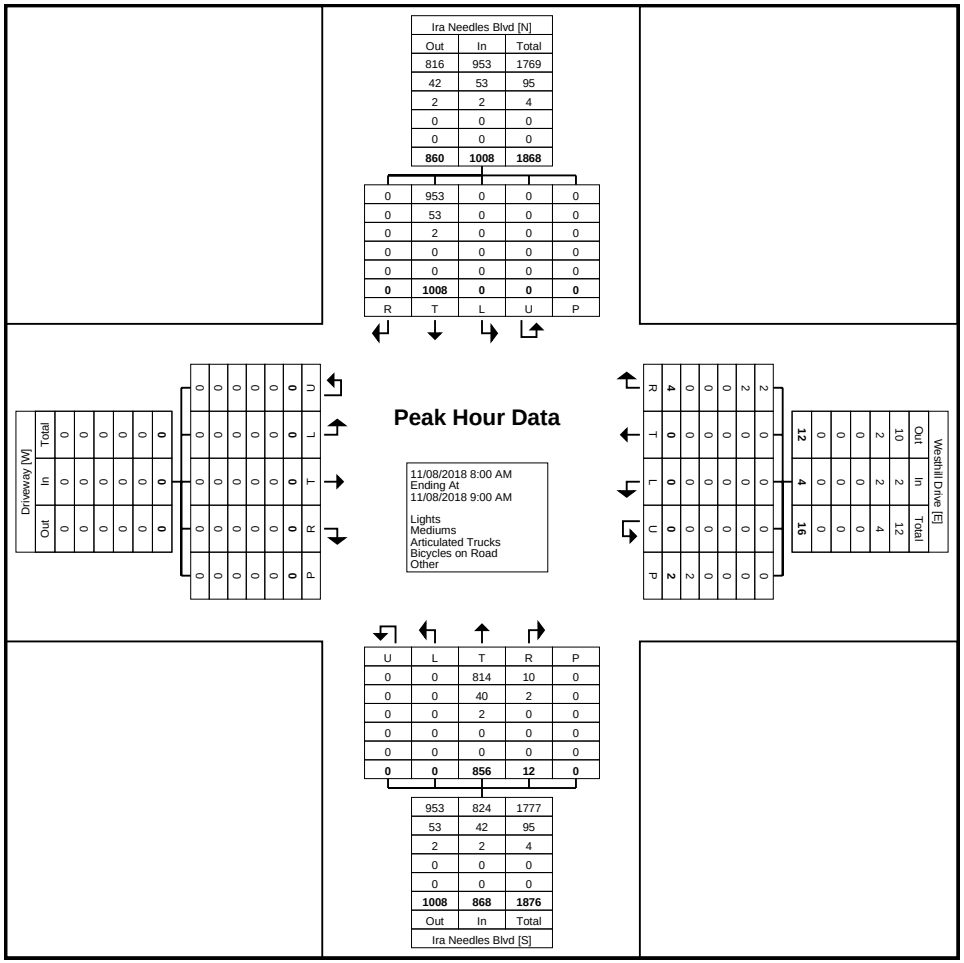
Turning Movement Peak Hour Data (8:00 AM)

Start Time	Driveway Eastbound						Westhill Drive Westbound						Ira Needles Blvd Northbound						Ira Needles Blvd Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	228	4	0	0	232	0	233	0	0	0	233	465
8:15 AM	0	0	0	0	0	0	0	0	1	0	2	1	0	210	3	0	0	213	0	229	0	0	0	229	443
8:30 AM	0	0	0	0	0	0	0	0	1	0	0	1	0	206	2	0	0	208	0	294	0	0	0	294	503
8:45 AM	0	0	0	0	0	0	0	0	2	0	0	2	0	212	3	0	0	215	0	252	0	0	0	252	469
Total	0	0	0	0	0	0	0	0	4	0	2	4	0	856	12	0	0	868	0	1008	0	0	0	1008	1880
Approach %	0.0	0.0	0.0	0.0	-	-	0.0	0.0	100.0	0.0	-	-	0.0	98.6	1.4	0.0	-	-	0.0	100.0	0.0	0.0	-	-	-
Total %	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.2	0.0	-	0.2	0.0	45.5	0.6	0.0	-	46.2	0.0	53.6	0.0	0.0	-	53.6	-
PHF	0.000	0.000	0.000	0.000	-	0.000	0.000	0.000	0.500	0.000	-	0.500	0.000	0.939	0.750	0.000	-	0.935	0.000	0.857	0.000	0.000	-	0.857	0.934
Lights	0	0	0	0	-	0	0	0	2	0	-	2	0	814	10	0	-	824	0	953	0	0	-	953	1779
% Lights	-	-	-	-	-	-	-	-	50.0	-	-	50.0	-	95.1	83.3	-	-	94.9	-	94.5	-	-	-	94.5	94.6
Mediums	0	0	0	0	-	0	0	0	2	0	-	2	0	40	2	0	-	42	0	53	0	0	-	53	97
% Mediums	-	-	-	-	-	-	-	-	50.0	-	-	50.0	-	4.7	16.7	-	-	4.8	-	5.3	-	-	-	5.3	5.2
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	2	0	0	-	2	0	2	0	0	-	2	4
% Articulated Trucks	-	-	-	-	-	-	-	-	0.0	-	-	0.0	-	0.2	0.0	-	-	0.2	-	0.2	-	-	-	0.2	0.2
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	-	-	-	-	-	-	-	-	0.0	-	-	0.0	-	0.0	0.0	-	-	0.0	-	0.0	-	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
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Count Name: West Hill Drive & Ira Needles Blvd
Site Code:
Start Date: 11/08/2018



Turning Movement Peak Hour Data Plot (8:00 AM)

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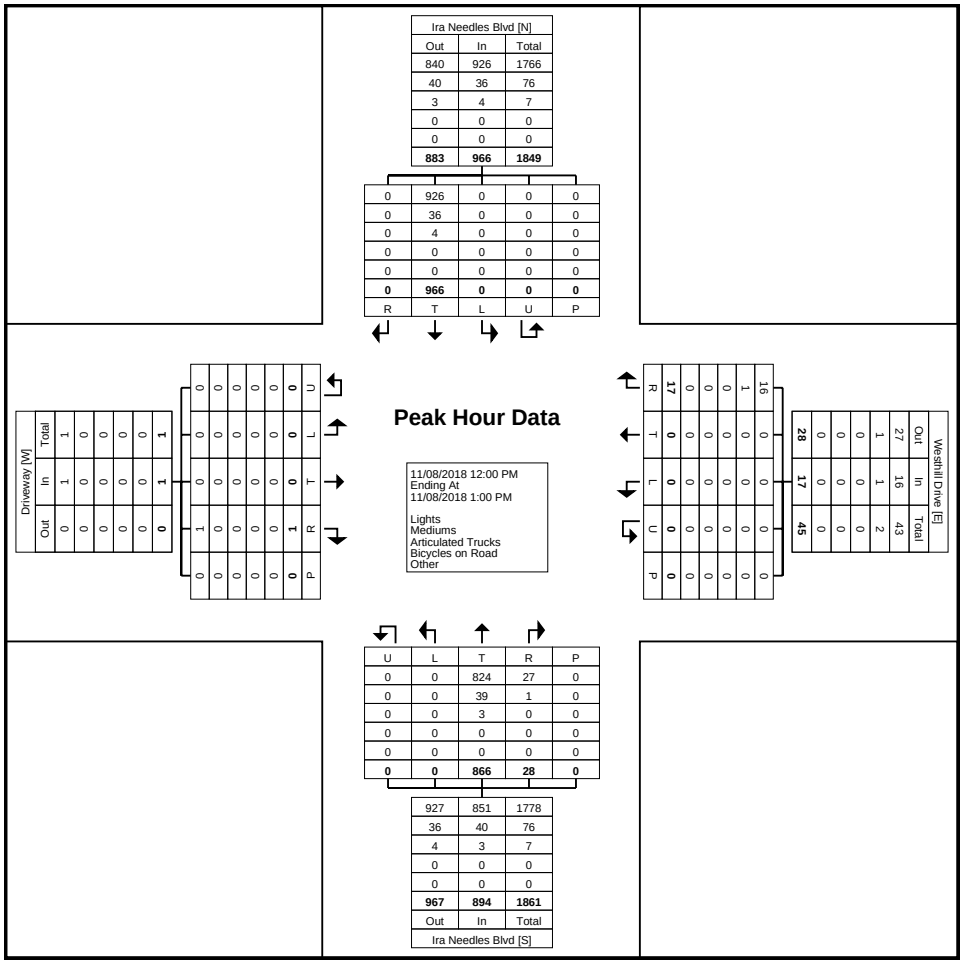
Turning Movement Peak Hour Data (12:00 PM)

Start Time	Driveway Eastbound						Westhill Drive Westbound						Ira Needles Blvd Northbound						Ira Needles Blvd Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
12:00 PM	0	0	1	0	0	1	0	0	5	0	0	5	0	208	8	0	0	216	0	247	0	0	0	247	469
12:15 PM	0	0	0	0	0	0	0	0	2	0	0	2	0	233	9	0	0	242	0	249	0	0	0	249	493
12:30 PM	0	0	0	0	0	0	0	0	5	0	0	5	0	197	8	0	0	205	0	233	0	0	0	233	443
12:45 PM	0	0	0	0	0	0	0	0	5	0	0	5	0	228	3	0	0	231	0	237	0	0	0	237	473
Total	0	0	1	0	0	1	0	0	17	0	0	17	0	866	28	0	0	894	0	966	0	0	0	966	1878
Approach %	0.0	0.0	100.0	0.0	-	-	0.0	0.0	100.0	0.0	-	-	0.0	96.9	3.1	0.0	-	-	0.0	100.0	0.0	0.0	-	-	-
Total %	0.0	0.0	0.1	0.0	-	0.1	0.0	0.0	0.9	0.0	-	0.9	0.0	46.1	1.5	0.0	-	47.6	0.0	51.4	0.0	0.0	-	51.4	-
PHF	0.000	0.000	0.250	0.000	-	0.250	0.000	0.000	0.850	0.000	-	0.850	0.000	0.929	0.778	0.000	-	0.924	0.000	0.970	0.000	0.000	-	0.970	0.952
Lights	0	0	1	0	-	1	0	0	16	0	-	16	0	824	27	0	-	851	0	926	0	0	-	926	1794
% Lights	-	-	100.0	-	-	100.0	-	-	94.1	-	-	94.1	-	95.2	96.4	-	-	95.2	-	95.9	-	-	-	95.9	95.5
Mediums	0	0	0	0	-	0	0	0	1	0	-	1	0	39	1	0	-	40	0	36	0	0	-	36	77
% Mediums	-	-	0.0	-	-	0.0	-	-	5.9	-	-	5.9	-	4.5	3.6	-	-	4.5	-	3.7	-	-	-	3.7	4.1
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	3	0	0	-	3	0	4	0	0	-	4	7
% Articulated Trucks	-	-	0.0	-	-	0.0	-	-	0.0	-	-	0.0	-	0.3	0.0	-	-	0.3	-	0.4	-	-	-	0.4	0.4
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	-	-	0.0	-	-	0.0	-	-	0.0	-	-	0.0	-	0.0	0.0	-	-	0.0	-	0.0	-	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
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Count Name: West Hill Drive & Ira Needles Blvd
Site Code:
Start Date: 11/08/2018



Turning Movement Peak Hour Data Plot (12:00 PM)

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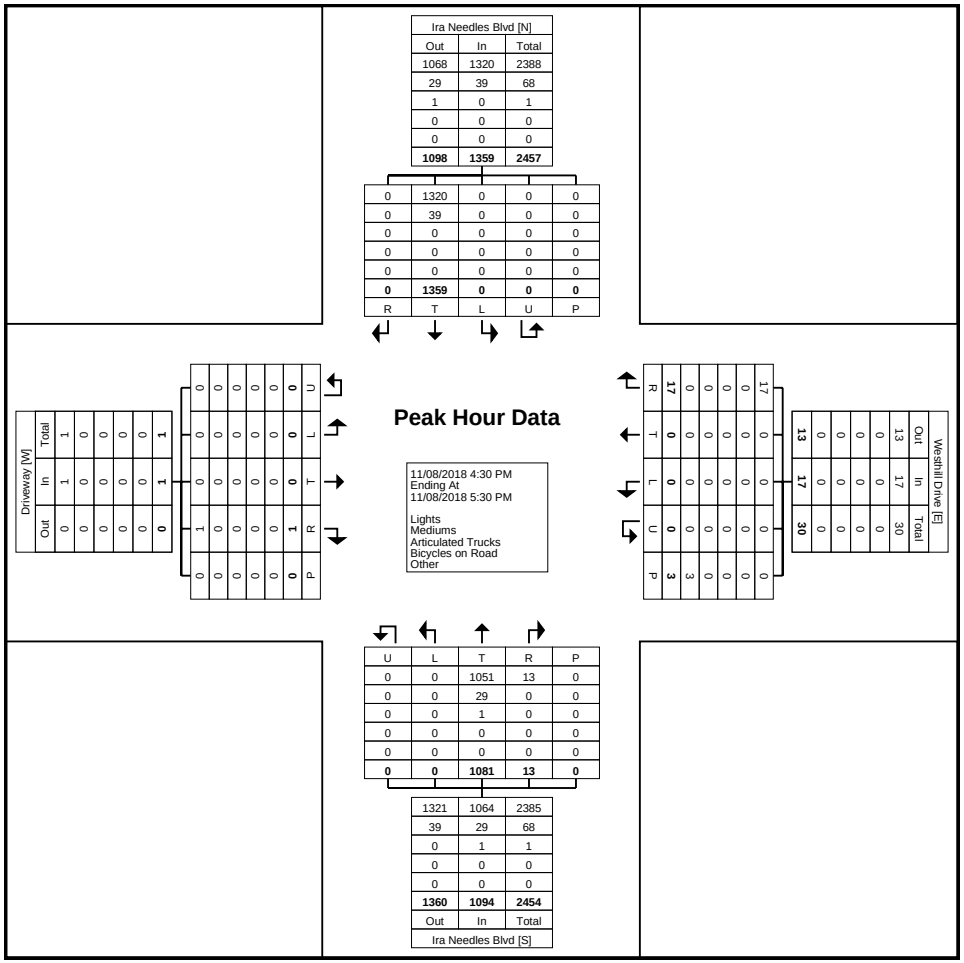
Turning Movement Peak Hour Data (4:30 PM)

Start Time	Driveway Eastbound						Westhill Drive Westbound						Ira Needles Blvd Northbound						Ira Needles Blvd Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:30 PM	0	0	0	0	0	0	0	0	12	0	0	12	0	266	8	0	0	274	0	339	0	0	0	339	625
4:45 PM	0	0	0	0	0	0	0	0	2	0	1	2	0	280	1	0	0	281	0	351	0	0	0	351	634
5:00 PM	0	0	0	0	0	0	0	0	2	0	1	2	0	254	1	0	0	255	0	350	0	0	0	350	607
5:15 PM	0	0	1	0	0	1	0	0	1	0	1	1	0	281	3	0	0	284	0	319	0	0	0	319	605
Total	0	0	1	0	0	1	0	0	17	0	3	17	0	1081	13	0	0	1094	0	1359	0	0	0	1359	2471
Approach %	0.0	0.0	100.0	0.0	-	-	0.0	0.0	100.0	0.0	-	-	0.0	98.8	1.2	0.0	-	-	0.0	100.0	0.0	0.0	-	-	-
Total %	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.7	0.0	-	0.7	0.0	43.7	0.5	0.0	-	44.3	0.0	55.0	0.0	0.0	-	55.0	-
PHF	0.000	0.000	0.250	0.000	-	0.250	0.000	0.000	0.354	0.000	-	0.354	0.000	0.962	0.406	0.000	-	0.963	0.000	0.968	0.000	0.000	-	0.968	0.974
Lights	0	0	1	0	-	1	0	0	17	0	-	17	0	1051	13	0	-	1064	0	1320	0	0	-	1320	2402
% Lights	-	-	100.0	-	-	100.0	-	-	100.0	-	-	100.0	-	97.2	100.0	-	-	97.3	-	97.1	-	-	-	97.1	97.2
Mediums	0	0	0	0	-	0	0	0	0	0	-	0	0	29	0	0	-	29	0	39	0	0	-	39	68
% Mediums	-	-	0.0	-	-	0.0	-	-	0.0	-	-	0.0	-	2.7	0.0	-	-	2.7	-	2.9	-	-	-	2.9	2.8
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	1
% Articulated Trucks	-	-	0.0	-	-	0.0	-	-	0.0	-	-	0.0	-	0.1	0.0	-	-	0.1	-	0.0	-	-	-	0.0	0.0
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	-	-	0.0	-	-	0.0	-	-	0.0	-	-	0.0	-	0.0	0.0	-	-	0.0	-	0.0	-	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	3	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
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Count Name: West Hill Drive & Ira Needles Blvd
Site Code:
Start Date: 11/08/2018



Turning Movement Peak Hour Data Plot (4:30 PM)

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Count Name: West Hill Drive & Ira Needles Blvd
Site Code:
Start Date: 11/08/2018

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22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: WestHill Drive & Ira Needles Blvd - Saturday
Site Code:
Start Date: 11/10/2018

Turning Movement Data

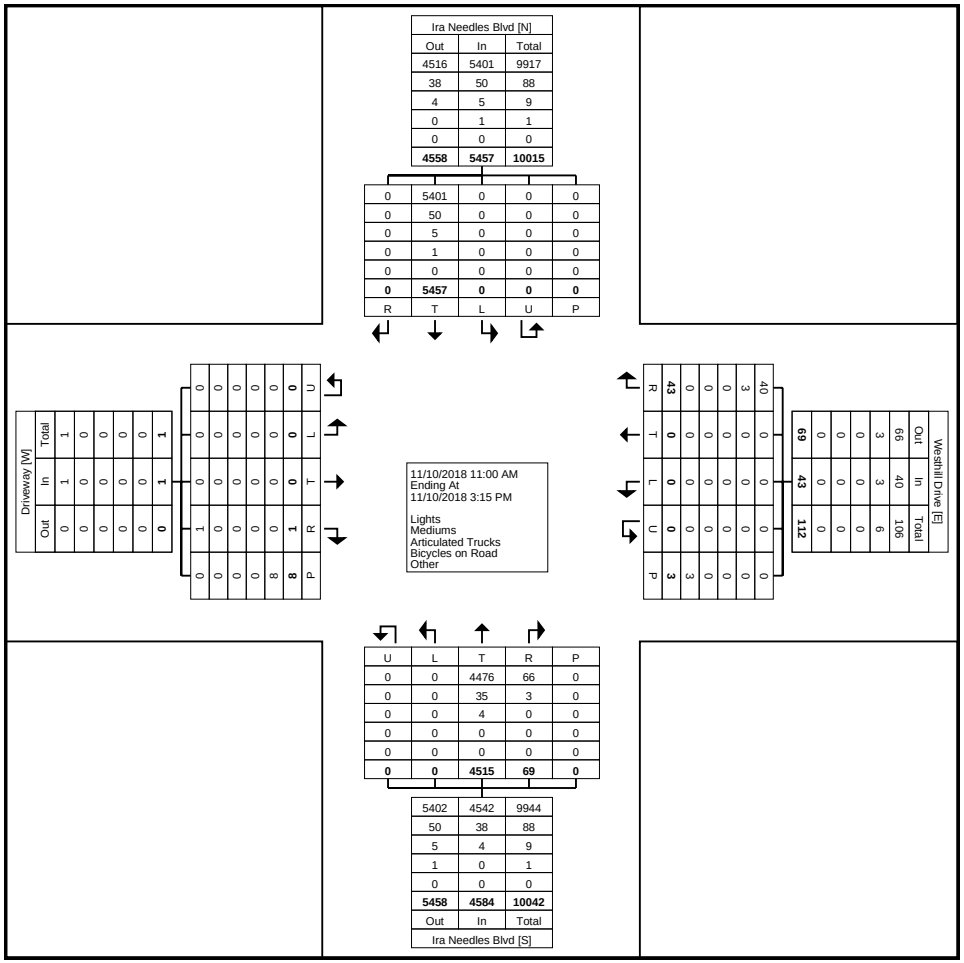
Start Time	Driveway Eastbound						Westhill Drive Westbound						Ira Needles Blvd Northbound						Ira Needles Blvd Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
11:00 AM	0	0	0	0	0	0	0	0	7	0	1	7	0	254	6	0	0	260	0	281	0	0	0	281	548
11:15 AM	0	0	0	0	2	0	0	0	3	0	0	3	0	240	4	0	0	244	0	335	0	0	0	335	582
11:30 AM	0	0	0	0	2	0	0	0	5	0	0	5	0	258	4	0	0	262	0	315	0	0	0	315	582
11:45 AM	0	0	1	0	0	1	0	0	1	0	0	1	0	254	3	0	0	257	0	346	0	0	0	346	605
Hourly Total	0	0	1	0	4	1	0	0	16	0	1	16	0	1006	17	0	0	1023	0	1277	0	0	0	1277	2317
12:00 PM	0	0	0	0	0	0	0	0	2	0	0	2	0	269	7	0	0	276	0	377	0	0	0	377	655
12:15 PM	0	0	0	0	1	0	0	0	2	0	0	2	0	293	3	0	0	296	0	294	0	0	0	294	592
12:30 PM	0	0	0	0	1	0	0	0	0	0	1	0	0	292	2	0	0	294	0	343	0	0	0	343	637
12:45 PM	0	0	0	0	1	0	0	0	2	0	0	2	0	275	2	0	0	277	0	324	0	0	0	324	603
Hourly Total	0	0	0	0	3	0	0	0	6	0	1	6	0	1129	14	0	0	1143	0	1338	0	0	0	1338	2487
1:00 PM	0	0	0	0	0	0	0	0	2	0	0	2	0	293	6	0	0	299	0	335	0	0	0	335	636
1:15 PM	0	0	0	0	0	0	0	0	3	0	0	3	0	317	5	0	0	322	0	337	0	0	0	337	662
1:30 PM	0	0	0	0	0	0	0	0	2	0	1	2	0	277	3	0	0	280	0	341	0	0	0	341	623
1:45 PM	0	0	0	0	0	0	0	0	2	0	0	2	0	276	2	0	0	278	0	375	0	0	0	375	655
Hourly Total	0	0	0	0	0	0	0	0	9	0	1	9	0	1163	16	0	0	1179	0	1388	0	0	0	1388	2576
2:00 PM	0	0	0	0	0	0	0	0	2	0	0	2	0	299	4	0	0	303	0	375	0	0	0	375	680
2:15 PM	0	0	0	0	0	0	0	0	1	0	0	1	0	306	4	0	0	310	0	369	0	0	0	369	680
2:30 PM	0	0	0	0	1	0	0	0	7	0	0	7	0	297	8	0	0	305	0	351	0	0	0	351	663
2:45 PM	0	0	0	0	0	0	0	0	2	0	0	2	0	315	6	0	0	321	0	359	0	0	0	359	682
Hourly Total	0	0	0	0	1	0	0	0	12	0	0	12	0	1217	22	0	0	1239	0	1454	0	0	0	1454	2705
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	1	0	8	1	0	0	43	0	3	43	0	4515	69	0	0	4584	0	5457	0	0	0	5457	10085
Approach %	0.0	0.0	100.0	0.0	-	-	0.0	0.0	100.0	0.0	-	-	0.0	98.5	1.5	0.0	-	-	0.0	100.0	0.0	0.0	-	-	-
Total %	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.4	0.0	-	0.4	0.0	44.8	0.7	0.0	-	45.5	0.0	54.1	0.0	0.0	-	54.1	-
Lights	0	0	1	0	-	1	0	0	40	0	-	40	0	4476	66	0	-	4542	0	5401	0	0	-	5401	9984
% Lights	-	-	100.0	-	-	100.0	-	-	93.0	-	-	93.0	-	99.1	95.7	-	-	99.1	-	99.0	-	-	-	99.0	99.0
Mediums	0	0	0	0	-	0	0	0	3	0	-	3	0	35	3	0	-	38	0	50	0	0	-	50	91
% Mediums	-	-	0.0	-	-	0.0	-	-	7.0	-	-	7.0	-	0.8	4.3	-	-	0.8	-	0.9	-	-	-	0.9	0.9
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	4	0	0	-	4	0	5	0	0	-	5	9
% Articulated Trucks	-	-	0.0	-	-	0.0	-	-	0.0	-	-	0.0	-	0.1	0.0	-	-	0.1	-	0.1	-	-	-	0.1	0.1
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	1
% Bicycles on Road	-	-	0.0	-	-	0.0	-	-	0.0	-	-	0.0	-	0.0	0.0	-	-	0.0	-	0.0	-	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	8	-	-	-	-	-	3	-	-	-	-	-	0	-	-	-	-	-	0	-	-

% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: WestHill Drive & Ira Needles Blvd - Saturday
Site Code:
Start Date: 11/10/2018



Turning Movement Data Plot

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Count Name: WestHill Drive & Ira Needles Blvd - Saturday
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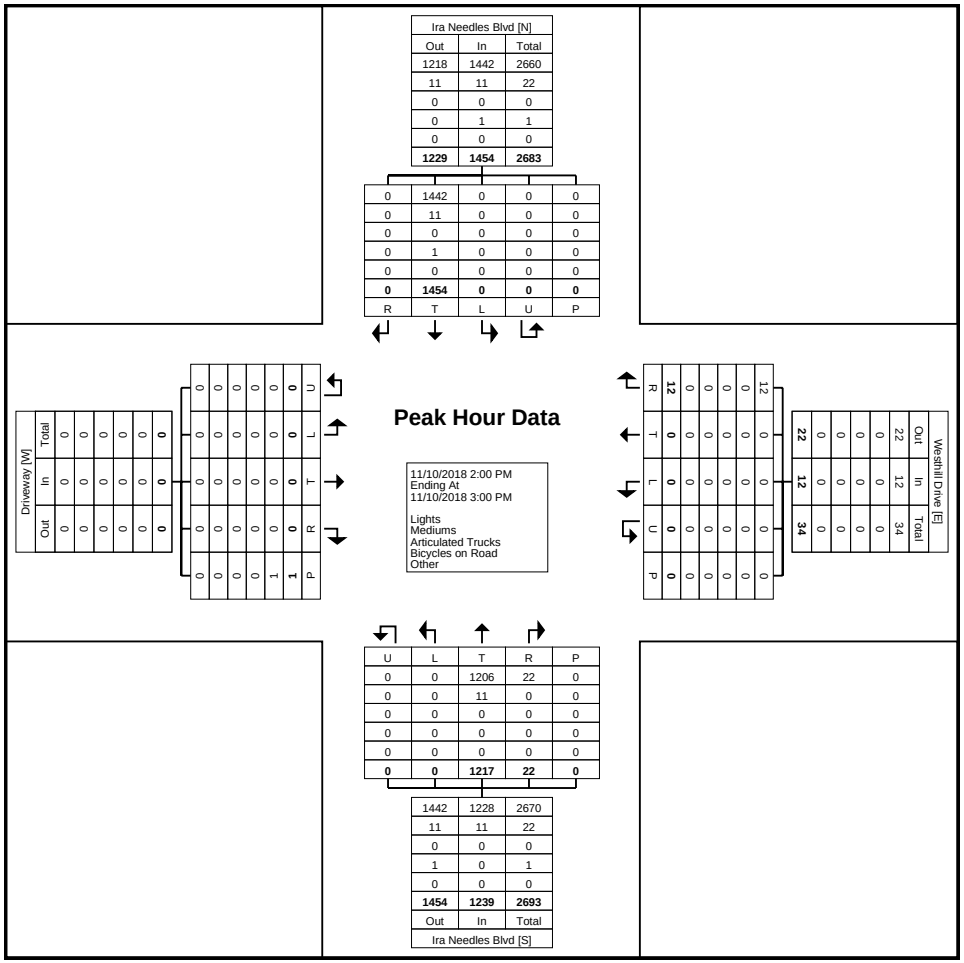
Turning Movement Peak Hour Data (2:00 PM)

Start Time	Driveway Eastbound						Westhill Drive Westbound						Ira Needles Blvd Northbound						Ira Needles Blvd Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
2:00 PM	0	0	0	0	0	0	0	0	2	0	0	2	0	299	4	0	0	303	0	375	0	0	0	375	680
2:15 PM	0	0	0	0	0	0	0	0	1	0	0	1	0	306	4	0	0	310	0	369	0	0	0	369	680
2:30 PM	0	0	0	0	1	0	0	0	7	0	0	7	0	297	8	0	0	305	0	351	0	0	0	351	663
2:45 PM	0	0	0	0	0	0	0	0	2	0	0	2	0	315	6	0	0	321	0	359	0	0	0	359	682
Total	0	0	0	0	1	0	0	0	12	0	0	12	0	1217	22	0	0	1239	0	1454	0	0	0	1454	2705
Approach %	0.0	0.0	0.0	0.0	-	-	0.0	0.0	100.0	0.0	-	-	0.0	98.2	1.8	0.0	-	-	0.0	100.0	0.0	0.0	-	-	-
Total %	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.4	0.0	-	0.4	0.0	45.0	0.8	0.0	-	45.8	0.0	53.8	0.0	0.0	-	53.8	-
PHF	0.000	0.000	0.000	0.000	-	0.000	0.000	0.000	0.429	0.000	-	0.429	0.000	0.966	0.688	0.000	-	0.965	0.000	0.969	0.000	0.000	-	0.969	0.992
Lights	0	0	0	0	-	0	0	0	12	0	-	12	0	1206	22	0	-	1228	0	1442	0	0	-	1442	2682
% Lights	-	-	-	-	-	-	-	-	100.0	-	-	100.0	-	99.1	100.0	-	-	99.1	-	99.2	-	-	-	99.2	99.1
Mediums	0	0	0	0	-	0	0	0	0	0	-	0	0	11	0	0	-	11	0	11	0	0	-	11	22
% Mediums	-	-	-	-	-	-	-	-	0.0	-	-	0.0	-	0.9	0.0	-	-	0.9	-	0.8	-	-	-	0.8	0.8
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	-	-	-	-	-	-	-	-	0.0	-	-	0.0	-	0.0	0.0	-	-	0.0	-	0.0	-	-	-	0.0	0.0
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	1
% Bicycles on Road	-	-	-	-	-	-	-	-	0.0	-	-	0.0	-	0.0	0.0	-	-	0.0	-	0.1	-	-	-	0.1	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Count Name: WestHill Drive & Ira Needles Blvd - Saturday
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Start Date: 11/10/2018



Turning Movement Peak Hour Data Plot (2:00 PM)

Paradigm Transportation Solutions Limited
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519-896-3163 cbowness@ptsl.com

Count Name: WestHill Drive & Ira Needles Blvd - Saturday
Site Code:
Start Date: 11/10/2018

Semi-Actuated Operation

Signal Timing in Effect: All times

ERBSVILLE ROAD

Green		60.0	seconds			
Amber		4.0	seconds	Walk	50.0	seconds
All Red		2.0	seconds	FDW	10.0	seconds

Keatsway Drive

				Pedestrian Call		
Green	Min	7.0	seconds	Green/Walk	7.0	seconds
	Ext	3.0	seconds	Green/FDW	15.0	seconds
	Max	15.0	seconds	Green/SDW	0.0	seconds
Amber		4.0	seconds	Amber	4.0	seconds
All Red		2.0	seconds	All Red	2.0	seconds
TOTAL		87.0	seconds			

INT # 214 **ERB STREET @ Erbsville Court** T08-50/ 79W

Semi-Actuated Operation

Signal Timing in Effect: 07:00 - 18:00 Monday to Friday, 0830 - 18:00 Saturday

ERBSVILLE ROAD							
Green		40.0	seconds				
Amber		4.0	seconds	Walk	26.0	seconds	
All Red		2.0	seconds	FDW	14.0	seconds	
Keatsway Drive				Pedestrian Call			
Green	Min	8.0	seconds	Green/Walk	7.0	seconds	
	Ext	3.0	seconds	Green/FDW	15.0	seconds	
	Max	20.0	seconds	Green/SDW	0.0	seconds	
Amber		4.0	seconds	Amber	4.0	seconds	
All Red		2.0	seconds	All Red	2.0	seconds	
TOTAL		72.0	seconds				

Signal Timing in Effect: All other times

ERBSVILLE ROAD							
Green		25.0	seconds				
Amber		4.0	seconds	Walk	11.0	seconds	
All Red		2.0	seconds	FDW	14.0	seconds	
Keatsway Drive				Pedestrian Call			
Green	Min	8.0	seconds	Green/Walk	7.0	seconds	
	Ext	3.0	seconds	Green/FDW	15.0	seconds	
	Max	15.0	seconds	Green/SDW	0.0	seconds	
Amber		4.0	seconds	Amber	4.0	seconds	
All Red		2.0	seconds	All Red	2.0	seconds	
TOTAL		52.0	seconds				

INT # 626 **ERBSVILLE ROAD @ Columbia Street** T08-50/ 93W

Fixed Time Operation
Actuated protected/permissive left-turn phase on all approaches
Offsets are percentages of the cycle length related to the beginning of Erbsville Road green

Signal Timing in Effect: 07:00-08:00, 9:00-10:00 M-F, 9:00-19:00 Sat, 10:00-18:00 Sun

ERBSVILLE ROAD **Offset= 35%**

SBL Green Arrow	Min	5.0	seconds						
	Ext	3.0	seconds						
	Max	12.2	seconds						
SBL Amber Arrow		3.0	seconds						
All Red		1.0	seconds						
Green		26.4	seconds						
Amber		4.0	seconds	Walk	17.4	seconds			
All Red		2.0	seconds	FDW	9.0	seconds			

Columbia Street

WBL Green Arrow	Min	5.0	seconds	EBL Green Arrow			Min	5.0	seconds
	Ext	3.0	seconds				Ext	3.0	seconds
	Max	8.6	seconds				Max	5.0	seconds
WBL Amber Arrow		3.0	seconds	EBL Amber Arrow				3.0	seconds
All Red		1.0	seconds	All Red				1.0	seconds
Green		22.8	seconds						
Amber		4.0	seconds	Walk	15.8	seconds			
All Red		2.0	seconds	FDW	7.0	seconds			
TOTAL		90.0	seconds						

Signal Timing in Effect: 10:00-14:30 Monday to Friday

ERBSVILLE ROAD **Offset= 68%**

Green		36.0	seconds			
Amber		4.0	seconds	Walk	27.0	seconds
All Red		2.0	seconds	FDW	9.0	seconds

Columbia Street

WBL Green Arrow	Min	5.0	seconds			
	Ext	3.0	seconds			
	Max	7.3	seconds			
WBL Amber Arrow		3.0	seconds			
All Red		1.0	seconds			
Green		15.8	seconds			
Amber		4.0	seconds	Walk	8.8	seconds
All Red		2.0	seconds	FDW	7.0	seconds
TOTAL		75.0	seconds			

Signal Timing in Effect: 14:30-20:00 Monday - Friday

ERBSVILLE ROAD **Offset= 46%**

SBL Green Arrow	Min	5.0	seconds	NBL Green			Min	5.0	seconds
	Ext	3.0	seconds				Ext	3.0	seconds
	Max	5.9	seconds				Max	5.0	seconds
SBL Amber Arrow		3.0	seconds	NBL Amber				3.0	seconds
All Red		1.0	seconds	All Red				1.0	seconds
Green		31.8	seconds						
Amber		4.0	seconds	Walk	22.8	seconds			
All Red		2.0	seconds	FDW	9.0	seconds			

Columbia Street

WBL Green Arrow	Min	5.0	seconds	EBL Green Arrow			Min	5.0	seconds
	Ext	3.0	seconds				Ext	3.0	seconds
	Max	14.9	seconds				Max	5.0	seconds
WBL Amber Arrow		3.0	seconds	EBL Amber Arrow				3.0	seconds
All Red		1.0	seconds	All Red				1.0	seconds
Green		17.4	seconds						
Amber		4.0	seconds	Walk	10.4	seconds			
All Red		2.0	seconds	FDW	7.0	seconds			
TOTAL		90.0	seconds						

Signal Timing in Effect: 10:00-14:30 Monday to Friday

ERBSVILLE ROAD **Offset= 68%**

Green	42.0	seconds			
Amber	4.0	seconds	Walk	33.0	seconds
All Red	2.0	seconds	FDW	9.0	seconds

Columbia Street

Green	26.0	seconds			
Amber	4.0	seconds	Walk	19.0	seconds
All Red	2.0	seconds	FDW	7.0	seconds
TOTAL	80.0	seconds			

INT # 627 **ERBSVILLE ROAD @ Keatsway Drive** T08-50/ 106W

Semi-Actuated Operation
Actuated protected/permissive NB/SB left-turn phases
Offsets are percentages of the cycle length related to the beginning of Erbsville Road green

Signal Timing in Effect: 7:00-8:00, 9:00-10:00 Mon to Fri, 9:00-20:00 Sat, 10:00-18:00 Sun

ERBSVILLE ROAD				**Offset= 81%**		
SBL Green Arrow	Min	5.0	seconds			
	Ext	3.0	seconds			
	Max	5.0	seconds			
SBL Amber Arrow		3.0	seconds			
All Red		1.0	seconds			
Green		42.6	seconds			
Amber		4.0	seconds	Walk	29.6	seconds
All Red		2.0	seconds	FDW	13.0	seconds

Keatsway Drive				Pedestrian Call		
Green	Min	8.0	seconds	Green/Walk	10.0	seconds
	Ext	3.0	seconds	Green/FDW	16.0	seconds
	Max	26.4	seconds	Green/SDW	0.4	seconds
Amber		4.0	seconds	Amber	4.0	seconds
All Red		2.0	seconds	All Red	2.0	seconds
TOTAL		90.0	seconds			

Signal Timing in Effect: 10:00-14:30 Monday - Friday

ERBSVILLE ROAD				**Offset= 18%**		
Green		37.5	seconds			
Amber		4.0	seconds	Walk	24.5	seconds
All Red		2.0	seconds	FDW	13.0	seconds

Keatsway Drive				Pedestrian Call		
Green	Min	8.0	seconds	Green/Walk	10.0	seconds
	Ext	3.0	seconds	Green/FDW	16.0	seconds
	Max	25.5	seconds	Green/SDW	0.0	seconds
Amber		4.0	seconds	Amber	4.0	seconds
All Red		2.0	seconds	All Red	2.0	seconds
TOTAL		75.0	seconds			

Signal Timing in Effect: 10:00-14:30 Monday - Friday

ERBSVILLE ROAD				**Offset= 92%**					
SBL Green Arrow	Min	5.0	seconds	NBL Green			Min	5.0	seconds
	Ext	3.0	seconds				Ext	3.0	seconds
	Max	5.0	seconds				Max	5.0	seconds
SBL Amber Arrow		3.0	seconds	NBL Amber				3.0	seconds
All Red		1.0	seconds	All Red				1.0	seconds
Green		43.5	seconds						
Amber		4.0	seconds	Walk	30.5	seconds			
All Red		2.0	seconds	FDW	13.0	seconds			

Keatsway Drive				Pedestrian Call		
Green	Min	8.0	seconds	Green/Walk	10.0	seconds
	Ext	3.0	seconds	Green/FDW	16.0	seconds
	Max	25.5	seconds	Green/SDW	0.0	seconds
Amber		4.0	seconds	Amber	4.0	seconds
All Red		2.0	seconds	All Red	2.0	seconds

TOTAL		90.0	seconds				

Signal Timing in Effect: 8:00-9:00 Mon to Fri (higher cycle length for school traffic)

ERBSVILLE ROAD				**Offset= 81%**			
SBL Green Arrow	Min	5.0	seconds				
	Ext	3.0	seconds				
	Max	5.0	seconds				
SBL Amber Arrow		3.0	seconds				
All Red		1.0	seconds				
Green		53.0	seconds				
Amber		4.0	seconds	Walk	40.0	seconds	
All Red		2.0	seconds	FDW	13.0	seconds	
Keatsway Drive				Pedestrian Call			
Green	Min	8.0	seconds	Green/Walk	10.0	seconds	
	Ext	3.0	seconds	Green/FDW	16.0	seconds	
	Max	26.0	seconds	Green/SDW	0.0	seconds	
Amber		4.0	seconds	Amber	4.0	seconds	
All Red		2.0	seconds	All Red	2.0	seconds	
TOTAL		100.0	seconds				

Signal Timing in Effect: All other times

ERBSVILLE ROAD							
Green		37.0	seconds				
Amber		4.0	seconds	Walk	24.0	seconds	
All Red		2.0	seconds	FDW	13.0	seconds	
Keatsway Drive				Pedestrian Call			
Green	Min	8.0	seconds	Green/Walk	10.0	seconds	
	Ext	3.0	seconds	Green/FDW	16.0	seconds	
	Max	26.0	seconds	Green/SDW	0.0	seconds	
Amber		4.0	seconds	Amber	4.0	seconds	
All Red		2.0	seconds	All Red	2.0	seconds	
TOTAL		75.0	seconds				

Appendix B

Existing Traffic Operations Reports

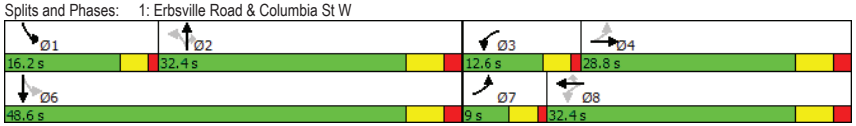


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	162	307	54	119	84	92	36	351	410	177	413	81
Future Volume (vph)	162	307	54	119	84	92	36	351	410	177	413	81
Ideal Flow (vphpl)	1775	1650	1650	1775	1900	1750	1775	1900	1750	1775	1650	1650
Storage Length (m)	60.0		0.0	0.0		75.0	80.0		170.0	145.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	50.0			7.5			80.0			80.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		1.00		0.97	0.99				1.00	
Frt		0.978				0.850			0.850		0.975	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1637	1552	0	1653	1727	1390	1561	1810	1473	1621	1513	0
Flt Permitted	0.702			0.229			0.483			0.302		
Satd. Flow (perm)	1202	1552	0	398	1727	1352	790	1810	1473	515	1513	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10				133			410		16	
Link Speed (k/h)		50			60			60			60	
Link Distance (m)		118.8			135.9			921.3			152.9	
Travel Time (s)		8.6			8.2			55.3			9.2	
Confl. Peds. (#/hr)	3		1	1		3	4					4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	7%	2%	10%	7%	8%	5%	1%	4%	5%	10%
Adj. Flow (vph)	162	307	54	119	84	92	36	351	410	177	413	81
Shared Lane Traffic (%)												
Lane Group Flow (vph)	162	361	0	119	84	92	36	351	410	177	494	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	7	4		3	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	22.8		5.0	22.8	22.8	26.4	26.4	26.4	5.0	26.4	
Minimum Split (s)	9.0	28.8		9.0	28.8	28.8	32.4	32.4	32.4	9.0	32.4	
Total Split (s)	9.0	28.8		12.6	32.4	32.4	32.4	32.4	32.4	16.2	48.6	
Total Split (%)	10.0%	32.0%		14.0%	36.0%	36.0%	36.0%	36.0%	36.0%	18.0%	54.0%	
Maximum Green (s)	5.0	22.8		8.6	26.4	26.4	26.4	26.4	26.4	12.2	42.6	
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	
All-Red Time (s)	1.0	2.0		1.0	2.0	2.0	2.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	-2.0		0.0	-2.0	-2.0	0.0	-2.0	-2.0	0.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	6.0	4.0	4.0	4.0	4.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Max		None	Max	Max	Max	Max	Max	None	Max	
Walk Time (s)		7.0			7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0		11.0	
Pedestrian Calls (#/hr)		0			0	0	0	0	0		0	
Act Effct Green (s)	30.3	25.3		36.5	28.4	28.4	28.1	30.1	30.1	44.6	44.6	
Actuated g/C Ratio	0.34	0.28		0.41	0.32	0.32	0.31	0.33	0.33	0.50	0.50	
v/c Ratio	0.38	0.81		0.43	0.15	0.18	0.15	0.58	0.54	0.46	0.65	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	22.0	46.2		21.9	23.2	2.5	25.3	29.9	5.4	17.1	21.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	22.0	46.2		21.9	23.2	2.5	25.3	29.9	5.4	17.1	21.4	
LOS	C	D		C	C	A	C	C	A	B	C	
Approach Delay		38.7			16.2			17.1			20.2	
Approach LOS		D			B			B			C	
Queue Length 50th (m)	18.6	60.1		13.3	10.9	0.0	4.7	52.7	0.0	17.4	61.8	
Queue Length 95th (m)	32.8	#108.4		24.8	22.0	5.1	12.7	83.3	21.0	30.2	97.9	
Internal Link Dist (m)		94.8			111.9			897.3			128.9	
Turn Bay Length (m)	60.0					75.0	80.0		170.0	145.0		
Base Capacity (vph)	429	443		283	544	517	246	605	765	405	757	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.38	0.81		0.42	0.15	0.18	0.15	0.58	0.54	0.44	0.65	

Intersection Summary		
Area Type:	Other	
Cycle Length: 90		
Actuated Cycle Length: 90		
Natural Cycle: 80		
Control Type: Semi Act-Uncoord		
Maximum v/c Ratio: 0.81		
Intersection Signal Delay: 22.9		Intersection LOS: C
Intersection Capacity Utilization 95.6%		ICU Level of Service F
Analysis Period (min) 15		
# 95th percentile volume exceeds capacity, queue may be longer.		
Queue shown is maximum after two cycles.		

Splits and Phases: 1: Erbsville Road & Columbia St W

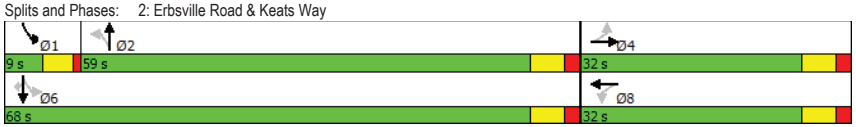


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	68	93	56	60	22	42	18	659	54	46	529	13
Future Volume (vph)	68	93	56	60	22	42	18	659	54	46	529	13
Ideal Flow (vphpl)	1775	1650	1650	1775	1650	1650	1775	1650	1650	1775	1900	1750
Storage Length (m)	15.0		0.0	35.0		0.0	20.0		0.0	25.0		25.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	30.0			25.0			65.0			50.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99		0.99	0.98		1.00	1.00		1.00		0.98
Frt		0.944			0.902			0.989				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1637	1474	0	1637	1297	0	1519	1564	0	1653	1810	1488
Flt Permitted	0.715			0.541			0.467			0.279		
Satd. Flow (perm)	1223	1474	0	923	1297	0	746	1564	0	485	1810	1456
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		30			42			7				33
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		155.7			226.8			139.9			921.3	
Travel Time (s)		11.2			16.3			8.4			55.3	
Confl. Peds. (#/hr)	4		7	7		4	1		2	2		1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	4%	5%	3%	14%	12%	11%	4%	6%	2%	5%	0%
Adj. Flow (vph)	68	93	56	60	22	42	18	659	54	46	529	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	68	149	0	60	64	0	18	713	0	46	529	13
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		1	6	6
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		53.0	53.0		4.5	53.0	53.0
Minimum Split (s)	14.0	14.0		14.0	14.0		59.0	59.0		9.0	68.0	68.0
Total Split (s)	32.0	32.0		32.0	32.0		59.0	59.0		9.0	68.0	68.0
Total Split (%)	32.0%	32.0%		32.0%	32.0%		59.0%	59.0%		9.0%	68.0%	68.0%
Maximum Green (s)	26.0	26.0		26.0	26.0		53.0	53.0		4.5	62.0	62.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		3.5	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		1.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		2.5	4.0	4.0
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		Max	Max		None	Max	Max
Walk Time (s)	10.0	10.0		10.0	10.0		40.0	40.0			40.0	40.0
Flash Dont Walk (s)	16.0	16.0		16.0	16.0		13.0	13.0			13.0	13.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0			0	0
Act Effct Green (s)	14.6	14.6		14.6	14.6		58.9	58.9		65.7	64.1	64.1
Actuated g/C Ratio	0.17	0.17		0.17	0.17		0.68	0.68		0.76	0.74	0.74
v/c Ratio	0.33	0.55		0.39	0.25		0.04	0.67		0.10	0.40	0.01

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	35.9	33.7		39.3	17.2		7.3	14.3		3.8	5.7	0.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	35.9	33.7		39.3	17.2		7.3	14.3		3.8	5.7	0.5
LOS	D	C		D	B		A	B		A	A	A
Approach Delay		34.4			27.9			14.1			5.5	
Approach LOS		C			C			B			A	
Queue Length 50th (m)	10.6	19.0		9.4	3.3		1.1	72.8		1.6	27.1	0.0
Queue Length 95th (m)	22.8	37.8		21.2	14.0		4.2	143.6		5.2	56.3	0.6
Internal Link Dist (m)		131.7			202.8			115.9			897.3	
Turn Bay Length (m)	15.0			35.0			20.0			25.0		25.0
Base Capacity (vph)	395	497		298	447		506	1063		454	1337	1084
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.17	0.30		0.20	0.14		0.04	0.67		0.10	0.40	0.01

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 86.8			
Natural Cycle: 85			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.67			
Intersection Signal Delay: 14.7		Intersection LOS: B	
Intersection Capacity Utilization 106.9%		ICU Level of Service G	
Analysis Period (min) 15			

Splits and Phases: 2: Erbsville Road & Keats Way



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	271	291	206	190	150	106	203	501	160	296	595	116
Future Volume (vph)	271	291	206	190	150	106	203	501	160	296	595	116
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1775	1775	1750	1775	1775	1750
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	1.00	0.95	0.95	1.00
Frt		0.960			0.964				0.850			0.850
Flt Protected		0.983			0.979			0.986			0.984	
Satd. Flow (prot)	0	2814	0	0	2805	0	0	3166	1444	0	3211	1430
Flt Permitted		0.983			0.979			0.986			0.984	
Satd. Flow (perm)	0	2814	0	0	2805	0	0	3166	1444	0	3211	1430
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		147.8			470.9			152.2			97.5	
Travel Time (s)		8.9			28.3			9.1			5.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	2%	11%	4%	7%	6%	10%	3%	3%	2%	4%	4%
Adj. Flow (vph)	271	291	206	190	150	106	203	501	160	296	595	116
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	768	0	0	446	0	0	704	160	0	891	116
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary					
Area Type:	Other				
Control Type: Roundabout					
Intersection Capacity Utilization	102.2%		ICU Level of Service G		
Analysis Period (min)	15				

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized									MOYes			MOYes
Traffic Volume (veh/h)	271	291	206	190	150	106	203	501	160	296	595	116
Future Volume (veh/h)	271	291	206	190	150	106	203	501	160	296	595	116
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	271	291	206	190	150	106	203	501	160	296	595	116
Approach Volume (veh/h)		768			446			704			891	
Crossing Volume (veh/h)		1081			975			858			543	
High Capacity (veh/h)		582			635			699			902	
High v/c (veh/h)		1.32			0.70			1.01			0.99	
Low Capacity (veh/h)		448			494			549			726	
Low v/c (veh/h)		1.71			0.90			1.28			1.23	

Intersection Summary					
Maximum v/c High		1.32			
Maximum v/c Low		1.71			
Intersection Capacity Utilization		102.2%	ICU Level of Service		G

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	507	38	34	686	64	3	2	45	0	0	26
Future Volume (vph)	0	507	38	34	686	64	3	2	45	0	0	26
Ideal Flow (vphpl)	1900	1650	1650	1900	1650	1650	1900	1650	1650	1650	1650	1900
Storage Length (m)	0.0		0.0	25.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		1	0		1
Taper Length (m)	0.0			60.0			0.0			0.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.991			0.987				0.865			0.865
Flt Protected				0.950				0.971				
Satd. Flow (prot)	0	1524	0	1752	2921	0	0	0	1334	0	0	1644
Flt Permitted				0.950				0.971				
Satd. Flow (perm)	0	1524	0	1752	2921	0	0	0	1334	0	0	1644
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		83.2			147.8			60.7			74.6	
Travel Time (s)		5.0			8.9			4.4			5.4	
Confl. Peds. (#/hr)			1	1								
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	7%	11%	3%	6%	5%	0%	0%	7%	0%	0%	0%
Adj. Flow (vph)	0	507	38	34	686	64	3	2	45	0	0	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	545	0	34	750	0	0	5	45	0	0	26
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	Err%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	507	38	34	686	64	3	2	45	0	0	26
Future Volume (Veh/h)	0	507	38	34	686	64	3	2	45	0	0	26
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	507	38	34	686	64	3	2	45	0	0	26
Pedestrians								1				
Lane Width (m)								3.6				
Walking Speed (m/s)								1.2				
Percent Blockage								0				
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		83										
pX, platoon unblocked				0.90			0.90	0.90	0.90	0.90	0.90	
vC, conflicting volume	750			546			964	1345	527	1358	1332	375
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	750			441			905	1328	420	1342	1314	375
tC, single (s)	4.1			4.2			7.5	6.5	7.0	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.4	3.5	4.0	3.3
p0 queue free %	100			97			98	99	91	100	100	96
cM capacity (veh/h)	868			998			197	136	512	89	139	628

Direction, Lane #	EB 1	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	545	34	457	293	50	26
Volume Left	0	34	0	0	3	0
Volume Right	38	0	0	64	45	26
cSH	1700	998	1700	1700	424	628
Volume to Capacity	0.32	0.03	0.27	0.17	0.12	0.04
Queue Length 95th (m)	0.0	0.8	0.0	0.0	3.2	1.0
Control Delay (s)	0.0	8.7	0.0	0.0	14.6	11.0
Lane LOS		A			B	B
Approach Delay (s)	0.0	0.4			14.6	11.0
Approach LOS					B	B

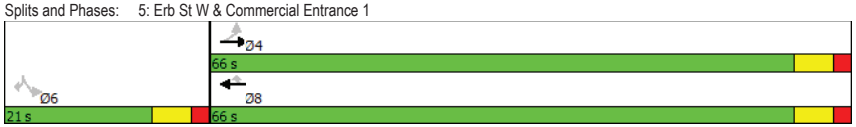
Intersection Summary					
Average Delay	0.9				
Intersection Capacity Utilization	Err%	ICU Level of Service		H	
Analysis Period (min)	15				

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	59	479	667	40	62	73
Future Volume (vph)	59	479	667	40	62	73
Ideal Flow (vphpl)	1775	1900	1900	1750	1775	1750
Storage Length (m)	30.0			0.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	55.0				0.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00			0.98		
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1606	1792	1792	1316	1466	1473
Flt Permitted	0.371				0.950	
Satd. Flow (perm)	627	1792	1792	1287	1466	1473
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				40		73
Link Speed (k/h)		60	60		50	
Link Distance (m)		435.4	83.2		96.6	
Travel Time (s)		26.1	5.0		7.0	
Confl. Peds. (#/hr)	3			3		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	6%	6%	13%	15%	1%
Adj. Flow (vph)	59	479	667	40	62	73
Shared Lane Traffic (%)						
Lane Group Flow (vph)	59	479	667	40	62	73
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4	8			
Permitted Phases	4			8	6	6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	60.0	60.0	60.0	60.0	7.0	7.0
Minimum Split (s)	66.0	66.0	66.0	66.0	13.0	13.0
Total Split (s)	66.0	66.0	66.0	66.0	21.0	21.0
Total Split (%)	75.9%	75.9%	75.9%	75.9%	24.1%	24.1%
Maximum Green (s)	60.0	60.0	60.0	60.0	15.0	15.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	Max	None	None
Walk Time (s)	50.0	50.0	50.0	50.0	7.0	7.0
Flash Dont Walk (s)	10.0	10.0	10.0	10.0	15.0	15.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	65.9	65.9	65.9	65.9	11.1	11.1
Actuated g/C Ratio	0.81	0.81	0.81	0.81	0.14	0.14
v/c Ratio	0.12	0.33	0.46	0.04	0.31	0.28

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Control Delay	3.5	3.8	4.8	1.1	35.7	11.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.5	3.8	4.8	1.1	35.7	11.1
LOS	A	A	A	A	D	B
Approach Delay		3.7	4.6		22.4	
Approach LOS		A	A		C	
Queue Length 50th (m)	1.9	18.5	30.0	0.0	9.2	0.0
Queue Length 95th (m)	5.9	36.8	59.4	2.2	20.6	11.4
Internal Link Dist (m)		411.4	59.2		72.6	
Turn Bay Length (m)	30.0					
Base Capacity (vph)	506	1446	1446	1046	305	364
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.33	0.46	0.04	0.20	0.20

Intersection Summary			
Area Type:	Other		
Cycle Length: 87			
Actuated Cycle Length: 81.6			
Natural Cycle: 80			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.46			
Intersection Signal Delay: 6.0		Intersection LOS: A	
Intersection Capacity Utilization 106.7%		ICU Level of Service G	
Analysis Period (min) 15			

Splits and Phases: 5: Erb St W & Commercial Entrance 1



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	315	5	31	226	469	5	2	25	204	0	10
Future Volume (vph)	13	315	5	31	226	469	5	2	25	204	0	10
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1550	1550	1550	1550	1550	1750
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.998			0.903			0.895			0.986	
Flt Protected		0.998			0.998			0.992		0.950	0.957	
Satd. Flow (prot)	0	2974	0	0	2695	0	0	773	0	1399	1389	0
Flt Permitted		0.998			0.998			0.992		0.950	0.957	
Satd. Flow (perm)	0	2974	0	0	2695	0	0	773	0	1399	1389	0
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		149.9			435.4			54.9			87.3	
Travel Time (s)		9.0			26.1			4.0			6.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	4%	80%	77%	5%	0%	60%	0%	88%	0%	0%	0%
Adj. Flow (vph)	13	315	5	31	226	469	5	2	25	204	0	10
Shared Lane Traffic (%)										47%		
Lane Group Flow (vph)	0	333	0	0	726	0	0	32	0	108	106	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization	60.3%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Traffic Volume (veh/h)	13	315	5	31	226	469	5	2	25	204	0	10
Future Volume (veh/h)	13	315	5	31	226	469	5	2	25	204	0	10
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	13	315	5	31	226	469	5	2	25	204	0	10
Approach Volume (veh/h)		333			726			32			214	
Crossing Volume (veh/h)		235			20			532			262	
High Capacity (veh/h)		1152			1363			910			1128	
High v/c (veh/h)		0.29			0.53			0.04			0.19	
Low Capacity (veh/h)		950			1142			734			928	
Low v/c (veh/h)		0.35			0.64			0.04			0.23	

Intersection Summary			
Maximum v/c High	0.53		
Maximum v/c Low	0.64		
Intersection Capacity Utilization	60.3%	ICU Level of Service	B

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	597	5	25	223	5	4	1	19	5	0	11
Future Volume (vph)	24	597	5	25	223	5	4	1	19	5	0	11
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1550	1550	1550	1550	1550	1750
Storage Length (m)	30.0		30.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (m)	85.0			0.0			0.0			0.0		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.999			0.997			0.893			0.862	
Flt Protected		0.998			0.995			0.992		0.950	0.996	
Satd. Flow (prot)	0	3034	0	0	2981	0	0	1219	0	777	1185	0
Flt Permitted		0.998			0.995			0.992		0.950	0.996	
Satd. Flow (perm)	0	3034	0	0	2981	0	0	1219	0	777	1185	0
Link Speed (k/h)		70			60			50			50	
Link Distance (m)		346.1			149.9			61.3			415.1	
Travel Time (s)		17.8			9.0			4.4			29.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	3%	0%	8%	4%	0%	0%	0%	16%	80%	0%	0%
Adj. Flow (vph)	24	597	5	25	223	5	4	1	19	5	0	11
Shared Lane Traffic (%)										10%		
Lane Group Flow (vph)	0	626	0	0	253	0	0	24	0	4	12	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization	44.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Traffic Volume (veh/h)	24	597	5	25	223	5	4	1	19	5	0	11
Future Volume (veh/h)	24	597	5	25	223	5	4	1	19	5	0	11
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	24	597	5	25	223	5	4	1	19	5	0	11
Approach Volume (veh/h)		626			253			24			16	
Crossing Volume (veh/h)		30			29			626			252	
High Capacity (veh/h)		1353			1354			844			1137	
High v/c (veh/h)		0.46			0.19			0.03			0.01	
Low Capacity (veh/h)		1132			1133			675			936	
Low v/c (veh/h)		0.55			0.22			0.04			0.02	

Intersection Summary			
Maximum v/c High	0.46		
Maximum v/c Low	0.55		
Intersection Capacity Utilization	44.3%	ICU Level of Service	A

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	7	576	234	16	46	11
Future Volume (vph)	7	576	234	16	46	11
Ideal Flow (vphpl)	1650	1650	1650	1650	1765	1765
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.991		0.974	
Flt Protected		0.999			0.961	
Satd. Flow (prot)	0	1614	1576	0	1624	0
Flt Permitted		0.999			0.961	
Satd. Flow (perm)	0	1614	1576	0	1624	0
Link Speed (k/h)		70	70		60	
Link Distance (m)		189.3	346.1		103.7	
Travel Time (s)		9.7	17.8		6.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	14%	2%	4%	0%	0%	9%
Adj. Flow (vph)	7	576	234	16	46	11
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	583	250	0	57	0
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 51.5%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	7	576	234	16	46	11
Future Volume (Veh/h)	7	576	234	16	46	11
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	7	576	234	16	46	11
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	250				832	242
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	250				832	242
tC, single (s)	4.2				6.4	6.3
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.4
p0 queue free %	99				86	99
cM capacity (veh/h)	1249				340	780

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	583	250	57
Volume Left	7	0	46
Volume Right	0	16	11
cSH	1249	1700	381
Volume to Capacity	0.01	0.15	0.15
Queue Length 95th (m)	0.1	0.0	4.2
Control Delay (s)	0.2	0.0	16.1
Lane LOS	A		C
Approach Delay (s)	0.2	0.0	16.1
Approach LOS			C

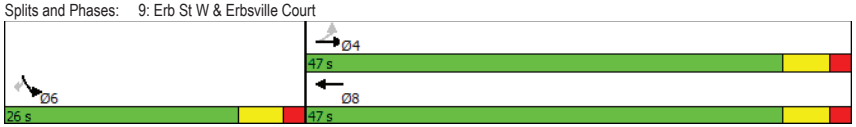
Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	51.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	69	712	309	48	118	86
Future Volume (vph)	69	712	309	48	118	86
Ideal Flow (vphpl)	1775	1900	1750	1750	1775	1750
Storage Length (m)	25.0			0.0	50.0	0.0
Storage Lanes	1			0	1	1
Taper Length (m)	75.0				55.0	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor	1.00		1.00		1.00	0.98
Frt			0.980			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1686	3505	3023	0	1637	1473
Flt Permitted	0.538				0.950	
Satd. Flow (perm)	954	3505	3023	0	1634	1446
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			41			86
Link Speed (k/h)		60	60		50	
Link Distance (m)		470.9	231.7		128.8	
Travel Time (s)		28.3	13.9		9.3	
Confl. Peds. (#/hr)	2			2	2	6
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	3%	8%	4%	3%	1%
Adj. Flow (vph)	69	712	309	48	118	86
Shared Lane Traffic (%)						
Lane Group Flow (vph)	69	712	357	0	118	86
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4					6
Detector Phase	4	4	8		6	6
Switch Phase						
Minimum Initial (s)	40.0	40.0	40.0		8.0	8.0
Minimum Split (s)	47.0	47.0	47.0		14.0	14.0
Total Split (s)	47.0	47.0	47.0		26.0	26.0
Total Split (%)	64.4%	64.4%	64.4%		35.6%	35.6%
Maximum Green (s)	41.0	41.0	41.0		20.0	20.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0		-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0		4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	Max	Max	Max		None	None
Walk Time (s)	26.0	26.0	26.0		7.0	7.0
Flash Dont Walk (s)	14.0	14.0	14.0		15.0	15.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)	47.0	47.0	47.0		12.2	12.2
Actuated g/C Ratio	0.74	0.74	0.74		0.19	0.19
v/c Ratio	0.10	0.27	0.16		0.38	0.25

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Control Delay	4.4	4.3	3.5		25.8	7.6
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	4.4	4.3	3.5		25.8	7.6
LOS	A	A	A		C	A
Approach Delay		4.3	3.5		18.1	
Approach LOS		A	A		B	
Queue Length 50th (m)	2.3	14.4	5.7		12.7	0.0
Queue Length 95th (m)	7.2	26.6	12.1		26.0	9.8
Internal Link Dist (m)		446.9	207.7		104.8	
Turn Bay Length (m)	25.0				50.0	
Base Capacity (vph)	705	2592	2246		568	557
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.10	0.27	0.16		0.21	0.15

Intersection Summary			
Area Type:	Other		
Cycle Length: 73			
Actuated Cycle Length: 63.5			
Natural Cycle: 65			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.38			
Intersection Signal Delay: 6.2		Intersection LOS: A	
Intersection Capacity Utilization 77.1%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 9: Erb St W & Erbsville Court



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	4	0	856	12	0	1008	0
Future Volume (vph)	0	0	0	0	0	4	0	856	12	0	1008	0
Ideal Flow (vphpl)	0	0	1750	0	0	1750	0	1775	1775	0	1775	1775
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor												
Frt						0.865		0.998				
Flt Protected												
Satd. Flow (prot)	0	0	1750	0	0	1009	0	3200	0	0	3182	0
Flt Permitted												
Satd. Flow (perm)	0	0	1750	0	0	1009	0	3200	0	0	3182	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		40.5			37.7			83.9			220.2	
Travel Time (s)		2.9			2.7			5.0			13.2	
Confl. Peds. (#/hr)									2	2		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	50%	0%	5%	17%	0%	6%	0%
Adj. Flow (vph)	0	0	0	0	0	4	0	856	12	0	1008	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	4	0	868	0	0	1008	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 35.7%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	0	4	0	856	12	0	1008	0
Future Volume (Veh/h)	0	0	0	0	0	4	0	856	12	0	1008	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	0	0	0	0	4	0	856	12	0	1008	0
Pedestrians					2							
Lane Width (m)					3.6							
Walking Speed (m/s)					1.2							
Percent Blockage					0							
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1440	1878	504	1368	1872	436	1008			870		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1440	1878	504	1368	1872	436	1008			870		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	7.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.8	2.2			2.2		
p0 queue free %	100	100	100	100	100	99	100			100		
cM capacity (veh/h)	94	72	518	107	73	453	695			782		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	0	4	571	297	672	336
Volume Left	0	0	0	0	0	0
Volume Right	0	4	0	12	0	0
cSH	1700	453	1700	1700	1700	1700
Volume to Capacity	0.00	0.01	0.34	0.17	0.40	0.20
Queue Length 95th (m)	0.0	0.2	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	13.0	0.0	0.0	0.0	0.0
Lane LOS	A	B				
Approach Delay (s)	0.0	13.0	0.0		0.0	
Approach LOS	A	B				

Intersection Summary				
Average Delay	0.0			
Intersection Capacity Utilization	35.7%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	71	16	2	72	21	68	2	719	45	36	855	109
Future Volume (vph)	71	16	2	72	21	68	2	719	45	36	855	109
Ideal Flow (vphpl)	1775	1650	1650	1550	1550	1550	1650	1650	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.983			0.943			0.991			0.984	
Flt Protected	0.950				0.978						0.998	
Satd. Flow (prot)	1492	1622	0	0	1417	0	0	2991	0	0	2905	0
Flt Permitted	0.950				0.978						0.998	
Satd. Flow (perm)	1492	1622	0	0	1417	0	0	2991	0	0	2905	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		115.1			101.1			188.2			237.1	
Travel Time (s)		8.3			7.3			11.3			14.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	13%	0%	0%	1%	0%	1%	0%	4%	2%	11%	6%	4%
Adj. Flow (vph)	71	16	2	72	21	68	2	719	45	36	855	109
Shared Lane Traffic (%)												
Lane Group Flow (vph)	71	18	0	0	161	0	0	766	0	0	1000	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization	85.0%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Traffic Volume (veh/h)	71	16	2	72	21	68	2	719	45	36	855	109
Future Volume (veh/h)	71	16	2	72	21	68	2	719	45	36	855	109
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	71	16	2	72	21	68	2	719	45	36	855	109
Approach Volume (veh/h)		89			161			766			1000	
Crossing Volume (veh/h)		963			792			123			95	
High Capacity (veh/h)		642			738			1258			1286	
High v/c (veh/h)		0.14			0.22			0.61			0.78	
Low Capacity (veh/h)		499			582			1046			1071	
Low v/c (veh/h)		0.18			0.28			0.73			0.93	

Intersection Summary					
Maximum v/c High		0.78			
Maximum v/c Low		0.93			
Intersection Capacity Utilization		85.0%	ICU Level of Service		E

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	18	0	767	892	36
Future Volume (vph)	0	18	0	767	892	36
Ideal Flow (vphpl)	0	1750	0	1900	1750	1750
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Frt		0.865			0.994	
Flt Protected						
Satd. Flow (prot)	0	1514	0	3471	3134	0
Flt Permitted						
Satd. Flow (perm)	0	1514	0	3471	3134	0
Link Speed (k/h)	50			60	60	
Link Distance (m)	55.4			149.5	188.2	
Travel Time (s)	4.0			9.0	11.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	4%	5%	17%
Adj. Flow (vph)	0	18	0	767	892	36
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	18	0	767	928	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	38.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	18	0	767	892	36
Future Volume (Veh/h)	0	18	0	767	892	36
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	18	0	767	892	36
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1294	464	928			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1294	464	928			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	97	100			
cM capacity (veh/h)	157	550	745			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	18	384	384	595	333
Volume Left	0	0	0	0	0
Volume Right	18	0	0	0	36
cSH	550	1700	1700	1700	1700
Volume to Capacity	0.03	0.23	0.23	0.35	0.20
Queue Length 95th (m)	0.8	0.0	0.0	0.0	0.0
Control Delay (s)	11.8	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	11.8	0.0		0.0	
Approach LOS	B				

Intersection Summary				
Average Delay		0.1		
Intersection Capacity Utilization		38.0%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	11	35	114	741	864	43
Future Volume (vph)	11	35	114	741	864	43
Ideal Flow (vphpl)	1775	1750	1775	1900	1750	1750
Storage Length (m)	0.0	0.0	85.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	0.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Frt		0.850			0.993	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1686	1444	1670	3471	3144	0
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	1686	1444	1670	3471	3144	0
Link Speed (k/h)	50			60	60	
Link Distance (m)	62.4			166.4	149.5	
Travel Time (s)	4.5			10.0	9.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	3%	1%	4%	5%	5%
Adj. Flow (vph)	11	35	114	741	864	43
Shared Lane Traffic (%)						
Lane Group Flow (vph)	11	35	114	741	907	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	47.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	11	35	114	741	864	43
Future Volume (Veh/h)	11	35	114	741	864	43
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	11	35	114	741	864	43
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1484	454	907			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1484	454	907			
tC, single (s)	6.8	7.0	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	89	94	85			
cM capacity (veh/h)	100	551	752			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	11	35	114	370	370	576	331
Volume Left	11	0	114	0	0	0	0
Volume Right	0	35	0	0	0	0	43
cSH	100	551	752	1700	1700	1700	1700
Volume to Capacity	0.11	0.06	0.15	0.22	0.22	0.34	0.19
Queue Length 95th (m)	2.9	1.6	4.3	0.0	0.0	0.0	0.0
Control Delay (s)	45.4	12.0	10.6	0.0	0.0	0.0	0.0
Lane LOS	E	B	B				
Approach Delay (s)	20.0		1.4			0.0	
Approach LOS	C						

Intersection Summary				
Average Delay	1.2			
Intersection Capacity Utilization	47.5%	ICU Level of Service		A
Analysis Period (min)	15			



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	8	0	869	887	12
Future Volume (vph)	0	8	0	869	887	12
Ideal Flow (vphpl)	0	1750	0	1900	1750	1750
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Ped Bike Factor						
Frt		0.865			0.998	
Flt Protected						
Satd. Flow (prot)	0	1514	0	3471	3159	0
Flt Permitted						
Satd. Flow (perm)	0	1514	0	3471	3159	0
Link Speed (k/h)	50			60	60	
Link Distance (m)	67.0			178.5	166.4	
Travel Time (s)	4.8			10.7	10.0	
Confl. Peds. (#/hr)			2			2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	4%	5%	8%
Adj. Flow (vph)	0	8	0	869	887	12
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	8	0	869	899	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	37.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	8	0	869	887	12
Future Volume (Veh/h)	0	8	0	869	887	12
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	8	0	869	887	12
Pedestrians	2					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1330	452	901			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1330	452	901			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	99	100			
cM capacity (veh/h)	149	560	761			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	8	434	434	591	308
Volume Left	0	0	0	0	0
Volume Right	8	0	0	0	12
cSH	560	1700	1700	1700	1700
Volume to Capacity	0.01	0.26	0.26	0.35	0.18
Queue Length 95th (m)	0.3	0.0	0.0	0.0	0.0
Control Delay (s)	11.5	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	11.5	0.0		0.0	
Approach LOS	B				

Intersection Summary				
Average Delay		0.1		
Intersection Capacity Utilization		37.0%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	45	15	283	76	111	66	710	487	155	715	28
Future Volume (vph)	15	45	15	283	76	111	66	710	487	155	715	28
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.970			0.965			0.942			0.995	
Flt Protected		0.990			0.971			0.997			0.991	
Satd. Flow (prot)	0	2480	0	0	2793	0	0	2836	0	0	2982	0
Flt Permitted		0.990			0.971			0.997			0.991	
Satd. Flow (perm)	0	2480	0	0	2793	0	0	2836	0	0	2982	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		112.4			150.8			180.3			178.5	
Travel Time (s)		8.1			10.9			10.8			10.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	47%	9%	33%	4%	7%	7%	15%	4%	2%	2%	4%	4%
Adj. Flow (vph)	15	45	15	283	76	111	66	710	487	155	715	28
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	75	0	0	470	0	0	1263	0	0	898	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization	106.5%	ICU Level of Service	G
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Traffic Volume (veh/h)	15	45	15	283	76	111	66	710	487	155	715	28
Future Volume (veh/h)	15	45	15	283	76	111	66	710	487	155	715	28
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	15	45	15	283	76	111	66	710	487	155	715	28
Approach Volume (veh/h)		75			470			1263			898	
Crossing Volume (veh/h)		1153			791			215			425	
High Capacity (veh/h)		549			738			1170			991	
High v/c (veh/h)		0.14			0.64			1.08			0.91	
Low Capacity (veh/h)		420			583			967			806	
Low v/c (veh/h)		0.18			0.81			1.31			1.11	

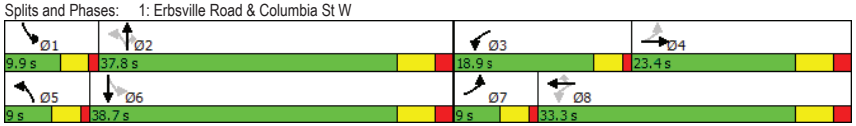
Intersection Summary					
Maximum v/c High		1.08			
Maximum v/c Low		1.31			
Intersection Capacity Utilization		106.5%	ICU Level of Service		G

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	86	149	91	385	374	191	47	394	210	111	438	109
Future Volume (vph)	86	149	91	385	374	191	47	394	210	111	438	109
Ideal Flow (vphpl)	1775	1650	1650	1775	1900	1750	1775	1900	1750	1775	1650	1650
Storage Length (m)	0.0		0.0	75.0		75.0	80.0		170.0	0.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	0.0			7.5			80.0			0.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99		0.99		0.97					1.00	
Frt		0.943				0.850			0.850		0.970	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1670	1517	0	1653	1881	1473	1686	1881	1488	1653	1568	0
Flt Permitted	0.523			0.322			0.205			0.322		
Satd. Flow (perm)	914	1517	0	556	1881	1429	364	1881	1488	560	1568	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		31				191			210		16	
Link Speed (k/h)		50			60			60			60	
Link Distance (m)		118.8			135.9			921.3			152.9	
Travel Time (s)		8.6			8.2			55.3			9.2	
Confl. Peds. (#/hr)	4		6	6		4	1					1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	2%	0%	2%	1%	1%	0%	1%	0%	2%	2%	0%
Adj. Flow (vph)	86	149	91	385	374	191	47	394	210	111	438	109
Shared Lane Traffic (%)												
Lane Group Flow (vph)	86	240	0	385	374	191	47	394	210	111	547	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	7	4		3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	17.4		5.0	17.4	17.4	5.0	31.8	31.8	5.0	31.8	
Minimum Split (s)	9.0	23.4		9.0	23.4	23.4	9.0	37.8	37.8	9.0	37.8	
Total Split (s)	9.0	23.4		18.9	33.3	33.3	9.0	37.8	37.8	9.9	38.7	
Total Split (%)	10.0%	26.0%		21.0%	37.0%	37.0%	10.0%	42.0%	42.0%	11.0%	43.0%	
Maximum Green (s)	5.0	17.4		14.9	27.3	27.3	5.0	31.8	31.8	5.9	32.7	
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	
All-Red Time (s)	1.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	-2.0		0.0	-2.0	-2.0	0.0	-2.0	-2.0	0.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Max		None	Max	Max	None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		11.0			11.0	11.0		11.0	11.0		11.0	
Pedestrian Calls (#/hr)		0			0	0		0	0		0	
Act Effct Green (s)	25.0	20.0		39.0	31.9	31.9	38.0	34.1	34.1	40.0	36.5	
Actuated g/C Ratio	0.28	0.23		0.44	0.36	0.36	0.43	0.38	0.38	0.45	0.41	
v/c Ratio	0.29	0.66		0.90	0.55	0.30	0.21	0.55	0.30	0.34	0.84	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	19.8	37.4		46.7	28.1	4.9	14.9	25.5	4.1	16.3	37.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	19.8	37.4		46.7	28.1	4.9	14.9	25.5	4.1	16.3	37.4	
LOS	B	D		D	C	A	B	C	A	B	D	
Approach Delay		32.7			31.0			17.8			33.8	
Approach LOS		C			C			B			C	
Queue Length 50th (m)	9.2	35.2		51.0	56.7	0.0	4.4	56.3	0.0	10.8	90.1	
Queue Length 95th (m)	18.5	#62.3		#93.1	86.9	14.5	10.3	85.5	13.9	20.5	#155.2	
Internal Link Dist (m)		94.8			111.9			897.3			128.9	
Turn Bay Length (m)				75.0		75.0	80.0		170.0			
Base Capacity (vph)	300	366		428	675	635	229	721	699	325	654	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.29	0.66		0.90	0.55	0.30	0.21	0.55	0.30	0.34	0.84	

Intersection Summary		
Area Type:	Other	
Cycle Length: 90		
Actuated Cycle Length: 88.8		
Natural Cycle: 90		
Control Type: Semi Act-Uncoord		
Maximum v/c Ratio: 0.90		
Intersection Signal Delay: 28.6		Intersection LOS: C
Intersection Capacity Utilization 90.2%		ICU Level of Service E
Analysis Period (min) 15		
# 95th percentile volume exceeds capacity, queue may be longer.		
Queue shown is maximum after two cycles.		

Splits and Phases: 1: Erbsville Road & Columbia St W

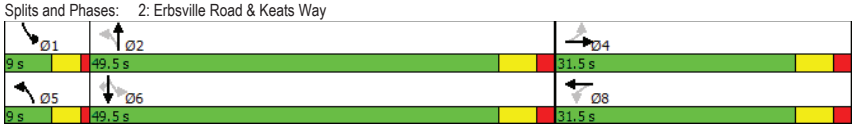


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	43	32	118	86	52	33	611	65	35	843	13
Future Volume (vph)	37	43	32	118	86	52	33	611	65	35	843	13
Ideal Flow (vphpl)	1775	1650	1650	1775	1650	1650	1775	1650	1650	1775	1900	1750
Storage Length (m)	0.0		0.0	0.0		0.0	20.0		0.0	25.0		25.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	0.0			0.0			65.0			50.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.99		1.00	0.99		1.00					0.98
Frt		0.936			0.943			0.986				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1686	1528	0	1621	1534	0	1686	1608	0	1686	1863	1488
Flt Permitted	0.590			0.708			0.206			0.303		
Satd. Flow (perm)	1033	1528	0	1203	1534	0	365	1608	0	538	1863	1454
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		32			35			9				85
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		155.7			226.8			139.9			921.3	
Travel Time (s)		11.2			16.3			8.4			55.3	
Confl. Peds. (#/hr)	10		3	3		10	3					3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	4%	0%	0%	0%	1%	3%	0%	2%	0%
Adj. Flow (vph)	37	43	32	118	86	52	33	611	65	35	843	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	37	75	0	118	138	0	33	676	0	35	843	13
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		5.0	43.5		5.0	43.5	43.5
Minimum Split (s)	14.0	14.0		14.0	14.0		9.0	49.5		9.0	49.5	49.5
Total Split (s)	31.5	31.5		31.5	31.5		9.0	49.5		9.0	49.5	49.5
Total Split (%)	35.0%	35.0%		35.0%	35.0%		10.0%	55.0%		10.0%	55.0%	55.0%
Maximum Green (s)	25.5	25.5		25.5	25.5		5.0	43.5		5.0	43.5	43.5
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		1.0	2.0		1.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		2.0	4.0		2.0	4.0	4.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max		None	Max	Max
Walk Time (s)	10.0	10.0		10.0	10.0			40.0			40.0	40.0
Flash Dont Walk (s)	16.0	16.0		16.0	16.0			13.0			13.0	13.0
Pedestrian Calls (#/hr)	0	0		0	0			0			0	0
Act Effct Green (s)	15.7	15.7		15.7	15.7		61.5	55.6		61.5	55.6	55.6
Actuated g/C Ratio	0.19	0.19		0.19	0.19		0.73	0.66		0.73	0.66	0.66
v/c Ratio	0.19	0.24		0.53	0.44		0.09	0.64		0.07	0.69	0.01

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	32.0	21.1		40.6	27.5		4.3	14.0		4.1	15.0	0.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	32.0	21.1		40.6	27.5		4.3	14.0		4.1	15.0	0.0
LOS	C	C		D	C		A	B		A	B	A
Approach Delay		24.7			33.5			13.6			14.4	
Approach LOS		C			C			B			B	
Queue Length 50th (m)	5.6	6.5		19.2	16.2		1.2	68.4		1.3	91.9	0.0
Queue Length 95th (m)	14.1	18.2		36.3	33.3		4.5	134.1		4.7	173.1	0.0
Internal Link Dist (m)		131.7			202.8			115.9			897.3	
Turn Bay Length (m)							20.0			25.0		25.0
Base Capacity (vph)	340	524		396	528		376	1061		488	1226	986
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.11	0.14		0.30	0.26		0.09	0.64		0.07	0.69	0.01

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 84.4			
Natural Cycle: 75			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.69			
Intersection Signal Delay: 17.2		Intersection LOS: B	
Intersection Capacity Utilization 73.8%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 2: Erbsville Road & Keats Way



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	277	292	349	188	465	148	339	615	142	135	795	299
Future Volume (vph)	277	292	349	188	465	148	339	615	142	135	795	299
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1775	1775	1750	1775	1775	1750
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	1.00	0.95	0.95	1.00
Frt		0.943			0.972				0.850			0.850
Flt Protected		0.985			0.988			0.983			0.993	
Satd. Flow (prot)	0	2868	0	0	2950	0	0	3248	1403	0	3265	1458
Flt Permitted		0.985			0.988			0.983			0.993	
Satd. Flow (perm)	0	2868	0	0	2950	0	0	3248	1403	0	3265	1458
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		147.8			470.9			152.2			97.5	
Travel Time (s)		8.9			28.3			9.1			5.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	4%	3%	2%	1%	4%	1%	6%	0%	3%	2%
Adj. Flow (vph)	277	292	349	188	465	148	339	615	142	135	795	299
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	918	0	0	801	0	0	954	142	0	930	299
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization	127.8%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized									MOYes			MOYes
Traffic Volume (veh/h)	277	292	349	188	465	148	339	615	142	135	795	299
Future Volume (veh/h)	277	292	349	188	465	148	339	615	142	135	795	299
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	277	292	349	188	465	148	339	615	142	135	795	299
Approach Volume (veh/h)		918			801			954			930	
Crossing Volume (veh/h)		1118			1231#			704			992	
High Capacity (veh/h)		565			514			792			627	
High v/c (veh/h)		1.63			1.56			1.20			1.48	
Low Capacity (veh/h)		433			391			630			486	
Low v/c (veh/h)		2.12			2.05			1.51			1.91	

Intersection Summary					
Maximum v/c High		1.63			
Maximum v/c Low		2.12			
Intersection Capacity Utilization		127.8%	ICU Level of Service	H	
# Crossing flow exceeds 1200, method is not applicable					

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	807	72	81	983	78	0	0	118	0	0	26
Future Volume (vph)	0	807	72	81	983	78	0	0	118	0	0	26
Ideal Flow (vphpl)	1900	1650	1650	1900	1650	1650	1900	1650	1650	1650	1650	1900
Storage Length (m)	0.0		0.0	25.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		1	0		1
Taper Length (m)	0.0			60.0			0.0			0.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.989			0.989				0.865			0.865
Flt Protected				0.950								
Satd. Flow (prot)	0	1602	0	1787	3042	0	0	0	1427	0	0	1644
Flt Permitted				0.950								
Satd. Flow (perm)	0	1602	0	1787	3042	0	0	0	1427	0	0	1644
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		83.2			147.8			60.7			74.6	
Travel Time (s)		5.0			8.9			4.4			5.4	
Confl. Peds. (#/hr)	3		4	4		3	1		1	1		1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	2%	0%	1%	2%	1%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	807	72	81	983	78	0	0	118	0	0	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	879	0	81	1061	0	0	0	118	0	0	26
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 69.3%		ICU Level of Service C	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	807	72	81	983	78	0	0	118	0	0	26
Future Volume (Veh/h)	0	807	72	81	983	78	0	0	118	0	0	26
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	807	72	81	983	78	0	0	118	0	0	26
Pedestrians		1			1			4			3	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		83										
pX, platoon unblocked				0.76			0.76	0.76	0.76	0.76	0.76	
vC, conflicting volume	1064			883			1528	2073	848	2149	2070	534
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1064			687			1536	2255	640	2356	2251	534
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			88			100	100	63	100	100	95
cM capacity (veh/h)	661			688			52	28	319	8	28	494

Direction, Lane #	EB 1	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	879	81	655	406	118	26
Volume Left	0	81	0	0	0	0
Volume Right	72	0	0	78	118	26
cSH	1700	688	1700	1700	319	494
Volume to Capacity	0.52	0.12	0.39	0.24	0.37	0.05
Queue Length 95th (m)	0.0	3.2	0.0	0.0	13.2	1.3
Control Delay (s)	0.0	10.9	0.0	0.0	22.7	12.7
Lane LOS		B			C	B
Approach Delay (s)	0.0	0.8			22.7	12.7
Approach LOS					C	B

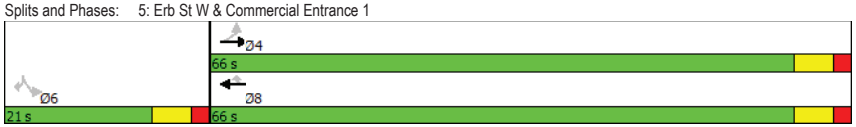
Intersection Summary					
Average Delay	1.8				
Intersection Capacity Utilization	69.3%	ICU Level of Service		C	
Analysis Period (min)	15				

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	82	772	961	46	106	117
Future Volume (vph)	82	772	961	46	106	117
Ideal Flow (vphpl)	1775	1900	1900	1750	1775	1750
Storage Length (m)	30.0			0.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	55.0				0.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00			0.98		
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1686	1863	1845	1488	1670	1473
Flt Permitted	0.214				0.950	
Satd. Flow (perm)	380	1863	1845	1457	1670	1473
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				46		117
Link Speed (k/h)		60	60		50	
Link Distance (m)		435.4	83.2		96.6	
Travel Time (s)		26.1	5.0		7.0	
Confl. Peds. (#/hr)	1			1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	2%	3%	0%	1%	1%
Adj. Flow (vph)	82	772	961	46	106	117
Shared Lane Traffic (%)						
Lane Group Flow (vph)	82	772	961	46	106	117
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4	8			
Permitted Phases	4			8	6	6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	60.0	60.0	60.0	60.0	7.0	7.0
Minimum Split (s)	66.0	66.0	66.0	66.0	13.0	13.0
Total Split (s)	66.0	66.0	66.0	66.0	21.0	21.0
Total Split (%)	75.9%	75.9%	75.9%	75.9%	24.1%	24.1%
Maximum Green (s)	60.0	60.0	60.0	60.0	15.0	15.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	Max	None	None
Walk Time (s)	50.0	50.0	50.0	50.0	7.0	7.0
Flash Dont Walk (s)	10.0	10.0	10.0	10.0	15.0	15.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	62.1	62.1	62.1	62.1	12.6	12.6
Actuated g/C Ratio	0.75	0.75	0.75	0.75	0.15	0.15
v/c Ratio	0.29	0.55	0.69	0.04	0.42	0.36

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Control Delay	7.1	6.7	9.3	1.2	36.6	9.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.1	6.7	9.3	1.2	36.6	9.6
LOS	A	A	A	A	D	A
Approach Delay		6.7	9.0		22.5	
Approach LOS		A	A		C	
Queue Length 50th (m)	3.4	42.6	64.8	0.0	16.1	0.0
Queue Length 95th (m)	11.7	83.7	132.1	2.7	31.3	13.8
Internal Link Dist (m)		411.4	59.2		72.6	
Turn Bay Length (m)	30.0					
Base Capacity (vph)	285	1398	1384	1104	343	395
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.55	0.69	0.04	0.31	0.30

Intersection Summary			
Area Type:	Other		
Cycle Length: 87			
Actuated Cycle Length: 82.7			
Natural Cycle: 80			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.69			
Intersection Signal Delay: 9.5		Intersection LOS: A	
Intersection Capacity Utilization 106.7%		ICU Level of Service G	
Analysis Period (min) 15			

Splits and Phases: 5: Erb St W & Commercial Entrance 1



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	435	2	28	574	482	4	1	29	204	0	10
Future Volume (vph)	11	435	2	28	574	482	4	1	29	204	0	10
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1550	1550	1550	1550	1550	1750
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.999			0.933			0.885			0.986	
Flt Protected		0.999			0.999			0.994		0.950	0.957	
Satd. Flow (prot)	0	3122	0	0	2857	0	0	989	0	1399	1389	0
Flt Permitted		0.999			0.999			0.994		0.950	0.957	
Satd. Flow (perm)	0	3122	0	0	2857	0	0	989	0	1399	1389	0
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		149.9			435.4			54.9			87.3	
Travel Time (s)		9.0			26.1			4.0			6.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	50%	68%	1%	0%	25%	0%	41%	0%	0%	0%
Adj. Flow (vph)	11	435	2	28	574	482	4	1	29	204	0	10
Shared Lane Traffic (%)										47%		
Lane Group Flow (vph)	0	448	0	0	1084	0	0	34	0	108	106	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization	75.3%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Traffic Volume (veh/h)	11	435	2	28	574	482	4	1	29	204	0	10
Future Volume (veh/h)	11	435	2	28	574	482	4	1	29	204	0	10
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	11	435	2	28	574	482	4	1	29	204	0	10
Approach Volume (veh/h)		448			1084			34			214	
Crossing Volume (veh/h)		232			16			650			606	
High Capacity (veh/h)		1155			1367			828			857	
High v/c (veh/h)		0.39			0.79			0.04			0.25	
Low Capacity (veh/h)		952			1146			661			687	
Low v/c (veh/h)		0.47			0.95			0.05			0.31	

Intersection Summary			
Maximum v/c High	0.79		
Maximum v/c Low	0.95		
Intersection Capacity Utilization	75.3%	ICU Level of Service	D

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	62	319	6	39	520	28	5	2	47	82	0	86
Future Volume (vph)	62	319	6	39	520	28	5	2	47	82	0	86
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1550	1550	1550	1550	1550	1750
Storage Length (m)	30.0		30.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (m)	85.0			0.0			0.0			0.0		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.998			0.993			0.882			0.863	
Flt Protected		0.992			0.997			0.995		0.950	0.996	
Satd. Flow (prot)	0	3078	0	0	3044	0	0	1337	0	1399	1266	0
Flt Permitted		0.992			0.997			0.995		0.950	0.996	
Satd. Flow (perm)	0	3078	0	0	3044	0	0	1337	0	1399	1266	0
Link Speed (k/h)		70			60			50			50	
Link Distance (m)		346.1			149.9			61.3			415.1	
Travel Time (s)		17.8			9.0			4.4			29.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	1%	0%	3%	2%	0%	0%	0%	2%	0%	0%	0%
Adj. Flow (vph)	62	319	6	39	520	28	5	2	47	82	0	86
Shared Lane Traffic (%)										10%		
Lane Group Flow (vph)	0	387	0	0	587	0	0	54	0	74	94	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization	54.0%	ICU Level of Service A	
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Traffic Volume (veh/h)	62	319	6	39	520	28	5	2	47	82	0	86
Future Volume (veh/h)	62	319	6	39	520	28	5	2	47	82	0	86
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	62	319	6	39	520	28	5	2	47	82	0	86
Approach Volume (veh/h)		387			587			54			168	
Crossing Volume (veh/h)		121			69			463			564	
High Capacity (veh/h)		1260			1312			961			887	
High v/c (veh/h)		0.31			0.45			0.06			0.19	
Low Capacity (veh/h)		1048			1095			779			713	
Low v/c (veh/h)		0.37			0.54			0.07			0.24	

Intersection Summary					
Maximum v/c High		0.45			
Maximum v/c Low		0.54			
Intersection Capacity Utilization		54.0%	ICU Level of Service		A

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	6	342	560	61	41	9
Future Volume (vph)	6	342	560	61	41	9
Ideal Flow (vphpl)	1650	1650	1650	1650	1765	1765
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.987		0.976	
Flt Protected		0.999			0.961	
Satd. Flow (prot)	0	1632	1611	0	1655	0
Flt Permitted		0.999			0.961	
Satd. Flow (perm)	0	1632	1611	0	1655	0
Link Speed (k/h)		70	70		60	
Link Distance (m)		189.3	346.1		103.7	
Travel Time (s)		9.7	17.8		6.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	1%	1%	2%	0%	0%
Adj. Flow (vph)	6	342	560	61	41	9
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	348	621	0	50	0
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 48.2%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	6	342	560	61	41	9
Future Volume (Veh/h)	6	342	560	61	41	9
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	6	342	560	61	41	9
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	621				944	590
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	621				944	590
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				86	98
cM capacity (veh/h)	969				291	511

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	348	621	50
Volume Left	6	0	41
Volume Right	0	61	9
cSH	969	1700	316
Volume to Capacity	0.01	0.37	0.16
Queue Length 95th (m)	0.1	0.0	4.4
Control Delay (s)	0.2	0.0	18.5
Lane LOS	A		C
Approach Delay (s)	0.2	0.0	18.5
Approach LOS			C

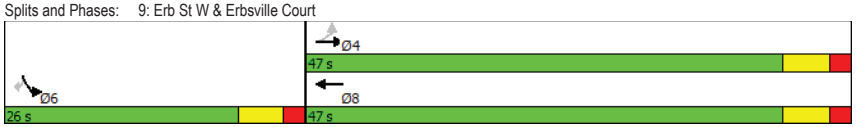
Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	48.2%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	39	514	796	44	64	46
Future Volume (vph)	39	514	796	44	64	46
Ideal Flow (vphpl)	1775	1900	1750	1750	1775	1750
Storage Length (m)	25.0			0.0	50.0	0.0
Storage Lanes	1			0	1	1
Taper Length (m)	75.0				55.0	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor	1.00		1.00		1.00	0.99
Frt			0.992			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1686	3539	3230	0	1653	1488
Flt Permitted	0.325				0.950	
Satd. Flow (perm)	576	3539	3230	0	1650	1465
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			13			46
Link Speed (k/h)		60	60		50	
Link Distance (m)		470.9	231.7		128.8	
Travel Time (s)		28.3	13.9		9.3	
Confl. Peds. (#/hr)	5			5	2	3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	2%	2%	2%	2%	0%
Adj. Flow (vph)	39	514	796	44	64	46
Shared Lane Traffic (%)						
Lane Group Flow (vph)	39	514	840	0	64	46
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4					6
Detector Phase	4	4	8		6	6
Switch Phase						
Minimum Initial (s)	40.0	40.0	40.0		8.0	8.0
Minimum Split (s)	47.0	47.0	47.0		14.0	14.0
Total Split (s)	47.0	47.0	47.0		26.0	26.0
Total Split (%)	64.4%	64.4%	64.4%		35.6%	35.6%
Maximum Green (s)	41.0	41.0	41.0		20.0	20.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0		-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0		4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	Max	Max	Max		None	None
Walk Time (s)	26.0	26.0	26.0		7.0	7.0
Flash Dont Walk (s)	14.0	14.0	14.0		15.0	15.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)	49.3	49.3	49.3		10.7	10.7
Actuated g/C Ratio	0.77	0.77	0.77		0.17	0.17
v/c Ratio	0.09	0.19	0.34		0.23	0.16

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Control Delay	3.8	3.2	3.8		24.9	9.2
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	3.8	3.2	3.8		24.9	9.2
LOS	A	A	A		C	A
Approach Delay		3.2	3.8		18.3	
Approach LOS		A	A		B	
Queue Length 50th (m)	1.1	8.4	15.6		6.7	0.0
Queue Length 95th (m)	4.1	15.1	26.8		16.1	7.5
Internal Link Dist (m)		446.9	207.7		104.8	
Turn Bay Length (m)	25.0				50.0	
Base Capacity (vph)	441	2713	2479		568	533
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.09	0.19	0.34		0.11	0.09

Intersection Summary			
Area Type:	Other		
Cycle Length: 73			
Actuated Cycle Length: 64.3			
Natural Cycle: 65			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.34			
Intersection Signal Delay: 4.6		Intersection LOS: A	
Intersection Capacity Utilization 49.1%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 9: Erb St W & Erbsville Court



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	1	0	0	17	0	1081	13	0	1359	0
Future Volume (vph)	0	0	1	0	0	17	0	1081	13	0	1359	0
Ideal Flow (vphpl)	0	0	1750	0	0	1750	0	1775	1775	0	1775	1775
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor												
Frt			0.865			0.865		0.998				
Flt Protected												
Satd. Flow (prot)	0	0	1514	0	0	1514	0	3269	0	0	3274	0
Flt Permitted												
Satd. Flow (perm)	0	0	1514	0	0	1514	0	3269	0	0	3274	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		40.5			37.7			83.9			220.2	
Travel Time (s)		2.9			2.7			5.0			13.2	
Confl. Peds. (#/hr)									3	3		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	3%	0%
Adj. Flow (vph)	0	0	1	0	0	17	0	1081	13	0	1359	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	1	0	0	17	0	1094	0	0	1359	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 50.2%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	1	0	0	17	0	1081	13	0	1359	0
Future Volume (Veh/h)	0	0	1	0	0	17	0	1081	13	0	1359	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	0	1	0	0	17	0	1081	13	0	1359	0
Pedestrians					3							
Lane Width (m)					3.6							
Walking Speed (m/s)					1.2							
Percent Blockage					0							
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1916	2456	680	1771	2450	550	1359			1097		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1916	2456	680	1771	2450	550	1359			1097		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	96	100			100		
cM capacity (veh/h)	40	31	399	54	31	483	512			642		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	1	17	721	373	906	453
Volume Left	0	0	0	0	0	0
Volume Right	1	17	0	13	0	0
cSH	399	483	1700	1700	1700	1700
Volume to Capacity	0.00	0.04	0.42	0.22	0.53	0.27
Queue Length 95th (m)	0.1	0.9	0.0	0.0	0.0	0.0
Control Delay (s)	14.1	12.7	0.0	0.0	0.0	0.0
Lane LOS	B	B				
Approach Delay (s)	14.1	12.7	0.0		0.0	
Approach LOS	B	B				

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	50.2%	ICU Level of Service	A	
Analysis Period (min)	15			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	186	38	7	50	30	54	10	841	67	85	1128	129
Future Volume (vph)	186	38	7	50	30	54	10	841	67	85	1128	129
Ideal Flow (vphpl)	1775	1650	1650	1550	1550	1550	1650	1650	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.977			0.946			0.989			0.986	
Flt Protected	0.950				0.982			0.999			0.997	
Satd. Flow (prot)	1606	1612	0	0	1430	0	0	3015	0	0	2974	0
Flt Permitted	0.950				0.982			0.999			0.997	
Satd. Flow (perm)	1606	1612	0	0	1430	0	0	3015	0	0	2974	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		115.1			101.1			188.2			237.1	
Travel Time (s)		8.3			7.3			11.3			14.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	0%	0%	0%	3%	0%	0%	3%	0%	1%	4%	2%
Adj. Flow (vph)	186	38	7	50	30	54	10	841	67	85	1128	129
Shared Lane Traffic (%)												
Lane Group Flow (vph)	186	45	0	0	134	0	0	918	0	0	1342	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization	100.7%	ICU Level of Service	G
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Traffic Volume (veh/h)	186	38	7	50	30	54	10	841	67	85	1128	129
Future Volume (veh/h)	186	38	7	50	30	54	10	841	67	85	1128	129
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	186	38	7	50	30	54	10	841	67	85	1128	129
Approach Volume (veh/h)		231			134			918			1342	
Crossing Volume (veh/h)		1263#			1037			309			90	
High Capacity (veh/h)		501			604			1087			1291	
High v/c (veh/h)		0.46			0.22			0.84			1.04	
Low Capacity (veh/h)		379			467			891			1076	
Low v/c (veh/h)		0.61			0.29			1.03			1.25	

Intersection Summary					
Maximum v/c High		1.04			
Maximum v/c Low		1.25			
Intersection Capacity Utilization		100.7%	ICU Level of Service	G	
# Crossing flow exceeds 1200, method is not applicable					

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	61	0	927	1130	39
Future Volume (vph)	0	61	0	927	1130	39
Ideal Flow (vphpl)	0	1750	0	1900	1750	1750
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Ped Bike Factor						
Frt		0.865			0.995	
Flt Protected						
Satd. Flow (prot)	0	1514	0	3505	3193	0
Flt Permitted						
Satd. Flow (perm)	0	1514	0	3505	3193	0
Link Speed (k/h)	50			60	60	
Link Distance (m)	55.4			149.5	188.2	
Travel Time (s)	4.0			9.0	11.3	
Confl. Peds. (#/hr)			5			5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	3%	3%	21%
Adj. Flow (vph)	0	61	0	927	1130	39
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	61	0	927	1169	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 46.0%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	61	0	927	1130	39
Future Volume (Veh/h)	0	61	0	927	1130	39
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	61	0	927	1130	39
Pedestrians	5					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1618	590	1174			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1618	590	1174			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	87	100			
cM capacity (veh/h)	96	454	600			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	61	464	464	753	416
Volume Left	0	0	0	0	0
Volume Right	61	0	0	0	39
cSH	454	1700	1700	1700	1700
Volume to Capacity	0.13	0.27	0.27	0.44	0.24
Queue Length 95th (m)	3.7	0.0	0.0	0.0	0.0
Control Delay (s)	14.1	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	14.1	0.0		0.0	
Approach LOS	B				

Intersection Summary				
Average Delay		0.4		
Intersection Capacity Utilization		46.0%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	20	116	120	891	1117	90
Future Volume (vph)	20	116	120	891	1117	90
Ideal Flow (vphpl)	1775	1750	1775	1900	1750	1750
Storage Length (m)	0.0	0.0	85.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	0.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Ped Bike Factor						
Frt		0.850			0.989	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1686	1473	1686	3539	3197	0
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	1686	1473	1686	3539	3197	0
Link Speed (k/h)	50			60	60	
Link Distance (m)	62.4			166.4	149.5	
Travel Time (s)	4.5			10.0	9.0	
Confl. Peds. (#/hr)		2	3			3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	1%	0%	2%	3%	1%
Adj. Flow (vph)	20	116	120	891	1117	90
Shared Lane Traffic (%)						
Lane Group Flow (vph)	20	116	120	891	1207	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 57.8%		ICU Level of Service B	
Analysis Period (min) 15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	116	120	891	1117	90
Future Volume (Veh/h)	20	116	120	891	1117	90
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	20	116	120	891	1117	90
Pedestrians	3			2		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.2			1.2		
Percent Blockage	0			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1850	608	1210			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1850	608	1210			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	62	74	79			
cM capacity (veh/h)	53	439	582			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	20	116	120	446	446	745	462
Volume Left	20	0	120	0	0	0	0
Volume Right	0	116	0	0	0	0	90
cSH	53	439	582	1700	1700	1700	1700
Volume to Capacity	0.38	0.26	0.21	0.26	0.26	0.44	0.27
Queue Length 95th (m)	10.9	8.4	6.1	0.0	0.0	0.0	0.0
Control Delay (s)	108.6	16.1	12.8	0.0	0.0	0.0	0.0
Lane LOS	F	C	B				
Approach Delay (s)	29.7		1.5			0.0	
Approach LOS	D						

Intersection Summary				
Average Delay		2.4		
Intersection Capacity Utilization		57.8%	ICU Level of Service	B
Analysis Period (min)		15		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	67	0	1003	1200	32
Future Volume (vph)	0	67	0	1003	1200	32
Ideal Flow (vphpl)	0	1750	0	1900	1750	1750
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Ped Bike Factor						
Frt		0.865			0.996	
Flt Protected						
Satd. Flow (prot)	0	1484	0	3539	3218	0
Flt Permitted						
Satd. Flow (perm)	0	1484	0	3539	3218	0
Link Speed (k/h)	50			60	60	
Link Distance (m)	67.0			178.5	166.4	
Travel Time (s)	4.8			10.7	10.0	
Confl. Peds. (#/hr)			1			1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	2%	0%	2%	3%	0%
Adj. Flow (vph)	0	67	0	1003	1200	32
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	67	0	1003	1232	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	48.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	67	0	1003	1200	32
Future Volume (Veh/h)	0	67	0	1003	1200	32
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	67	0	1003	1200	32
Pedestrians	1					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1718	617	1233			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1718	617	1233			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	85	100			
cM capacity (veh/h)	82	432	572			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	67	502	502	800	432
Volume Left	0	0	0	0	0
Volume Right	67	0	0	0	32
cSH	432	1700	1700	1700	1700
Volume to Capacity	0.15	0.29	0.29	0.47	0.25
Queue Length 95th (m)	4.3	0.0	0.0	0.0	0.0
Control Delay (s)	14.8	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	14.8	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	48.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	64	117	68	264	199	175	132	758	292	164	1022	79
Future Volume (vph)	64	117	68	264	199	175	132	758	292	164	1022	79
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.959			0.959			0.963			0.991	
Flt Protected		0.987			0.980			0.994			0.994	
Satd. Flow (prot)	0	2816	0	0	2908	0	0	2937	0	0	3009	0
Flt Permitted		0.987			0.980			0.994			0.994	
Satd. Flow (perm)	0	2816	0	0	2908	0	0	2937	0	0	3009	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		112.4			150.8			180.3			178.5	
Travel Time (s)		8.1			10.9			10.8			10.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	9%	3%	6%	1%	2%	1%	8%	2%	0%	1%	3%	1%
Adj. Flow (vph)	64	117	68	264	199	175	132	758	292	164	1022	79
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	249	0	0	638	0	0	1182	0	0	1265	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization	123.5%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Traffic Volume (veh/h)	64	117	68	264	199	175	132	758	292	164	1022	79
Future Volume (veh/h)	64	117	68	264	199	175	132	758	292	164	1022	79
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	64	117	68	264	199	175	132	758	292	164	1022	79
Approach Volume (veh/h)		249			638			1182			1265	
Crossing Volume (veh/h)		1450#			954			345			595	
High Capacity (veh/h)		428			646			1056			865	
High v/c (veh/h)		0.58			0.99			1.12			1.46	
Low Capacity (veh/h)		319			503			864			694	
Low v/c (veh/h)		0.78			1.27			1.37			1.82	

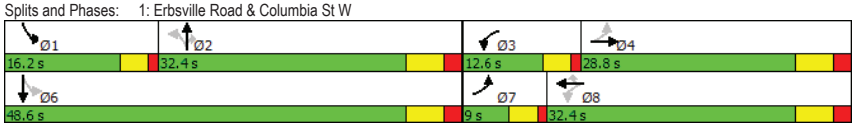
Intersection Summary					
Maximum v/c High		1.46			
Maximum v/c Low		1.82			
Intersection Capacity Utilization		123.5%	ICU Level of Service	H	
# Crossing flow exceeds 1200, method is not applicable					

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	150	36	314	117	143	37	383	222	106	372	58
Future Volume (vph)	43	150	36	314	117	143	37	383	222	106	372	58
Ideal Flow (vphpl)	1775	1650	1650	1775	1900	1750	1775	1900	1750	1775	1650	1650
Storage Length (m)	0.0		0.0	75.0		75.0	80.0		170.0	0.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	0.0			7.5			80.0			0.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		1.00		0.97	0.99				1.00	
Frt		0.971				0.850			0.850		0.980	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1637	1537	0	1653	1727	1390	1561	1810	1473	1621	1524	0
Flt Permitted	0.682			0.469			0.512			0.299		
Satd. Flow (perm)	1168	1537	0	815	1727	1352	837	1810	1473	510	1524	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13				143			222		12	
Link Speed (k/h)		50			60			60			60	
Link Distance (m)		118.8			135.9			921.3			152.9	
Travel Time (s)		8.6			8.2			55.3			9.2	
Confl. Peds. (#/hr)	3		1	1		3	4					4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	7%	2%	10%	7%	8%	5%	1%	4%	5%	10%
Adj. Flow (vph)	43	150	36	314	117	143	37	383	222	106	372	58
Shared Lane Traffic (%)												
Lane Group Flow (vph)	43	186	0	314	117	143	37	383	222	106	430	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	7	4		3	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	22.8		5.0	22.8	22.8	26.4	26.4	26.4	5.0	26.4	
Minimum Split (s)	9.0	28.8		9.0	28.8	28.8	32.4	32.4	32.4	9.0	32.4	
Total Split (s)	9.0	28.8		12.6	32.4	32.4	32.4	32.4	32.4	16.2	48.6	
Total Split (%)	10.0%	32.0%		14.0%	36.0%	36.0%	36.0%	36.0%	36.0%	18.0%	54.0%	
Maximum Green (s)	5.0	22.8		8.6	26.4	26.4	26.4	26.4	26.4	12.2	42.6	
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	
All-Red Time (s)	1.0	2.0		1.0	2.0	2.0	2.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	-2.0		0.0	-2.0	-2.0	0.0	-2.0	-2.0	0.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	6.0	4.0	4.0	4.0	4.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Max		None	Max	Max	Max	Max	Max	None	Max	
Walk Time (s)		7.0			7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0		11.0	
Pedestrian Calls (#/hr)		0			0	0	0	0	0		0	
Act Effct Green (s)	29.8	24.8		37.2	32.0	32.0	31.9	33.9	33.9	44.6	44.6	
Actuated g/C Ratio	0.33	0.28		0.41	0.36	0.36	0.35	0.38	0.38	0.50	0.50	
v/c Ratio	0.10	0.43		0.75	0.19	0.25	0.12	0.56	0.32	0.30	0.57	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	16.9	28.6		33.8	22.6	5.4	23.6	27.5	4.6	14.6	19.0	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	16.9	28.6		33.8	22.6	5.4	23.6	27.5	4.6	14.6	19.0	
LOS	B	C		C	C	A	C	C	A	B	B	
Approach Delay		26.4			24.4			19.4			18.1	
Approach LOS		C			C			B			B	
Queue Length 50th (m)	4.6	25.7		40.2	15.5	0.0	4.6	56.1	0.0	9.9	50.8	
Queue Length 95th (m)	11.0	45.8		#71.7	29.1	12.9	12.7	90.8	15.5	19.1	80.2	
Internal Link Dist (m)		94.8			111.9			897.3			128.9	
Turn Bay Length (m)				75.0		75.0	80.0		170.0			
Base Capacity (vph)	412	432		416	613	572	297	682	693	403	761	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.10	0.43		0.75	0.19	0.25	0.12	0.56	0.32	0.26	0.57	

Intersection Summary		
Area Type:	Other	
Cycle Length: 90		
Actuated Cycle Length: 90		
Natural Cycle: 80		
Control Type: Semi Act-Uncoord		
Maximum v/c Ratio: 0.75		
Intersection Signal Delay: 21.3		Intersection LOS: C
Intersection Capacity Utilization 99.6%		ICU Level of Service F
Analysis Period (min) 15		
# 95th percentile volume exceeds capacity, queue may be longer.		
Queue shown is maximum after two cycles.		

Splits and Phases: 1: Erbsville Road & Columbia St W

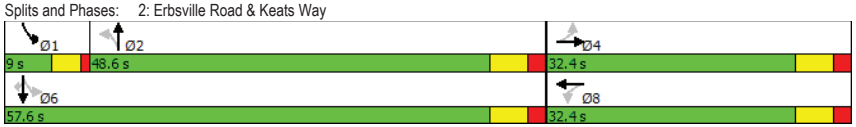


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	20	36	91	30	37	36	586	67	34	640	12
Future Volume (vph)	18	20	36	91	30	37	36	586	67	34	640	12
Ideal Flow (vphpl)	1775	1650	1650	1775	1650	1650	1775	1650	1650	1775	1900	1750
Storage Length (m)	0.0		0.0	0.0		0.0	20.0		0.0	25.0		25.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	0.0			0.0			65.0			50.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.98		0.99	0.99		1.00	1.00		1.00		0.98
Frt		0.904			0.917			0.985				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1637	1396	0	1637	1320	0	1519	1556	0	1653	1810	1488
Flt Permitted	0.713			0.720			0.415			0.323		
Satd. Flow (perm)	1221	1396	0	1227	1320	0	663	1556	0	562	1810	1456
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		36			37			9				36
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		155.7			226.8			139.9			921.3	
Travel Time (s)		11.2			16.3			8.4			55.3	
Confl. Peds. (#/hr)	4		7	7		4	1		2	2		1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	4%	5%	3%	14%	12%	11%	4%	6%	2%	5%	0%
Adj. Flow (vph)	18	20	36	91	30	37	36	586	67	34	640	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	18	56	0	91	67	0	36	653	0	34	640	12
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		1	6	6
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		42.6	42.6		5.0	42.6	42.6
Minimum Split (s)	14.0	14.0		14.0	14.0		48.6	48.6		9.0	57.6	57.6
Total Split (s)	32.4	32.4		32.4	32.4		48.6	48.6		9.0	57.6	57.6
Total Split (%)	36.0%	36.0%		36.0%	36.0%		54.0%	54.0%		10.0%	64.0%	64.0%
Maximum Green (s)	26.4	26.4		26.4	26.4		42.6	42.6		5.0	51.6	51.6
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		3.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		1.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		2.0	4.0	4.0
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		Max	Max		None	Max	Max
Walk Time (s)	10.0	10.0		10.0	10.0		29.6	29.6			29.6	29.6
Flash Dont Walk (s)	16.0	16.0		16.0	16.0		13.0	13.0			13.0	13.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0			0	0
Act Effct Green (s)	13.2	13.2		13.2	13.2		54.1	54.1		58.7	57.6	57.6
Actuated g/C Ratio	0.18	0.18		0.18	0.18		0.72	0.72		0.78	0.77	0.77
v/c Ratio	0.08	0.20		0.42	0.26		0.08	0.58		0.06	0.46	0.01

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	26.1	15.2		33.7	16.9		7.1	11.3		3.4	6.1	0.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	26.1	15.2		33.7	16.9		7.1	11.3		3.4	6.1	0.3
LOS	C	B		C	B		A	B		A	A	A
Approach Delay		17.9			26.6			11.1			5.8	
Approach LOS		B			C			B			A	
Queue Length 50th (m)	2.3	2.5		12.2	3.8		1.3	36.1		1.0	32.4	0.0
Queue Length 95th (m)	7.7	11.8		25.5	14.1		6.9	116.5		3.8	67.6	0.4
Internal Link Dist (m)		131.7			202.8			115.9			897.3	
Turn Bay Length (m)							20.0			25.0		25.0
Base Capacity (vph)	462	551		465	523		478	1125		542	1389	1126
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.04	0.10		0.20	0.13		0.08	0.58		0.06	0.46	0.01

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 75			
Natural Cycle: 75			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.58			
Intersection Signal Delay: 10.7		Intersection LOS: B	
Intersection Capacity Utilization 89.5%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 2: Erbsville Road & Keats Way



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	260	316	498	176	367	166	499	577	150	137	666	227
Future Volume (vph)	260	316	498	176	367	166	499	577	150	137	666	227
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1775	1775	1750	1775	1775	1750
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	1.00	0.95	0.95	1.00
Frt		0.930			0.965				0.850			0.850
Flt Protected		0.988			0.988			0.977			0.992	
Satd. Flow (prot)	0	2701	0	0	2819	0	0	3101	1444	0	3227	1430
Flt Permitted		0.988			0.988			0.977			0.992	
Satd. Flow (perm)	0	2701	0	0	2819	0	0	3101	1444	0	3227	1430
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		147.8			470.9			152.2			97.5	
Travel Time (s)		8.9			28.3			9.1			5.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	2%	11%	4%	7%	6%	10%	3%	3%	2%	4%	4%
Adj. Flow (vph)	260	316	498	176	367	166	499	577	150	137	666	227
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1074	0	0	709	0	0	1076	150	0	803	227
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization 130.8%		ICU Level of Service H	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized									MOYes			MOYes
Traffic Volume (veh/h)	260	316	498	176	367	166	499	577	150	137	666	227
Future Volume (veh/h)	260	316	498	176	367	166	499	577	150	137	666	227
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	260	316	498	176	367	166	499	577	150	137	666	227
Approach Volume (veh/h)		1074			709			1076			803	
Crossing Volume (veh/h)		979			1336#			713			1042	
High Capacity (veh/h)		633			471			787			601	
High v/c (veh/h)		1.70			1.50			1.37			1.34	
Low Capacity (veh/h)		492			355			625			465	
Low v/c (veh/h)		2.18			2.00			1.72			1.73	

Intersection Summary					
Maximum v/c High		1.70			
Maximum v/c Low		2.18			
Intersection Capacity Utilization		130.8%	ICU Level of Service		H
# Crossing flow exceeds 1200, method is not applicable					

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	943	129	102	955	99	0	0	143	0	0	43
Future Volume (vph)	0	943	129	102	955	99	0	0	143	0	0	43
Ideal Flow (vphpl)	1900	1650	1650	1900	1650	1650	1900	1650	1650	1650	1650	1900
Storage Length (m)	0.0		0.0	25.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		1	0		1
Taper Length (m)	0.0			60.0			0.0			0.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.984			0.986				0.865			0.865
Flt Protected				0.950								
Satd. Flow (prot)	0	1511	0	1752	2919	0	0	0	1334	0	0	1644
Flt Permitted				0.950								
Satd. Flow (perm)	0	1511	0	1752	2919	0	0	0	1334	0	0	1644
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		83.2			147.8			60.7			74.6	
Travel Time (s)		5.0			8.9			4.4			5.4	
Confl. Peds. (#/hr)			1	1								
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	7%	11%	3%	6%	5%	0%	0%	7%	0%	0%	0%
Adj. Flow (vph)	0	943	129	102	955	99	0	0	143	0	0	43
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1072	0	102	1054	0	0	0	143	0	0	43
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 83.0%		ICU Level of Service E	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	943	129	102	955	99	0	0	143	0	0	43
Future Volume (Veh/h)	0	943	129	102	955	99	0	0	143	0	0	43
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	943	129	102	955	99	0	0	143	0	0	43
Pedestrians								1				
Lane Width (m)								3.6				
Walking Speed (m/s)								1.2				
Percent Blockage								0				
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		83										
pX, platoon unblocked				0.60			0.60	0.60	0.60	0.60	0.60	
vC, conflicting volume	1054			1073			1733	2266	1008	2359	2282	527
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1054			791			1887	2772	684	2926	2797	527
tC, single (s)	4.1			4.2			7.5	6.5	7.0	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.4	3.5	4.0	3.3
p0 queue free %	100			79			100	100	37	100	100	91
cM capacity (veh/h)	668			493			20	9	228	1	9	501

Direction, Lane #	EB 1	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	1072	102	637	417	143	43
Volume Left	0	102	0	0	0	0
Volume Right	129	0	0	99	143	43
cSH	1700	493	1700	1700	228	501
Volume to Capacity	0.63	0.21	0.37	0.25	0.63	0.09
Queue Length 95th (m)	0.0	6.2	0.0	0.0	29.8	2.2
Control Delay (s)	0.0	14.2	0.0	0.0	43.9	12.9
Lane LOS		B			E	B
Approach Delay (s)	0.0	1.3			43.9	12.9
Approach LOS					E	B

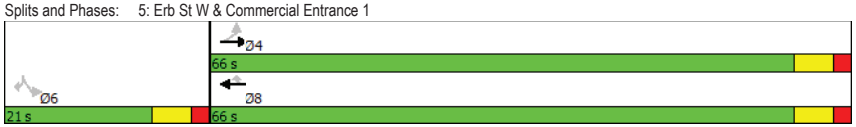
Intersection Summary				
Average Delay	3.4			
Intersection Capacity Utilization	83.0%	ICU Level of Service	E	
Analysis Period (min)	15			

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	114	929	949	51	148	126
Future Volume (vph)	114	929	949	51	148	126
Ideal Flow (vphpl)	1775	1900	1900	1750	1775	1750
Storage Length (m)	30.0			0.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	55.0				0.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00			0.98		
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1606	1792	1792	1316	1466	1473
Flt Permitted	0.209				0.950	
Satd. Flow (perm)	353	1792	1792	1287	1466	1473
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				51		126
Link Speed (k/h)		60	60		50	
Link Distance (m)		435.4	83.2		96.6	
Travel Time (s)		26.1	5.0		7.0	
Confl. Peds. (#/hr)	3			3		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	6%	6%	13%	15%	1%
Adj. Flow (vph)	114	929	949	51	148	126
Shared Lane Traffic (%)						
Lane Group Flow (vph)	114	929	949	51	148	126
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4	8			
Permitted Phases	4			8	6	6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	60.0	60.0	60.0	60.0	7.0	7.0
Minimum Split (s)	66.0	66.0	66.0	66.0	13.0	13.0
Total Split (s)	66.0	66.0	66.0	66.0	21.0	21.0
Total Split (%)	75.9%	75.9%	75.9%	75.9%	24.1%	24.1%
Maximum Green (s)	60.0	60.0	60.0	60.0	15.0	15.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	Max	None	None
Walk Time (s)	50.0	50.0	50.0	50.0	7.0	7.0
Flash Dont Walk (s)	10.0	10.0	10.0	10.0	15.0	15.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	62.0	62.0	62.0	62.0	14.5	14.5
Actuated g/C Ratio	0.73	0.73	0.73	0.73	0.17	0.17
v/c Ratio	0.44	0.71	0.72	0.05	0.59	0.35

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Control Delay	11.6	10.5	11.0	1.3	42.3	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.6	10.5	11.0	1.3	42.3	9.0
LOS	B	B	B	A	D	A
Approach Delay		10.6	10.5		27.0	
Approach LOS		B	B		C	
Queue Length 50th (m)	6.7	76.5	79.8	0.0	23.4	0.0
Queue Length 95th (m)	20.5	128.6	135.3	2.8	42.7	14.5
Internal Link Dist (m)		411.4	59.2		72.6	
Turn Bay Length (m)	30.0					
Base Capacity (vph)	258	1314	1314	957	294	396
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.71	0.72	0.05	0.50	0.32

Intersection Summary			
Area Type:	Other		
Cycle Length: 87			
Actuated Cycle Length: 84.6			
Natural Cycle: 80			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.72			
Intersection Signal Delay: 12.5		Intersection LOS: B	
Intersection Capacity Utilization 116.9%		ICU Level of Service H	
Analysis Period (min) 15			

Splits and Phases: 5: Erb St W & Commercial Entrance 1



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	513	1	9	432	641	5	3	5	519	1	24
Future Volume (vph)	5	513	1	9	432	641	5	3	5	519	1	24
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1550	1550	1550	1550	1550	1750
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	0.95	0.95	1.00
Frt					0.911			0.948			0.987	
Flt Protected								0.981		0.950	0.957	
Satd. Flow (prot)	0	3011	0	0	2783	0	0	919	0	1399	1391	0
Flt Permitted								0.981		0.950	0.957	
Satd. Flow (perm)	0	3011	0	0	2783	0	0	919	0	1399	1391	0
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		149.9			435.4			54.9			87.3	
Travel Time (s)		9.0			26.1			4.0			6.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	4%	80%	77%	5%	0%	60%	0%	88%	0%	0%	0%
Adj. Flow (vph)	5	513	1	9	432	641	5	3	5	519	1	24
Shared Lane Traffic (%)										47%		
Lane Group Flow (vph)	0	519	0	0	1082	0	0	13	0	275	269	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization	77.3%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Traffic Volume (veh/h)	5	513	1	9	432	641	5	3	5	519	1	24
Future Volume (veh/h)	5	513	1	9	432	641	5	3	5	519	1	24
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	5	513	1	9	432	641	5	3	5	519	1	24
Approach Volume (veh/h)		519			1082			13			544	
Crossing Volume (veh/h)		529			13			1037			446	
High Capacity (veh/h)		912			1371			604			975	
High v/c (veh/h)		0.57			0.79			0.02			0.56	
Low Capacity (veh/h)		735			1149			467			791	
Low v/c (veh/h)		0.71			0.94			0.03			0.69	

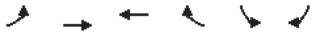
Intersection Summary			
Maximum v/c High	0.79		
Maximum v/c Low	0.94		
Intersection Capacity Utilization	77.3%	ICU Level of Service	D

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	71	212	14	96	224	143	13	10	59	217	1	97
Future Volume (vph)	71	212	14	96	224	143	13	10	59	217	1	97
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1550	1550	1550	1550	1550	1750
Storage Length (m)	30.0		30.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (m)	85.0			0.0			0.0			0.0		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.993			0.954			0.903			0.904	
Flt Protected		0.988			0.990			0.992		0.950	0.983	
Satd. Flow (prot)	0	2983	0	0	2858	0	0	1245	0	777	1019	0
Flt Permitted		0.988			0.990			0.992		0.950	0.983	
Satd. Flow (perm)	0	2983	0	0	2858	0	0	1245	0	777	1019	0
Link Speed (k/h)		70			60			50			50	
Link Distance (m)		346.1			149.9			61.3			415.1	
Travel Time (s)		17.8			9.0			4.4			29.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	3%	0%	8%	4%	0%	0%	0%	16%	80%	0%	0%
Adj. Flow (vph)	71	212	14	96	224	143	13	10	59	217	1	97
Shared Lane Traffic (%)										25%		
Lane Group Flow (vph)	0	297	0	0	463	0	0	82	0	163	152	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization	53.0%	ICU Level of Service A	
Analysis Period (min)	15		

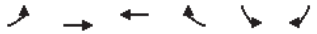
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Traffic Volume (veh/h)	71	212	14	96	224	143	13	10	59	217	1	97
Future Volume (veh/h)	71	212	14	96	224	143	13	10	59	217	1	97
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	71	212	14	96	224	143	13	10	59	217	1	97
Approach Volume (veh/h)		297			463			82			315	
Crossing Volume (veh/h)		314			94			500			333	
High Capacity (veh/h)		1082			1287			933			1066	
High v/c (veh/h)		0.27			0.36			0.09			0.30	
Low Capacity (veh/h)		887			1072			754			873	
Low v/c (veh/h)		0.33			0.43			0.11			0.36	

Intersection Summary					
Maximum v/c High		0.36			
Maximum v/c Low		0.43			
Intersection Capacity Utilization		53.0%	ICU Level of Service	A	



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	6	309	281	41	29	10
Future Volume (vph)	6	309	281	41	29	10
Ideal Flow (vphpl)	1650	1650	1650	1650	1765	1765
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.983		0.965	
Flt Protected		0.999			0.964	
Satd. Flow (prot)	0	1612	1567	0	1605	0
Flt Permitted		0.999			0.964	
Satd. Flow (perm)	0	1612	1567	0	1605	0
Link Speed (k/h)		70	70		60	
Link Distance (m)		189.3	346.1		103.7	
Travel Time (s)		9.7	17.8		6.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	14%	2%	4%	0%	0%	9%
Adj. Flow (vph)	6	309	281	41	29	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	315	322	0	39	0
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 34.3%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	6	309	281	41	29	10
Future Volume (Veh/h)	6	309	281	41	29	10
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	6	309	281	41	29	10
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	322				622	302
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	322				622	302
tC, single (s)	4.2				6.4	6.3
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.4
p0 queue free %	99				94	99
cM capacity (veh/h)	1173				451	722

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	315	322	39
Volume Left	6	0	29
Volume Right	0	41	10
cSH	1173	1700	499
Volume to Capacity	0.01	0.19	0.08
Queue Length 95th (m)	0.1	0.0	2.0
Control Delay (s)	0.2	0.0	12.8
Lane LOS	A		B
Approach Delay (s)	0.2	0.0	12.8
Approach LOS			B

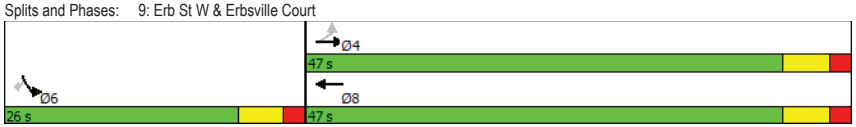
Intersection Summary				
Average Delay		0.8		
Intersection Capacity Utilization		34.3%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	28	570	648	21	26	29
Future Volume (vph)	28	570	648	21	26	29
Ideal Flow (vphpl)	1775	1900	1750	1750	1775	1750
Storage Length (m)	25.0			0.0	50.0	0.0
Storage Lanes	1			0	1	1
Taper Length (m)	75.0				55.0	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor	1.00		1.00		1.00	0.98
Frt			0.995			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1686	3505	3065	0	1637	1473
Flt Permitted	0.397				0.950	
Satd. Flow (perm)	704	3505	3065	0	1634	1446
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			8			29
Link Speed (k/h)		60	60		50	
Link Distance (m)		470.9	231.7		128.8	
Travel Time (s)		28.3	13.9		9.3	
Confl. Peds. (#/hr)	2			2	2	6
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	3%	8%	4%	3%	1%
Adj. Flow (vph)	28	570	648	21	26	29
Shared Lane Traffic (%)						
Lane Group Flow (vph)	28	570	669	0	26	29
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4					6
Detector Phase	4	4	8		6	6
Switch Phase						
Minimum Initial (s)	40.0	40.0	40.0		8.0	8.0
Minimum Split (s)	47.0	47.0	47.0		14.0	14.0
Total Split (s)	47.0	47.0	47.0		26.0	26.0
Total Split (%)	64.4%	64.4%	64.4%		35.6%	35.6%
Maximum Green (s)	41.0	41.0	41.0		20.0	20.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0		-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0		4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	Max	Max	Max		None	None
Walk Time (s)	26.0	26.0	26.0		7.0	7.0
Flash Dont Walk (s)	14.0	14.0	14.0		15.0	15.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)	53.3	53.3	53.3		10.1	10.1
Actuated g/C Ratio	0.83	0.83	0.83		0.16	0.16
v/c Ratio	0.05	0.20	0.26		0.10	0.12

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Control Delay	2.9	2.4	2.6		24.0	10.7
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	2.9	2.4	2.6		24.0	10.7
LOS	A	A	A		C	B
Approach Delay		2.4	2.6		17.0	
Approach LOS		A	A		B	
Queue Length 50th (m)	0.8	9.5	11.8		3.4	0.0
Queue Length 95th (m)	2.6	14.2	17.6		8.5	6.0
Internal Link Dist (m)		446.9	207.7		104.8	
Turn Bay Length (m)	25.0				50.0	
Base Capacity (vph)	586	2920	2555		565	518
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.05	0.20	0.26		0.05	0.06

Intersection Summary			
Area Type:	Other		
Cycle Length: 73			
Actuated Cycle Length: 64			
Natural Cycle: 65			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.26			
Intersection Signal Delay: 3.1		Intersection LOS: A	
Intersection Capacity Utilization 48.8%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 9: Erb St W & Erbsville Court



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	4	0	856	12	0	1008	0
Future Volume (vph)	0	0	0	0	0	4	0	856	12	0	1008	0
Ideal Flow (vphpl)	0	0	1750	0	0	1750	0	1775	1775	0	1775	1775
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor												
Frt						0.865		0.998				
Flt Protected												
Satd. Flow (prot)	0	0	1750	0	0	1009	0	3200	0	0	3182	0
Flt Permitted												
Satd. Flow (perm)	0	0	1750	0	0	1009	0	3200	0	0	3182	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		40.5			37.7			83.9			220.2	
Travel Time (s)		2.9			2.7			5.0			13.2	
Confl. Peds. (#/hr)									2	2		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	50%	0%	5%	17%	0%	6%	0%
Adj. Flow (vph)	0	0	0	0	0	4	0	856	12	0	1008	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	4	0	868	0	0	1008	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 35.7%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	0	4	0	856	12	0	1008	0
Future Volume (Veh/h)	0	0	0	0	0	4	0	856	12	0	1008	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	0	0	0	0	4	0	856	12	0	1008	0
Pedestrians					2							
Lane Width (m)					3.6							
Walking Speed (m/s)					1.2							
Percent Blockage					0							
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1440	1878	504	1368	1872	436	1008			870		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1440	1878	504	1368	1872	436	1008			870		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	7.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.8	2.2			2.2		
p0 queue free %	100	100	100	100	100	99	100			100		
cM capacity (veh/h)	94	72	518	107	73	453	695			782		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	0	4	571	297	672	336
Volume Left	0	0	0	0	0	0
Volume Right	0	4	0	12	0	0
cSH	1700	453	1700	1700	1700	1700
Volume to Capacity	0.00	0.01	0.34	0.17	0.40	0.20
Queue Length 95th (m)	0.0	0.2	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	13.0	0.0	0.0	0.0	0.0
Lane LOS	A	B				
Approach Delay (s)	0.0	13.0	0.0		0.0	
Approach LOS	A	B				

Intersection Summary				
Average Delay	0.0			
Intersection Capacity Utilization	35.7%	ICU Level of Service	A	
Analysis Period (min)	15			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	228	37	11	38	23	39	3	941	46	41	1187	201
Future Volume (vph)	228	37	11	38	23	39	3	941	46	41	1187	201
Ideal Flow (vphpl)	1775	1650	1650	1550	1550	1550	1650	1650	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.966			0.947			0.993			0.979	
Flt Protected	0.950				0.981						0.999	
Satd. Flow (prot)	1492	1594	0	0	1429	0	0	2996	0	0	2896	0
Flt Permitted	0.950				0.981						0.999	
Satd. Flow (perm)	1492	1594	0	0	1429	0	0	2996	0	0	2896	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		115.1			101.1			188.2			237.1	
Travel Time (s)		8.3			7.3			11.3			14.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	13%	0%	0%	1%	0%	1%	0%	4%	2%	11%	6%	4%
Adj. Flow (vph)	228	37	11	38	23	39	3	941	46	41	1187	201
Shared Lane Traffic (%)												
Lane Group Flow (vph)	228	48	0	0	100	0	0	990	0	0	1429	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization	106.8%	ICU Level of Service	G
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Traffic Volume (veh/h)	228	37	11	38	23	39	3	941	46	41	1187	201
Future Volume (veh/h)	228	37	11	38	23	39	3	941	46	41	1187	201
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	228	37	11	38	23	39	3	941	46	41	1187	201
Approach Volume (veh/h)		276			100			990			1429	
Crossing Volume (veh/h)		1266#			1172			306			64	
High Capacity (veh/h)		500			540			1089			1317	
High v/c (veh/h)		0.55			0.19			0.91			1.08	
Low Capacity (veh/h)		378			413			893			1100	
Low v/c (veh/h)		0.73			0.24			1.11			1.30	

Intersection Summary					
Maximum v/c High		1.08			
Maximum v/c Low		1.30			
Intersection Capacity Utilization		106.8%	ICU Level of Service	G	
# Crossing flow exceeds 1200, method is not applicable					

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	39	1	905	1209	56
Future Volume (vph)	0	39	1	905	1209	56
Ideal Flow (vphpl)	0	1750	0	1900	1750	1750
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Frt		0.865			0.993	
Flt Protected						
Satd. Flow (prot)	0	1514	0	3471	3129	0
Flt Permitted						
Satd. Flow (perm)	0	1514	0	3471	3129	0
Link Speed (k/h)	50			60	60	
Link Distance (m)	55.4			149.5	188.2	
Travel Time (s)	4.0			9.0	11.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	4%	5%	17%
Adj. Flow (vph)	0	39	1	905	1209	56
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	39	0	906	1265	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	48.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	39	1	905	1209	56
Future Volume (Veh/h)	0	39	1	905	1209	56
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	39	1	905	1209	56
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1692	632	1265			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1692	632	1265			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	91	100			
cM capacity (veh/h)	86	428	556			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	39	303	603	806	459
Volume Left	0	1	0	0	0
Volume Right	39	0	0	0	56
cSH	428	556	1700	1700	1700
Volume to Capacity	0.09	0.00	0.35	0.47	0.27
Queue Length 95th (m)	2.4	0.0	0.0	0.0	0.0
Control Delay (s)	14.3	0.1	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	14.3	0.0		0.0	
Approach LOS	B				

Intersection Summary				
Average Delay	0.3			
Intersection Capacity Utilization	48.2%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	45	85	87	944	1081	129
Future Volume (vph)	45	85	87	944	1081	129
Ideal Flow (vphpl)	1775	1750	1775	1900	1750	1750
Storage Length (m)	0.0	0.0	85.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	0.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Frt		0.850			0.984	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1686	1444	1670	3471	3116	0
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	1686	1444	1670	3471	3116	0
Link Speed (k/h)	50			60	60	
Link Distance (m)	62.4			166.4	149.5	
Travel Time (s)	4.5			10.0	9.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	3%	1%	4%	5%	5%
Adj. Flow (vph)	45	85	87	944	1081	129
Shared Lane Traffic (%)						
Lane Group Flow (vph)	45	85	87	944	1210	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	55.4%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	45	85	87	944	1081	129
Future Volume (Veh/h)	45	85	87	944	1081	129
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	45	85	87	944	1081	129
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1792	605	1210			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1792	605	1210			
tC, single (s)	6.8	7.0	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	28	81	85			
cM capacity (veh/h)	63	438	578			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	45	85	87	472	472	721	489
Volume Left	45	0	87	0	0	0	0
Volume Right	0	85	0	0	0	0	129
cSH	63	438	578	1700	1700	1700	1700
Volume to Capacity	0.72	0.19	0.15	0.28	0.28	0.42	0.29
Queue Length 95th (m)	25.2	5.7	4.2	0.0	0.0	0.0	0.0
Control Delay (s)	149.7	15.2	12.3	0.0	0.0	0.0	0.0
Lane LOS	F	C	B				
Approach Delay (s)	61.7		1.0			0.0	
Approach LOS	F						

Intersection Summary				
Average Delay	3.8			
Intersection Capacity Utilization	55.4%	ICU Level of Service		B
Analysis Period (min)	15			



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	57	0	1040	1129	39
Future Volume (vph)	0	57	0	1040	1129	39
Ideal Flow (vphpl)	0	1750	0	1900	1750	1750
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Ped Bike Factor						
Frt		0.865			0.995	
Flt Protected						
Satd. Flow (prot)	0	1514	0	3471	3148	0
Flt Permitted						
Satd. Flow (perm)	0	1514	0	3471	3148	0
Link Speed (k/h)	50			60	60	
Link Distance (m)	67.0			178.5	166.4	
Travel Time (s)	4.8			10.7	10.0	
Confl. Peds. (#/hr)			2			2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	4%	5%	8%
Adj. Flow (vph)	0	57	0	1040	1129	39
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	57	0	1040	1168	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	45.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	57	0	1040	1129	39
Future Volume (Veh/h)	0	57	0	1040	1129	39
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	57	0	1040	1129	39
Pedestrians	2					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1670	586	1170			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1670	586	1170			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	88	100			
cM capacity (veh/h)	89	458	603			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	57	520	520	753	415
Volume Left	0	0	0	0	0
Volume Right	57	0	0	0	39
cSH	458	1700	1700	1700	1700
Volume to Capacity	0.12	0.31	0.31	0.44	0.24
Queue Length 95th (m)	3.4	0.0	0.0	0.0	0.0
Control Delay (s)	14.0	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	14.0	0.0		0.0	
Approach LOS	B				

Intersection Summary				
Average Delay		0.4		
Intersection Capacity Utilization		45.7%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	96	119	106	124	217	182	166	773	294	149	869	131
Future Volume (vph)	96	119	106	124	217	182	166	773	294	149	869	131
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.950			0.948			0.964			0.983	
Flt Protected		0.985			0.988			0.993			0.994	
Satd. Flow (prot)	0	2287	0	0	2763	0	0	2858	0	0	2953	0
Flt Permitted		0.985			0.988			0.993			0.994	
Satd. Flow (perm)	0	2287	0	0	2763	0	0	2858	0	0	2953	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		112.4			150.8			180.3			178.5	
Travel Time (s)		8.1			10.9			10.8			10.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	47%	9%	33%	4%	7%	7%	15%	4%	2%	2%	4%	4%
Adj. Flow (vph)	96	119	106	124	217	182	166	773	294	149	869	131
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	321	0	0	523	0	0	1233	0	0	1149	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization	120.5%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Traffic Volume (veh/h)	96	119	106	124	217	182	166	773	294	149	869	131
Future Volume (veh/h)	96	119	106	124	217	182	166	773	294	149	869	131
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	96	119	106	124	217	182	166	773	294	149	869	131
Approach Volume (veh/h)		321			523			1233			1149	
Crossing Volume (veh/h)		1142			1035			364			507	
High Capacity (veh/h)		554			605			1040			928	
High v/c (veh/h)		0.58			0.86			1.19			1.24	
Low Capacity (veh/h)		424			468			850			750	
Low v/c (veh/h)		0.76			1.12			1.45			1.53	

Intersection Summary			
Maximum v/c High	1.24		
Maximum v/c Low	1.53		
Intersection Capacity Utilization	120.5%	ICU Level of Service	H

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Erb Street & Waterloo Waste Road 1Platinum Drive.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Without Extension
Report generation date: 2019-07-31 4:20:32 PM

Summary of intersection performance

	AM					
	Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	Default - Existing					
Leg North	0.01	2.12	0.01	A	2.42	A
Leg West	0.48	2.51	0.32	A		
Leg South	0.04	4.86	0.03	A		
Leg East	0.15	1.98	0.13	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM " model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - Existing, Sat" model duration: 12:00 PM - 1:30 PM
"D4 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D7 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM
"D8 - Total 2031, PM" model duration: 4:00 PM - 5:30 PM
"D9 - Total 2031, Sat" model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 4:20:31 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-22
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Default - Existing, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Default	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Existing, AM	Existing	AM		ONE HOUR	08:00	09:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Erbsville Road/Ira-Needles Boulavard & Erb Street	Roundabout	North,West,South,East				2.42	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	(untitled)	
West	West	(untitled)	
South	South	(untitled)	
East	East	(untitled)	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	3.50	4.50	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.527	1221.701
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	16.00	100.000
West	ONE HOUR	✓	626.00	100.000
South	ONE HOUR	✓	24.00	100.000
East	ONE HOUR	✓	253.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	11.000	0.000	5.000
	West	24.000	0.000	5.000	597.000
	South	1.000	4.000	0.000	19.000
	East	5.000	223.000	25.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.69	0.00	0.31
	West	0.04	0.00	0.01	0.95
	South	0.04	0.17	0.00	0.79
	East	0.02	0.88	0.10	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.000	1.000	1.800
	West	1.040	1.000	1.000	1.030
	South	1.000	1.000	1.000	1.160
	East	1.000	1.040	1.080	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	0.0	0.0	80.0
	West	4.0	0.0	0.0	3.0
	South	0.0	0.0	0.0	16.0
	East	0.0	4.0	8.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.01	2.12	0.01	~1	A	14.68	22.02	0.76	2.08	0.01	0.76	2.08
West	0.32	2.51	0.48	1.03	A	574.43	861.64	33.59	2.34	0.37	33.59	2.34
South	0.03	4.86	0.04	~1	A	22.02	33.03	2.50	4.53	0.03	2.50	4.53
East	0.13	1.98	0.15	~1	A	232.16	348.24	11.23	1.94	0.12	11.23	1.94

Main Results for each time segment

Main results: (08:00-08:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	12.05	3.01	12.02	22.53	189.31	0.00	2055.85	674.22	0.006	0.00	0.01	2.045	A
West	471.29	117.82	470.15	178.79	22.54	0.00	2176.42	1888.82	0.217	0.00	0.28	2.172	A
South	18.07	4.52	17.98	22.54	470.15	0.00	974.00	123.50	0.019	0.00	0.02	4.227	A
East	190.47	47.62	190.07	466.36	21.77	0.00	2176.97	2121.76	0.087	0.00	0.10	1.889	A

Main results: (08:15-08:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	14.38	3.60	14.38	26.96	226.45	0.00	2029.00	674.22	0.007	0.01	0.01	2.074	A
West	562.76	140.69	562.46	213.87	26.96	0.00	2173.22	1888.82	0.259	0.28	0.36	2.302	A
South	21.58	5.39	21.55	26.96	562.46	0.00	925.36	123.50	0.023	0.02	0.03	4.471	A
East	227.44	56.86	227.35	557.96	26.05	0.00	2173.87	2121.76	0.105	0.10	0.12	1.928	A

Main results: (08:30-08:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	17.62	4.40	17.61	33.01	277.33	0.00	1992.22	674.22	0.009	0.01	0.01	2.116	A

West	689.24	172.31	688.76	261.92	33.02	0.00	2168.84	1888.82	0.318	0.36	0.48	2.505	A
South	26.42	6.61	26.39	33.01	688.76	0.00	858.82	123.50	0.031	0.03	0.04	4.854	A
East	278.56	69.64	278.43	683.25	31.90	0.00	2169.65	2121.76	0.128	0.12	0.15	1.985	A

Main results: (08:45-09:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	17.62	4.40	17.62	33.03	277.46	0.00	1992.12	674.22	0.009	0.01	0.01	2.116	A
West	689.24	172.31	689.24	262.04	33.03	0.00	2168.83	1888.82	0.318	0.48	0.48	2.505	A
South	26.42	6.61	26.42	33.03	689.24	0.00	858.57	123.50	0.031	0.04	0.04	4.856	A
East	278.56	69.64	278.56	683.73	31.93	0.00	2169.63	2121.76	0.128	0.15	0.15	1.985	A

Main results: (09:00-09:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	14.38	3.60	14.39	26.99	226.67	0.00	2028.84	674.22	0.007	0.01	0.01	2.075	A
West	562.76	140.69	563.23	214.08	26.98	0.00	2173.20	1888.82	0.259	0.48	0.36	2.303	A
South	21.58	5.39	21.61	26.99	563.23	0.00	924.96	123.50	0.023	0.04	0.03	4.475	A
East	227.44	56.86	227.57	558.75	26.10	0.00	2173.84	2121.76	0.105	0.15	0.12	1.930	A

Main results: (09:15-09:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	12.05	3.01	12.05	22.60	189.81	0.00	2055.49	674.22	0.006	0.01	0.01	2.047	A
West	471.29	117.82	471.59	179.26	22.60	0.00	2176.37	1888.82	0.217	0.36	0.29	2.175	A
South	18.07	4.52	18.09	22.60	471.59	0.00	973.24	123.50	0.019	0.03	0.02	4.232	A
East	190.47	47.62	190.56	467.83	21.85	0.00	2176.91	2121.76	0.088	0.12	0.10	1.892	A

Queueing Delay Results for each time segment

Queueing Delay results: (08:00-08:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.10	0.01	2.045	A	A
West	4.20	0.28	2.172	A	A
South	0.31	0.02	4.227	A	A
East	1.48	0.10	1.889	A	A

Queueing Delay results: (08:15-08:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.12	0.01	2.074	A	A
West	5.32	0.35	2.302	A	A
South	0.39	0.03	4.471	A	A
East	1.81	0.12	1.928	A	A

Queueing Delay results: (08:30-08:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.15	0.01	2.116	A	A
West	7.08	0.47	2.505	A	A
South	0.52	0.03	4.854	A	A
East	2.28	0.15	1.985	A	A

Queueing Delay results: (08:45-09:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.16	0.01	2.116	A	A
West	7.18	0.48	2.505	A	A
South	0.53	0.04	4.856	A	A

East	2.30	0.15	1.985	A	A

Queueing Delay results: (09:00-09:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.13	0.01	2.075	A	A
West	5.48	0.37	2.303	A	A
South	0.41	0.03	4.475	A	A
East	1.85	0.12	1.930	A	A

Queueing Delay results: (09:15-09:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.10	0.01	2.047	A	A
West	4.33	0.29	2.175	A	A
South	0.32	0.02	4.232	A	A
East	1.52	0.10	1.892	A	A

Queue Variation Results for each time segment

Queue Variation results: (08:00-08:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.01	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.28	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.02	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.10	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:15-08:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.01	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.36	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.03	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.12	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:30-08:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.01	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.48	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.04	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.15	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:45-09:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker

North	0.01	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.48	0.00	0.00	0.00	1.03			N/A	N/A
South	0.04	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.15	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:00-09:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.01	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.36	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.03	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.12	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:15-09:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.01	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.29	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.02	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.10	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Erb Street & Waterloo Waste Road 1Platinum Drive.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Without Extension
Report generation date: 2019-07-31 4:20:54 PM

Summary of intersection performance

	PM					
	Queue (PCE)	**Delay (s)**	**V/C Ratio**	**LOS**	**Intersection Delay (s)**	**Intersection LOS**
	Default - Existing					
Leg North	0.12	2.31	0.11	A	2.42	A
Leg West	0.26	2.17	0.20	A		
Leg South	0.07	4.10	0.06	A		
Leg East	0.44	2.46	0.30	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM " model duration: 4:00 PM - 5:30 PM
"D3 - Existing, Sat" model duration: 12:00 PM - 1:30 PM
"D4 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D7 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM
"D8 - Total 2031, PM" model duration: 4:00 PM - 5:30 PM
"D9 - Total 2031, Sat" model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 4:20:53 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-22
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Default - Existing, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Default	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Existing, PM	Existing	PM		ONE HOUR	16:00	17:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Erbsville Road/Ira-Needles Boulavard & Erb Street	Roundabout	North,West,South,East				2.42	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	(untitled)	
West	West	(untitled)	
South	South	(untitled)	
East	East	(untitled)	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	3.50	4.50	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.527	1221.701
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	168.00	100.000
West	ONE HOUR	✓	387.00	100.000
South	ONE HOUR	✓	54.00	100.000
East	ONE HOUR	✓	587.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	86.000	0.000	82.000
	West	62.000	0.000	6.000	319.000
	South	2.000	5.000	0.000	47.000
	East	28.000	520.000	39.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.51	0.00	0.49
	West	0.16	0.00	0.02	0.82
	South	0.04	0.09	0.00	0.87
	East	0.05	0.89	0.07	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.000	1.000	1.000
	West	1.000	1.000	1.000	1.010
	South	1.000	1.000	1.000	1.020
	East	1.000	1.020	1.030	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	0.0	0.0	0.0
	West	0.0	0.0	0.0	1.0
	South	0.0	0.0	0.0	2.0
	East	0.0	2.0	3.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.11	2.31	0.12	~1	A	154.16	231.24	8.39	2.18	0.09	8.39	2.18
West	0.20	2.17	0.26	~1	A	355.12	532.68	18.41	2.07	0.20	18.41	2.07
South	0.06	4.10	0.07	~1	A	49.55	74.33	4.80	3.88	0.05	4.80	3.88
East	0.30	2.46	0.44	~1	A	538.64	807.96	30.98	2.30	0.34	30.98	2.30

Main Results for each time segment

Main results: (16:00-16:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	126.48	31.62	126.19	69.10	423.59	0.00	1886.47	826.94	0.067	0.00	0.07	2.045	A
West	291.35	72.84	290.72	458.90	90.89	0.00	2127.00	1805.96	0.137	0.00	0.16	1.977	A
South	40.65	10.16	40.49	33.80	347.80	0.00	1038.46	72.31	0.039	0.00	0.04	3.669	A
East	441.92	110.48	440.88	336.47	51.82	0.00	2155.24	1976.76	0.205	0.00	0.26	2.140	A

Main results: (16:15-16:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	151.03	37.76	150.96	82.67	506.76	0.00	1826.35	826.94	0.083	0.07	0.09	2.148	A
West	347.91	86.98	347.75	548.99	108.72	0.00	2114.11	1805.96	0.165	0.16	0.20	2.054	A
South	48.54	12.14	48.50	40.43	416.04	0.00	1002.51	72.31	0.048	0.04	0.05	3.838	A
East	527.70	131.93	527.43	402.54	62.00	0.00	2147.89	1976.76	0.246	0.26	0.33	2.265	A

Main results: (16:30-16:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	184.97	46.24	184.86	101.23	620.55	0.00	1744.08	826.94	0.106	0.09	0.12	2.308	A
West	426.09	106.52	425.86	672.27	133.14	0.00	2096.46	1805.96	0.203	0.20	0.26	2.172	A
South	59.46	14.86	59.39	49.51	509.49	0.00	953.27	72.31	0.062	0.05	0.07	4.097	A
East	646.30	161.57	645.86	492.95	75.92	0.00	2137.82	1976.76	0.302	0.33	0.44	2.460	A

Main results: (16:45-17:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	184.97	46.24	184.97	101.29	620.97	0.00	1743.78	826.94	0.106	0.12	0.12	2.309	A
West	426.09	106.52	426.09	672.72	133.22	0.00	2096.40	1805.96	0.203	0.26	0.26	2.172	A
South	59.46	14.86	59.45	49.55	509.77	0.00	953.12	72.31	0.062	0.07	0.07	4.097	A
East	646.30	161.57	646.30	493.25	75.97	0.00	2137.79	1976.76	0.302	0.44	0.44	2.460	A

Main results: (17:00-17:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	151.03	37.76	151.14	82.77	507.44	0.00	1825.86	826.94	0.083	0.12	0.09	2.151	A
West	347.91	86.98	348.14	549.72	108.86	0.00	2114.01	1805.96	0.165	0.26	0.20	2.057	A
South	48.54	12.14	48.61	40.49	416.51	0.00	1002.26	72.31	0.048	0.07	0.05	3.842	A
East	527.70	131.93	528.13	403.04	62.07	0.00	2147.83	1976.76	0.246	0.44	0.33	2.266	A

Main results: (17:15-17:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	126.48	31.62	126.55	69.30	424.88	0.00	1885.55	826.94	0.067	0.09	0.07	2.046	A
West	291.35	72.84	291.51	460.28	91.15	0.00	2126.81	1805.96	0.137	0.20	0.16	1.977	A
South	40.65	10.16	40.70	33.90	348.76	0.00	1037.95	72.31	0.039	0.05	0.04	3.671	A
East	441.92	110.48	442.20	337.48	51.98	0.00	2155.13	1976.76	0.205	0.33	0.26	2.143	A

Queueing Delay Results for each time segment

Queueing Delay results: (16:00-16:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	1.06	0.07	2.045	A	A
West	2.36	0.16	1.977	A	A
South	0.61	0.04	3.669	A	A
East	3.88	0.26	2.140	A	A

Queueing Delay results: (16:15-16:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	1.34	0.09	2.148	A	A
West	2.94	0.20	2.054	A	A
South	0.76	0.05	3.838	A	A
East	4.91	0.33	2.265	A	A

Queueing Delay results: (16:30-16:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	1.76	0.12	2.308	A	A
West	3.81	0.25	2.172	A	A
South	1.00	0.07	4.097	A	A
East	6.52	0.43	2.460	A	A

Queueing Delay results: (16:45-17:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	1.78	0.12	2.309	A	A
West	3.85	0.26	2.172	A	A
South	1.01	0.07	4.097	A	A

East	6.61	0.44	2.460	A	A

Queueing Delay results: (17:00-17:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	1.37	0.09	2.151	A	A
West	3.02	0.20	2.057	A	A
South	0.79	0.05	3.842	A	A
East	5.06	0.34	2.266	A	A

Queueing Delay results: (17:15-17:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	1.09	0.07	2.046	A	A
West	2.43	0.16	1.977	A	A
South	0.63	0.04	3.671	A	A
East	4.00	0.27	2.143	A	A

Queue Variation Results for each time segment

Queue Variation results: (16:00-16:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.07	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.16	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.04	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.26	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:15-16:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.09	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.20	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.05	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.33	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:30-16:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.12	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.26	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.07	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.44	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:45-17:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker

North	0.12	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.26	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.07	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.44	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:00-17:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.09	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.20	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.05	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.33	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:15-17:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.07	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.16	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.04	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.26	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Erb Street & Waterloo Waste Road 1Platinum Drive.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Without Extension
Report generation date: 2019-07-31 4:26:03 PM

Summary of intersection performance

	Sat					
	Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	Default - Existing					
Leg North	0.22	2.28	0.18	A	2.39	A
Leg West	0.20	2.23	0.17	A		
Leg South	0.11	4.28	0.10	A		
Leg East	0.32	2.24	0.24	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - Existing, Sat " model duration: 12:00 PM - 1:30 PM
"D4 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D7 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM
"D8 - Total 2031, PM" model duration: 4:00 PM - 5:30 PM
"D9 - Total 2031, Sat" model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 4:26:03 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-22
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Default - Existing, Sat

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Default	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Existing, Sat	Existing	Sat		ONE HOUR	12:00	13:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Erbsville Road/Ira-Needles Boulavard & Erb Street	Roundabout	North,West,South,East				2.39	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	(untitled)	
West	West	(untitled)	
South	South	(untitled)	
East	East	(untitled)	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	3.50	4.50	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.527	1221.701
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	315.00	100.000
West	ONE HOUR	✓	297.00	100.000
South	ONE HOUR	✓	82.00	100.000
East	ONE HOUR	✓	463.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	97.000	1.000	217.000
	West	71.000	0.000	14.000	212.000
	South	10.000	13.000	0.000	59.000
	East	143.000	224.000	96.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.31	0.00	0.69
	West	0.24	0.00	0.05	0.71
	South	0.12	0.16	0.00	0.72
	East	0.31	0.48	0.21	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.000	1.000	1.000
	West	1.000	1.000	1.000	1.000
	South	1.000	1.000	1.000	1.000
	East	1.000	1.000	1.000	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	0.0	0.0	0.0
	West	0.0	0.0	0.0	0.0
	South	0.0	0.0	0.0	0.0
	East	0.0	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.18	2.28	0.22	~1	A	289.05	433.57	15.55	2.15	0.17	15.55	2.15
West	0.17	2.23	0.20	~1	A	272.53	408.80	14.40	2.11	0.16	14.40	2.11
South	0.10	4.28	0.11	~1	A	75.24	112.87	7.53	4.00	0.08	7.53	4.00
East	0.24	2.24	0.32	~1	A	424.86	637.29	22.54	2.12	0.25	22.54	2.12

Main Results for each time segment

Main results: (12:00-12:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	237.15	59.29	236.62	168.25	250.12	0.00	2011.88	1207.39	0.118	0.00	0.13	2.028	A
West	223.60	55.90	223.10	250.87	235.87	0.00	2022.19	1297.57	0.111	0.00	0.12	2.001	A
South	61.73	15.43	61.48	83.38	375.59	0.00	1023.82	132.07	0.060	0.00	0.06	3.740	A
East	348.57	87.14	347.80	366.49	70.58	0.00	2141.69	1941.68	0.163	0.00	0.19	2.005	A

Main results: (12:15-12:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	283.18	70.79	283.04	201.27	299.22	0.00	1976.39	1207.39	0.143	0.13	0.17	2.125	A
West	267.00	66.75	266.87	300.11	282.15	0.00	1988.73	1297.57	0.134	0.12	0.15	2.090	A
South	73.72	18.43	73.65	99.74	449.28	0.00	984.99	132.07	0.075	0.06	0.08	3.950	A
East	416.23	104.06	416.04	438.47	84.46	0.00	2131.65	1941.68	0.195	0.19	0.24	2.098	A

Main results: (12:30-12:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	346.82	86.71	346.61	246.48	366.42	0.00	1927.81	1207.39	0.180	0.17	0.22	2.276	A

West	327.00	81.75	326.81	367.52	345.52	0.00	1942.92	1297.57	0.168	0.15	0.20	2.227	A
South	90.28	22.57	90.18	122.14	550.19	0.00	931.83	132.07	0.097	0.08	0.11	4.277	A
East	509.77	127.44	509.48	536.95	103.42	0.00	2117.94	1941.68	0.241	0.24	0.32	2.238	A

Main results: (12:45-13:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	346.82	86.71	346.82	246.63	366.64	0.00	1927.65	1207.39	0.180	0.22	0.22	2.276	A
West	327.00	81.75	327.00	367.74	345.72	0.00	1942.77	1297.57	0.168	0.20	0.20	2.227	A
South	90.28	22.57	90.28	122.21	550.51	0.00	931.66	132.07	0.097	0.11	0.11	4.278	A
East	509.77	127.44	509.77	537.30	103.50	0.00	2117.89	1941.68	0.241	0.32	0.32	2.238	A

Main results: (13:00-13:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	283.18	70.79	283.38	201.52	299.58	0.00	1976.13	1207.39	0.143	0.22	0.17	2.126	A
West	267.00	66.75	267.18	300.48	282.48	0.00	1988.49	1297.57	0.134	0.20	0.16	2.091	A
South	73.72	18.43	73.82	99.86	449.81	0.00	984.71	132.07	0.075	0.11	0.08	3.952	A
East	416.23	104.06	416.52	439.05	84.58	0.00	2131.57	1941.68	0.195	0.32	0.24	2.099	A

Main results: (13:15-13:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	237.15	59.29	237.28	168.74	250.84	0.00	2011.36	1207.39	0.118	0.17	0.13	2.029	A
West	223.60	55.90	223.72	251.60	236.53	0.00	2021.71	1297.57	0.111	0.16	0.12	2.003	A
South	61.73	15.43	61.80	83.61	376.64	0.00	1023.27	132.07	0.060	0.08	0.06	3.746	A
East	348.57	87.14	348.76	367.62	70.82	0.00	2141.51	1941.68	0.163	0.24	0.19	2.008	A

Queueing Delay Results for each time segment

Queueing Delay results: (12:00-12:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	1.97	0.13	2.028	A	A
West	1.84	0.12	2.001	A	A
South	0.94	0.06	3.740	A	A
East	2.87	0.19	2.005	A	A

Queueing Delay results: (12:15-12:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.48	0.17	2.125	A	A
West	2.30	0.15	2.090	A	A
South	1.19	0.08	3.950	A	A
East	3.59	0.24	2.098	A	A

Queueing Delay results: (12:30-12:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	3.25	0.22	2.276	A	A
West	3.00	0.20	2.227	A	A
South	1.58	0.11	4.277	A	A
East	4.69	0.31	2.238	A	A

Queueing Delay results: (12:45-13:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	3.28	0.22	2.276	A	A
West	3.03	0.20	2.227	A	A
South	1.60	0.11	4.278	A	A

East	4.74	0.32	2.238	A	A

Queueing Delay results: (13:00-13:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.54	0.17	2.126	A	A
West	2.36	0.16	2.091	A	A
South	1.24	0.08	3.952	A	A
East	3.69	0.25	2.099	A	A

Queueing Delay results: (13:15-13:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.03	0.14	2.029	A	A
West	1.89	0.13	2.003	A	A
South	0.98	0.07	3.746	A	A
East	2.95	0.20	2.008	A	A

Queue Variation Results for each time segment

Queue Variation results: (12:00-12:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.13	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.12	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.19	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (12:15-12:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.17	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.15	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.08	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.24	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (12:30-12:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.22	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.20	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.11	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.32	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (12:45-13:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker

North	0.22	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.20	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.11	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.32	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (13:00-13:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.17	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.16	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.08	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.24	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (13:15-13:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.13	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.12	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.19	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Erb Street & Waterloo Waste Road 2Costco Entrance.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Without Extension
Report generation date: 2019-07-31 4:18:00 PM

Summary of intersection performance

	AM					
	Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	Default - Existing					
Leg North	0.13	2.06	0.12	A	2.60	A
Leg West	0.23	2.29	0.18	A		
Leg South	0.07	7.12	0.04	A		
Leg East	0.60	2.70	0.37	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM " model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - Existing, Sat" model duration: 12:00 PM - 1:30 PM
"D4 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D7 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM
"D8 - Total 2031, PM" model duration: 4:00 PM - 5:30 PM
"D9 - Total 2031, Sat" model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 4:17:59 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-22
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Default - Existing, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Default	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Existing, AM	Existing	AM		ONE HOUR	08:00	09:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Erbsville Road/Ira-Needles Boulavard & Erb Street	Roundabout	North,West,South,East				2.60	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	(untitled)	
West	West	(untitled)	
South	South	(untitled)	
East	East	(untitled)	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	3.50	4.50	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.527	1221.701
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	214.00	100.000
West	ONE HOUR	✓	333.00	100.000
South	ONE HOUR	✓	32.00	100.000
East	ONE HOUR	✓	726.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	10.000	0.000	204.000
	West	13.000	0.000	5.000	315.000
	South	2.000	5.000	0.000	25.000
	East	469.000	226.000	31.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.05	0.00	0.95
	West	0.04	0.00	0.02	0.95
	South	0.06	0.16	0.00	0.78
	East	0.65	0.31	0.04	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.000	1.000	1.000
	West	1.000	1.000	1.800	1.040
	South	1.000	1.600	1.000	1.880
	East	1.000	1.050	1.770	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	0.0	0.0	0.0
	West	0.0	0.0	80.0	4.0
	South	0.0	60.0	0.0	88.0
	East	0.0	5.0	77.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.12	2.06	0.13	~1	A	196.37	294.56	9.72	1.98	0.11	9.72	1.98
West	0.18	2.29	0.23	~1	A	305.57	458.35	16.68	2.18	0.19	16.68	2.18
South	0.04	7.12	0.07	~1	A	29.36	44.05	4.92	6.70	0.05	4.92	6.70
East	0.37	2.70	0.60	1.03	A	666.19	999.29	41.44	2.49	0.46	41.44	2.49

Main Results for each time segment

Main results: (08:00-08:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	161.11	40.28	160.77	363.46	196.73	0.00	2050.48	1638.75	0.079	0.00	0.09	1.904	A
West	250.70	62.67	250.12	180.97	176.54	0.00	2065.08	996.52	0.121	0.00	0.14	2.073	A
South	24.09	6.02	23.92	27.04	399.63	0.00	1011.15	0.00	0.024	0.00	0.04	6.334	A
East	546.57	136.64	545.19	408.55	15.00	0.00	2181.87	2164.59	0.251	0.00	0.34	2.273	A

Main results: (08:15-08:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	192.38	48.10	192.30	434.85	235.39	0.00	2022.54	1638.75	0.095	0.09	0.10	1.966	A
West	299.36	74.84	299.22	216.52	211.17	0.00	2040.05	996.52	0.147	0.14	0.18	2.160	A
South	28.77	7.19	28.72	32.34	478.04	0.00	969.84	0.00	0.030	0.04	0.05	6.643	A
East	652.66	163.16	652.28	488.80	17.96	0.00	2179.72	2164.59	0.299	0.34	0.44	2.438	A

Main results: (08:30-08:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	235.62	58.90	235.50	532.48	288.23	0.00	1984.33	1638.75	0.119	0.10	0.13	2.058	A

West	366.64	91.66	366.42	265.13	258.60	0.00	2005.76	996.52	0.183	0.18	0.23	2.294	A
South	35.23	8.81	35.17	39.61	585.42	0.00	913.27	0.00	0.039	0.05	0.07	7.120	A
East	799.34	199.84	798.71	598.59	22.00	0.00	2176.81	2164.59	0.367	0.44	0.60	2.701	A

Main results: (08:45-09:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	235.62	58.90	235.62	532.89	288.47	0.00	1984.16	1638.75	0.119	0.13	0.13	2.058	A
West	366.64	91.66	366.64	265.34	258.74	0.00	2005.66	996.52	0.183	0.23	0.23	2.294	A
South	35.23	8.81	35.23	39.64	585.74	0.00	913.10	0.00	0.039	0.07	0.07	7.122	A
East	799.34	199.84	799.34	598.95	22.02	0.00	2176.79	2164.59	0.367	0.60	0.60	2.703	A

Main results: (09:00-09:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	192.38	48.10	192.50	435.52	235.76	0.00	2022.27	1638.75	0.095	0.13	0.11	1.968	A
West	299.36	74.84	299.57	216.86	211.40	0.00	2039.88	996.52	0.147	0.23	0.18	2.163	A
South	28.77	7.19	28.83	32.39	478.58	0.00	969.56	0.00	0.030	0.07	0.05	6.649	A
East	652.66	163.16	653.28	489.41	18.00	0.00	2179.70	2164.59	0.299	0.60	0.44	2.442	A

Main results: (09:15-09:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	161.11	40.28	161.19	364.64	197.39	0.00	2050.01	1638.75	0.079	0.11	0.09	1.905	A
West	250.70	62.67	250.84	181.57	177.01	0.00	2064.74	996.52	0.121	0.18	0.14	2.073	A
South	24.09	6.02	24.13	27.12	400.73	0.00	1010.57	0.00	0.024	0.05	0.04	6.341	A
East	546.57	136.64	546.96	409.80	15.07	0.00	2181.81	2164.59	0.251	0.44	0.35	2.280	A

Queueing Delay Results for each time segment

Queueing Delay results: (08:00-08:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	1.26	0.08	1.904	A	A
West	2.13	0.14	2.073	A	A
South	0.61	0.04	6.334	A	A
East	5.09	0.34	2.273	A	A

Queueing Delay results: (08:15-08:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	1.56	0.10	1.966	A	A
West	2.66	0.18	2.160	A	A
South	0.78	0.05	6.643	A	A
East	6.53	0.44	2.438	A	A

Queueing Delay results: (08:30-08:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.00	0.13	2.058	A	A
West	3.46	0.23	2.294	A	A
South	1.02	0.07	7.120	A	A
East	8.83	0.59	2.701	A	A

Queueing Delay results: (08:45-09:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.02	0.13	2.058	A	A
West	3.50	0.23	2.294	A	A
South	1.04	0.07	7.122	A	A

East	8.98	0.60	2.703	A	A

Queueing Delay results: (09:00-09:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	1.60	0.11	1.968	A	A
West	2.73	0.18	2.163	A	A
South	0.82	0.05	6.649	A	A
East	6.75	0.45	2.442	A	A

Queueing Delay results: (09:15-09:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	1.29	0.09	1.905	A	A
West	2.19	0.15	2.073	A	A
South	0.65	0.04	6.341	A	A
East	5.26	0.35	2.280	A	A

Queue Variation Results for each time segment

Queue Variation results: (08:00-08:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.09	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.14	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.04	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.34	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:15-08:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.10	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.18	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.05	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.44	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:30-08:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.13	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.23	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.07	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.60	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:45-09:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker

North	0.13	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.23	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.07	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.60	0.00	0.00	0.00	1.03			N/A	N/A

Queue Variation results: (09:00-09:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.11	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.18	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.05	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.44	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:15-09:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.09	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.14	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.04	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.35	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Erb Street & Waterloo Waste Road 2Costco Entrance.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Without Extension
Report generation date: 2019-07-31 4:18:40 PM

Summary of intersection performance

	PM					
	Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	Default - Existing					
Leg North	0.16	2.44	0.14	A	3.27	A
Leg West	0.33	2.38	0.25	A		
Leg South	0.06	6.12	0.04	A		
Leg East	1.22	3.71	0.55	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM " model duration: 4:00 PM - 5:30 PM
"D3 - Existing, Sat" model duration: 12:00 PM - 1:30 PM
"D4 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D7 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM
"D8 - Total 2031, PM" model duration: 4:00 PM - 5:30 PM
"D9 - Total 2031, Sat" model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 4:18:39 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-22
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Default - Existing, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Default	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Existing, PM	Existing	PM		ONE HOUR	16:00	17:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Erbsville Road/Ira-Needles Boulavard & Erb Street	Roundabout	North,West,South,East				3.27	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	(untitled)	
West	West	(untitled)	
South	South	(untitled)	
East	East	(untitled)	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	3.50	4.50	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.527	1221.701
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	214.00	100.000
West	ONE HOUR	✓	448.00	100.000
South	ONE HOUR	✓	34.00	100.000
East	ONE HOUR	✓	1084.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	10.000	0.000	204.000
	West	11.000	0.000	2.000	435.000
	South	1.000	4.000	0.000	29.000
	East	482.000	574.000	28.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.05	0.00	0.95
	West	0.02	0.00	0.00	0.97
	South	0.03	0.12	0.00	0.85
	East	0.44	0.53	0.03	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.000	1.000	1.000
	West	1.000	1.000	1.500	1.000
	South	1.000	1.250	1.000	1.410
	East	1.000	1.010	1.680	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	0.0	0.0	0.0
	West	0.0	0.0	50.0	0.0
	South	0.0	25.0	0.0	41.0
	East	0.0	1.0	68.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.14	2.44	0.16	~1	A	196.37	294.56	11.18	2.28	0.12	11.18	2.28
West	0.25	2.38	0.33	~1	A	411.09	616.64	22.93	2.23	0.25	22.94	2.23
South	0.04	6.12	0.06	~1	A	31.20	46.80	4.43	5.68	0.05	4.43	5.68
East	0.55	3.71	1.22	1.02	A	994.70	1492.05	78.94	3.17	0.88	78.94	3.17

Main Results for each time segment

Main results: (16:00-16:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	161.11	40.28	160.73	370.81	454.87	0.00	1863.86	1321.21	0.086	0.00	0.09	2.113	A
West	337.28	84.32	336.50	441.36	174.24	0.00	2066.74	1241.64	0.163	0.00	0.19	2.082	A
South	25.60	6.40	25.45	22.52	488.22	0.00	964.48	0.00	0.027	0.00	0.04	5.263	A
East	816.09	204.02	813.68	501.66	12.00	0.00	2184.03	2170.67	0.374	0.00	0.60	2.664	A

Main results: (16:15-16:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	192.38	48.10	192.28	443.71	544.31	0.00	1799.20	1321.21	0.107	0.09	0.12	2.240	A
West	402.74	100.69	402.54	528.14	208.45	0.00	2042.01	1241.64	0.197	0.19	0.25	2.199	A
South	30.57	7.64	30.53	26.95	584.04	0.00	913.99	0.00	0.033	0.04	0.05	5.593	A
East	974.49	243.62	973.65	600.19	14.37	0.00	2182.32	2170.67	0.447	0.60	0.81	3.025	A

Main results: (16:30-16:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	235.62	58.90	235.46	543.18	666.31	0.00	1711.00	1321.21	0.138	0.12	0.16	2.439	A

West	493.26	123.31	492.94	646.53	255.24	0.00	2008.18	1241.64	0.246	0.25	0.32	2.379	A
South	37.43	9.36	37.37	32.99	715.19	0.00	844.89	0.00	0.044	0.05	0.06	6.119	A
East	1193.51	298.38	1191.89	734.97	17.60	0.00	2179.99	2170.67	0.547	0.81	1.22	3.695	A

Main results: (16:45-17:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	235.62	58.90	235.62	543.89	667.21	0.00	1710.35	1321.21	0.138	0.16	0.16	2.440	A
West	493.26	123.31	493.25	647.39	255.44	0.00	2008.04	1241.64	0.246	0.32	0.33	2.379	A
South	37.43	9.36	37.43	33.03	715.66	0.00	844.65	0.00	0.044	0.06	0.06	6.121	A
East	1193.51	298.38	1193.48	735.48	17.62	0.00	2179.97	2170.67	0.547	1.22	1.22	3.706	A

Main results: (17:00-17:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	192.38	48.10	192.54	444.82	545.68	0.00	1798.21	1321.21	0.107	0.16	0.12	2.243	A
West	402.74	100.69	403.06	529.46	208.75	0.00	2041.79	1241.64	0.197	0.33	0.25	2.201	A
South	30.57	7.64	30.63	27.01	584.80	0.00	913.59	0.00	0.033	0.06	0.05	5.596	A
East	974.49	243.62	976.09	601.03	14.40	0.00	2182.30	2170.67	0.447	1.22	0.82	3.035	A

Main results: (17:15-17:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	161.11	40.28	161.21	372.30	456.71	0.00	1862.53	1321.21	0.087	0.12	0.09	2.115	A
West	337.28	84.32	337.48	443.14	174.78	0.00	2066.35	1241.64	0.163	0.25	0.20	2.085	A
South	25.60	6.40	25.64	22.61	489.65	0.00	963.72	0.00	0.027	0.05	0.04	5.269	A
East	816.09	204.02	816.95	503.23	12.06	0.00	2183.99	2170.67	0.374	0.82	0.61	2.676	A

Queueing Delay Results for each time segment

Queueing Delay results: (16:00-16:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	1.40	0.09	2.113	A	A
West	2.88	0.19	2.082	A	A
South	0.54	0.04	5.263	A	A
East	8.87	0.59	2.664	A	A

Queueing Delay results: (16:15-16:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	1.77	0.12	2.240	A	A
West	3.64	0.24	2.199	A	A
South	0.70	0.05	5.593	A	A
East	12.01	0.80	3.025	A	A

Queueing Delay results: (16:30-16:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.36	0.16	2.439	A	A
West	4.82	0.32	2.379	A	A
South	0.93	0.06	6.119	A	A
East	17.83	1.19	3.695	A	A

Queueing Delay results: (16:45-17:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.39	0.16	2.440	A	A
West	4.88	0.33	2.379	A	A
South	0.95	0.06	6.121	A	A

East	18.32	1.22	3.706	A	A

Queueing Delay results: (17:00-17:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	1.82	0.12	2.243	A	A
West	3.74	0.25	2.201	A	A
South	0.73	0.05	5.596	A	A
East	12.62	0.84	3.035	A	A

Queueing Delay results: (17:15-17:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	1.44	0.10	2.115	A	A
West	2.97	0.20	2.085	A	A
South	0.57	0.04	5.269	A	A
East	9.28	0.62	2.676	A	A

Queue Variation Results for each time segment

Queue Variation results: (16:00-16:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.09	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.19	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.04	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.60	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:15-16:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.12	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.25	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.05	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.81	0.00	0.00	0.00	1.02			N/A	N/A

Queue Variation results: (16:30-16:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.16	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.32	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.22	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:45-17:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
						Percentiles could not be calculated. This may			

North	0.16	~1	~1	~1	~1	be because the mean queue is very small or very big.		N/A	N/A
West	0.33	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.22	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:00-17:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.12	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.25	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.05	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.82	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:15-17:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.09	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.20	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.04	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.61	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Erb Street & Waterloo Waste Road 2Costco Entrance.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Without Extension
Report generation date: 2019-07-31 4:19:04 PM

Summary of intersection performance

	Sat					
	Queue (PCE)	**Delay (s)**	**V/C Ratio**	**LOS**	**Intersection Delay (s)**	**Intersection LOS**
	Default - Existing					
Leg North	0.48	2.91	0.33	A	3.34	A
Leg West	0.48	3.03	0.32	A		
Leg South	0.03	8.26	0.02	A		
Leg East	1.20	3.64	0.55	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - Existing, Sat " model duration: 12:00 PM - 1:30 PM
"D4 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D7 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM
"D8 - Total 2031, PM" model duration: 4:00 PM - 5:30 PM
"D9 - Total 2031, Sat" model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 4:19:03 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-22
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Default - Existing, Sat

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Default	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Existing, Sat	Existing	Sat		ONE HOUR	12:00	13:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Erbsville Road/Ira-Needles Boulavard & Erb Street	Roundabout	North,West,South,East				3.34	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	(untitled)	
West	West	(untitled)	
South	South	(untitled)	
East	East	(untitled)	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	3.50	4.50	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.527	1221.701
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	544.00	100.000
West	ONE HOUR	✓	519.00	100.000
South	ONE HOUR	✓	13.00	100.000
East	ONE HOUR	✓	1082.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	24.000	1.000	519.000
	West	5.000	0.000	1.000	513.000
	South	3.000	5.000	0.000	5.000
	East	641.000	432.000	9.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.04	0.00	0.95
	West	0.01	0.00	0.00	0.99
	South	0.23	0.38	0.00	0.38
	East	0.59	0.40	0.01	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.000	1.000	1.000
	West	1.000	1.000	1.000	1.010
	South	1.000	1.400	1.000	1.800
	East	1.000	1.000	1.670	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	0.0	0.0	0.0
	West	0.0	0.0	0.0	1.0
	South	0.0	40.0	0.0	80.0
	East	0.0	0.0	67.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.33	2.91	0.48	1.00	A	499.18	748.78	32.68	2.62	0.36	32.69	2.62
West	0.32	3.03	0.48	1.01	A	476.24	714.37	32.29	2.71	0.36	32.29	2.71
South	0.02	8.26	0.03	~1	A	11.93	17.89	2.15	7.22	0.02	2.15	7.22
East	0.55	3.64	1.20	1.00	A	992.86	1489.29	77.54	3.12	0.86	77.55	3.12

Main Results for each time segment

Main results: (12:00-12:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	409.55	102.39	408.49	487.17	334.78	0.00	1950.68	1548.89	0.210	0.00	0.26	2.333	A
West	390.73	97.68	389.69	346.04	397.23	0.00	1905.54	1109.21	0.205	0.00	0.26	2.397	A
South	9.79	2.45	9.72	8.26	778.66	0.00	811.46	0.00	0.012	0.00	0.02	6.243	A
East	814.59	203.65	812.21	778.64	9.74	0.00	2185.67	2184.98	0.373	0.00	0.59	2.625	A

Main results: (12:15-12:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	489.04	122.26	488.73	582.94	400.60	0.00	1903.10	1548.89	0.257	0.26	0.34	2.545	A
West	466.57	116.64	466.25	414.08	475.25	0.00	1849.13	1109.21	0.252	0.26	0.34	2.629	A
South	11.69	2.92	11.66	9.88	931.62	0.00	730.87	0.00	0.016	0.02	0.02	6.959	A
East	972.70	243.17	971.87	931.61	11.67	0.00	2184.27	2184.98	0.445	0.59	0.80	2.978	A

Main results: (12:30-12:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	598.96	149.74	598.41	713.61	490.40	0.00	1838.18	1548.89	0.326	0.34	0.48	2.902	A

West	571.43	142.86	570.87	506.90	581.90	0.00	1772.02	1109.21	0.322	0.34	0.48	3.025	A
South	14.31	3.58	14.27	12.10	1140.68	0.00	620.72	0.00	0.023	0.02	0.03	8.254	A
East	1191.30	297.83	1189.73	1140.67	14.28	0.00	2182.38	2184.98	0.546	0.80	1.20	3.632	A

Main results: (12:45-13:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	598.96	149.74	598.95	714.55	491.05	0.00	1837.71	1548.89	0.326	0.48	0.48	2.905	A
West	571.43	142.86	571.42	507.56	582.43	0.00	1771.64	1109.21	0.323	0.48	0.48	3.028	A
South	14.31	3.58	14.31	12.11	1141.75	0.00	620.16	0.00	0.023	0.03	0.03	8.262	A
East	1191.30	297.83	1191.28	1141.75	14.31	0.00	2182.36	2184.98	0.546	1.20	1.20	3.643	A

Main results: (13:00-13:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	489.04	122.26	489.58	584.38	401.60	0.00	1902.38	1548.89	0.257	0.48	0.35	2.550	A
West	466.57	116.64	467.12	415.09	476.09	0.00	1848.52	1109.21	0.252	0.48	0.34	2.634	A
South	11.69	2.92	11.73	9.90	933.31	0.00	729.98	0.00	0.016	0.03	0.02	6.971	A
East	972.70	243.17	974.26	933.32	11.72	0.00	2184.24	2184.98	0.445	1.20	0.81	2.990	A

Main results: (13:15-13:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	409.55	102.39	409.87	489.11	336.13	0.00	1949.71	1548.89	0.210	0.35	0.27	2.339	A
West	390.73	97.68	391.05	347.43	398.57	0.00	1904.56	1109.21	0.205	0.34	0.26	2.404	A
South	9.79	2.45	9.81	8.29	781.34	0.00	810.05	0.00	0.012	0.02	0.02	6.254	A
East	814.59	203.65	815.43	781.34	9.80	0.00	2185.62	2184.98	0.373	0.81	0.60	2.639	A

Queueing Delay Results for each time segment

Queueing Delay results: (12:00-12:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	3.91	0.26	2.333	A	A
West	3.83	0.26	2.397	A	A
South	0.25	0.02	6.243	A	A
East	8.73	0.58	2.625	A	A

Queueing Delay results: (12:15-12:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	5.11	0.34	2.545	A	A
West	5.03	0.34	2.629	A	A
South	0.33	0.02	6.959	A	A
East	11.81	0.79	2.978	A	A

Queueing Delay results: (12:30-12:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	7.11	0.47	2.902	A	A
West	7.06	0.47	3.025	A	A
South	0.48	0.03	8.254	A	A
East	17.51	1.17	3.632	A	A

Queueing Delay results: (12:45-13:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	7.23	0.48	2.905	A	A
West	7.19	0.48	3.028	A	A
South	0.49	0.03	8.262	A	A

East	17.98	1.20	3.643	A	A

Queueing Delay results: (13:00-13:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	5.28	0.35	2.550	A	A
West	5.21	0.35	2.634	A	A
South	0.35	0.02	6.971	A	A
East	12.40	0.83	2.990	A	A

Queueing Delay results: (13:15-13:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	4.05	0.27	2.339	A	A
West	3.97	0.26	2.404	A	A
South	0.26	0.02	6.254	A	A
East	9.12	0.61	2.639	A	A

Queue Variation Results for each time segment

Queue Variation results: (12:00-12:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.26	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.26	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.02	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.59	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (12:15-12:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.34	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.34	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.02	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.80	0.00	0.00	0.00	1.00			N/A	N/A

Queue Variation results: (12:30-12:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.48	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.48	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.03	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.20	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (12:45-13:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.48	0.00	0.00	0.00	1.00			N/A	N/A

West	0.48	0.00	0.00	0.00	1.01			N/A	N/A
South	0.03	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.20	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (13:00-13:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.35	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.34	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.02	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.81	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (13:15-13:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.27	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.26	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.02	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.60	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Erbsville Road-Ira-Needles Boulavard & Erb Street.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Without Extension
Report generation date: 2019-07-31 4:15:33 PM

Summary of intersection performance

There are warnings associated with this model run - see the 'Data Errors and Warnings' tables.

	AM						
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	Default - Existing						
Leg North	1.29	1.03	4.77	0.56	A	27.13	D
Leg West	20.55	70.35	87.33	1.00	F		
Leg South	2.00	1.05	9.48	0.66	A		
Leg East	1.10	2.11	8.13	0.51	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM " model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - Existing, Sat" model duration: 12:00 PM - 1:30 PM
"D4 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D7 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM
"D8 - Total 2031, PM" model duration: 4:00 PM - 5:30 PM
"D9 - Total 2031, Sat" model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 4:15:32 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-22
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Default - Existing, AM

Data Errors and Warnings

Severity	Area	Item	Description
Last Run	Last Run	Leg North - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment(s).
Last Run	Last Run	Leg South - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment(s).
Last Run	Last Run	Leg East - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment(s).
Warning	Pedestrian Crossing	Leg West - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Default	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Existing, AM	Existing	AM		ONE HOUR	08:00	09:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Erbsville Road/Ira-Needles Boulavard & Erb Street	Roundabout	North,West,South,East				27.13	D

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	(untitled)	
West	West	(untitled)	
South	South	(untitled)	
East	East	(untitled)	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only

North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	7.00	8.00	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Bypass

Leg	Leg Has Bypass	Bypass Utilisation (%)
North	✓	100
West		
South	✓	100
East		

Pedestrian Crossings

Leg	Crossing Type
North	Unsignalled Pedestrian Crossing
West	Unsignalled Pedestrian Crossing
South	Unsignalled Pedestrian Crossing
East	Unsignalled Pedestrian Crossing

Unsignalled Pedestrian Crossing Crossings

Leg	Space between crossing and intersection entry (PCE)	Vehicles queueing on exit (PCE)	Central Refuge	Crossing Data Type	Crossing length (m)	Crossing time (s)	Crossing length (entry side) (m)	Crossing time (entry side) (s)	Crossing length (exit side) (m)	Crossing time (exit side) (s)
North	1.00	1.00	✓	Distance			9.00	6.43	9.00	6.43
West	1.00	1.00	✓	Distance			9.00	6.43	9.50	6.79
South	1.00	1.00	✓	Distance			8.50	6.07	8.25	5.89
East	1.00	1.00	✓	Distance			8.50	6.07	7.50	5.36

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.723	2192.710
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR		1007.00	100.000

		✓		
West	ONE HOUR	✓	768.00	100.000
South	ONE HOUR	✓	864.00	100.000
East	ONE HOUR	✓	446.00	100.000

Pedestrian Flows

General Flows Data

Leg	Profile Type	Average Pedestrian Flow (Ped/hr)
North	ONE HOUR	5.00
West	ONE HOUR	4.00
South	ONE HOUR	6.00
East	ONE HOUR	8.00

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	116.000	595.000	296.000
	West	271.000	0.000	206.000	291.000
	South	501.000	203.000	0.000	160.000
	East	106.000	150.000	190.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.12	0.59	0.29
	West	0.35	0.00	0.27	0.38
	South	0.58	0.23	0.00	0.19
	East	0.24	0.34	0.43	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.040	1.040	1.020
	West	1.040	1.000	1.110	1.020
	South	1.030	1.100	1.000	1.030
	East	1.060	1.070	1.040	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	4.0	4.0	2.0
	West	4.0	0.0	11.0	2.0
	South	3.0	10.0	0.0	3.0
	East	6.0	7.0	4.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C	Max Delay	Max Queue	Max 95th percentile	Max	Average Demand	Total Intersection	Total Queueing	Average Queueing	Rate Of Queueing	Inclusive Total Queueing Delay	Inclusive Average

	Ratio	(s)	(PCE)	Queue (PCE)	LOS	(PCE/hr)	Arrivals (PCE)	Delay (PCE-min)	Delay (s)	Delay (PCE-min/min)	(PCE-min)	Queueing Delay (s)
North	0.56	4.77	1.29	1.03	A	924.04	1226.40	78.88	3.86	0.88	78.89	3.86
West	1.00	87.33	20.55	70.35	F	704.73	1057.10	539.27	30.61	5.99	539.30	30.61
South	0.66	9.48	2.00	1.05	A	792.82	969.00	105.71	6.55	1.17	105.72	6.55
East	0.51	8.13	1.10	2.11	A	409.26	613.89	60.95	5.96	0.68	60.95	5.96

Main Results for each time segment

Main results: (08:00-08:15)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	758.12	670.79	167.70	87.33	0.00	668.54	657.51	406.95	3.76	1898.38	1536.53	0.353	0.00	0.56	3.019	A
West	578.19	578.19	144.55	0.00	87.33	574.21	264.55	810.94	0.00	1179.31	455.24	0.490	0.00	1.00	6.206	A
South	650.46	530.01	132.50	120.46	0.00	527.58	742.86	642.28	4.52	1438.51	1197.38	0.368	0.00	0.61	4.136	A
East	335.77	335.77	83.94	0.00	120.46	334.26	439.67	730.19	6.02	1269.18	737.58	0.265	0.00	0.38	4.054	A

Main results: (08:15-08:30)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	905.27	800.99	200.25	104.28	0.00	800.07	786.61	487.14	4.49	1840.38	1536.65	0.435	0.56	0.79	3.572	A
West	690.42	690.42	172.60	0.00	104.28	686.15	316.67	970.54	0.00	1029.68	454.76	0.671	1.00	2.06	10.868	B
South	776.72	632.88	158.22	143.84	0.00	631.48	888.79	767.90	5.39	1317.51	1197.03	0.480	0.61	0.96	5.495	A
East	400.94	400.94	100.24	0.00	143.84	400.15	525.78	873.60	7.19	1129.14	737.44	0.355	0.38	0.58	5.203	A

Main results: (08:30-08:45)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1108.73	981.01	245.25	127.72	0.00	979.04	946.39	595.24	5.51	1762.17	1536.82	0.557	0.79	1.28	4.739	A
West	845.58	845.58	211.40	0.00	127.72	797.14	386.89	1187.40	0.00	849.05	454.11	0.996	2.06	14.17	50.810	F
South	951.28	775.12	193.78	176.16	0.00	771.27	1075.97	908.57	6.61	1186.56	1196.55	0.653	0.96	1.92	9.010	A
East	491.06	491.06	122.76	0.00	176.16	489.09	627.29	1052.55	8.81	968.10	737.23	0.507	0.58	1.07	7.895	A

Main results: (08:45-09:00)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1108.73	981.01	245.25	127.72	0.00	980.97	957.43	597.67	5.51	1760.42	1536.82	0.557	1.28	1.29	4.772	A
West	845.58	845.58	211.40	0.00	127.72	820.07	388.53	1190.12	0.00	844.64	454.11	1.001	14.17	20.55	87.329	F
South	951.28	775.12	193.78	176.16	0.00	774.79	1084.19	925.99	6.61	1172.48	1196.55	0.661	1.92	2.00	9.483	A
East	491.06	491.06	122.76	0.00	176.16	490.94	636.62	1064.16	8.81	957.90	737.23	0.513	1.07	1.10	8.127	A

Main results: (09:00-09:15)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	905.27	800.99	200.25	104.28	0.00	802.94	818.19	490.71	4.49	1837.79	1536.65	0.436	1.29	0.80	3.603	A
West	690.42	690.42	172.60	0.00	104.28	763.33	319.08	974.57	0.00	1017.10	454.76	0.679	20.55	2.33	19.169	C
South	776.72	632.88	158.22	143.84	0.00	636.67	912.57	825.33	5.39	1269.00	1197.03	0.499	2.00	1.06	6.008	A
East	400.94	400.94	100.24	0.00	143.84	402.88	555.98	906.02	7.19	1097.82	737.44	0.365	1.10	0.61	5.477	A

Main results: (09:15-09:30)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	758.12	670.79	167.70	87.33	0.00	671.73	664.29	410.00	3.76	1896.18	1536.52	0.354	0.80	0.57	3.039	A
West	578.19	578.19	144.55	0.00	87.33	583.36	266.57	815.16	0.00	1174.34	455.24	0.492	2.33	1.03	6.452	A

South	650.46	530.01	132.50	120.46	0.00	531.75	748.48	650.05	4.52	1431.32	1197.38	0.370	1.06	0.62	4.208	A
East	335.77	335.77	83.94	0.00	120.46	336.68	444.20	737.60	6.02	1261.67	737.59	0.266	0.61	0.38	4.108	A

Queueing Delay Results for each time segment

Queueing Delay results: (08:00-08:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	8.24	0.55	3.019	A	A
West	14.30	0.95	6.206	A	A
South	8.86	0.59	4.136	A	A
East	5.52	0.37	4.054	A	A

Queueing Delay results: (08:15-08:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	11.63	0.78	3.572	A	A
West	28.87	1.92	10.868	B	B
South	13.96	0.93	5.495	A	A
East	8.42	0.56	5.203	A	A

Queueing Delay results: (08:30-08:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	18.66	1.24	4.739	A	A
West	143.92	9.59	50.810	F	D
South	27.17	1.81	9.010	A	A
East	15.33	1.02	7.895	A	A

Queueing Delay results: (08:45-09:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	19.33	1.29	4.772	A	A
West	263.23	17.55	87.329	F	F
South	29.67	1.98	9.483	A	A
East	16.30	1.09	8.127	A	A

Queueing Delay results: (09:00-09:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	12.35	0.82	3.603	A	A
West	72.72	4.85	19.169	C	B
South	16.49	1.10	6.008	A	A
East	9.48	0.63	5.477	A	A

Queueing Delay results: (09:15-09:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	8.68	0.58	3.039	A	A
West	16.22	1.08	6.452	A	A
South	9.56	0.64	4.208	A	A
East	5.90	0.39	4.108	A	A

Queue Variation Results for each time segment

Queue Variation results: (08:00-08:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.56	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	1.00	0.00	0.00	1.05	1.05			N/A	N/A
South	0.61	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.38	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:15-08:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.79	0.00	0.00	0.00	1.03			N/A	N/A
West	2.06	0.00	0.00	4.20	6.30			N/A	N/A
South	0.96	0.00	0.00	1.05	1.05			N/A	N/A
East	0.58	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:30-08:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.28	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	14.17	0.00	7.35	33.60	45.15			N/A	N/A
South	1.92	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.07	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:45-09:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.29	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	20.55	0.00	10.50	51.45	70.35			N/A	N/A
South	2.00	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.10	0.00	0.00	0.00	2.11			N/A	N/A

Queue Variation results: (09:00-09:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.80	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	2.33	0.00	0.00	3.15	7.35			N/A	N/A
South	1.06	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.61	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:15-09:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.57	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	1.03	0.00	0.00	0.00	1.05			N/A	N/A
South	0.62	0.00	0.00	0.00	1.05			N/A	N/A
East	0.38	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Erbsville Road-Ira-Needles Boulavard & Erb Street.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Without Extension
Report generation date: 2019-07-31 4:16:16 PM

Summary of intersection performance

There are warnings associated with this model run - see the 'Data Errors and Warnings' tables.

	PM						
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	Default - Existing						
Leg North	24.72	79.99	85.17	1.01	F	190.93	F
Leg West	140.28	200.94	583.47	1.34	F		
Leg South	2.42	3.06	8.38	0.71	A		
Leg East	40.64	90.82	153.08	1.07	F		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM " model duration: 4:00 PM - 5:30 PM
"D3 - Existing, Sat" model duration: 12:00 PM - 1:30 PM
"D4 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D7 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM
"D8 - Total 2031, PM" model duration: 4:00 PM - 5:30 PM
"D9 - Total 2031, Sat" model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 4:16:16 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-22
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Default - Existing, PM

Data Errors and Warnings

Severity	Area	Item	Description
Last Run	Last Run	Leg North - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment(s).
Last Run	Last Run	Leg West - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment(s).
Last Run	Last Run	Leg South - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment(s).
Last Run	Last Run	Leg East - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment(s).

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Default	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Existing, PM	Existing	PM		ONE HOUR	16:00	17:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Erbsville Road/Ira-Needles Boulavard & Erb Street	Roundabout	North,West,South,East				190.93	F

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	(untitled)	
West	West	(untitled)	
South	South	(untitled)	
East	East	(untitled)	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	7.00	8.00	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Bypass

Leg	Leg Has Bypass	Bypass Utilisation (%)
North	✓	100
West		
South	✓	100
East		

Pedestrian Crossings

Leg	Crossing Type
North	Unsignalled Pedestrian Crossing
West	Unsignalled Pedestrian Crossing
South	Unsignalled Pedestrian Crossing
East	Unsignalled Pedestrian Crossing

Unsignalled Pedestrian Crossing Crossings

Leg	Space between crossing and intersection entry (PCE)	Vehicles queueing on exit (PCE)	Central Refuge	Crossing Data Type	Crossing length (m)	Crossing time (s)	Crossing length (entry side) (m)	Crossing time (entry side) (s)	Crossing length (exit side) (m)	Crossing time (exit side) (s)
North	1.00	1.00	✓	Distance			9.00	6.43	9.00	6.43
West	1.00	1.00	✓	Distance			9.00	6.43	9.50	6.79
South	1.00	1.00	✓	Distance			8.50	6.07	8.25	5.89
East	1.00	1.00	✓	Distance			8.50	6.07	7.50	5.36

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.723	2192.710
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	1229.00	100.000
West	ONE HOUR	✓	918.00	100.000
South	ONE HOUR	✓	1096.00	100.000
East	ONE HOUR	✓	801.00	100.000

Pedestrian Flows

General Flows Data

Leg	Profile Type	Average Pedestrian Flow (Ped/hr)
North	ONE HOUR	8.00
West	ONE HOUR	15.00
South	ONE HOUR	16.00
East	ONE HOUR	14.00

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	299.000	795.000	135.000
	West	277.000	0.000	349.000	292.000
	South	615.000	339.000	0.000	142.000
	East	148.000	465.000	188.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.24	0.65	0.11
	West	0.30	0.00	0.38	0.32
	South	0.56	0.31	0.00	0.13
	East	0.18	0.58	0.23	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.020	1.030	1.000
	West	1.000	1.000	1.040	1.000
	South	1.010	1.040	1.000	1.060
	East	1.010	1.020	1.030	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	2.0	3.0	0.0
	West	0.0	0.0	4.0	0.0
	South	1.0	4.0	0.0	6.0
	East	1.0	2.0	3.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	1.01	85.17	24.72	79.99	F	1127.75	1280.08	690.53	32.37	7.67	690.57	32.37
West	1.34	583.47	140.28	200.94	F	842.37	1263.56	5844.20	277.51	64.94	5993.35	284.59
South	0.71	8.38	2.42	3.06	A	1005.71	1313.11	140.57	6.42	1.56	140.60	6.42
East	1.07	153.08	40.64	90.82	F	735.01	1102.52	1045.93	56.92	11.62	1045.99	56.92

Main Results for each time segment

Main results: (16:00-16:15)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	925.26	700.15	175.04	225.10	0.00	695.34	777.63	741.78	6.02	1288.62	1040.87	0.543	0.00	1.20	6.175	A
West	691.12	691.12	172.78	0.00	225.10	683.52	601.35	835.77	11.29	1048.53	767.46	0.659	0.00	1.90	9.818	A
South	825.13	718.22	179.56	106.91	0.00	714.86	994.69	524.60	12.05	1583.64	1474.80	0.454	0.00	0.84	4.213	A
East	603.03	603.03	150.76	0.00	106.91	598.30	318.35	921.11	10.54	1113.98	561.57	0.541	0.00	1.18	7.062	A

Main results: (16:15-16:30)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1104.85	836.05	209.01	268.79	0.00	830.43	924.73	885.54	7.19	1150.59	1039.66	0.727	1.20	2.61	11.335	B
West	825.26	825.26	206.32	0.00	268.79	800.00	718.11	997.85	13.48	891.39	766.65	0.926	1.90	8.22	33.479	D
South	985.28	857.63	214.41	127.66	0.00	855.55	1181.44	616.41	14.38	1491.86	1474.57	0.575	0.84	1.36	5.755	A
East	720.08	720.08	180.02	0.00	127.66	713.32	375.01	1096.94	12.59	960.49	561.18	0.750	1.18	2.87	14.483	B

Main results: (16:30-16:45)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1353.15	1023.95	255.99	329.21	0.00	970.72	1053.24	1021.71	8.81	1024.52	1037.96	0.999	2.61	15.92	47.035	E
West	1010.74	1010.74	252.68	0.00	329.21	767.13	834.59	1157.83	16.52	770.84	765.53	1.311	8.22	69.12	195.065	F
South	1206.72	1050.37	262.59	156.34	0.00	1046.24	1308.57	616.40	17.62	1484.89	1474.22	0.707	1.36	2.39	8.295	A
East	881.92	881.92	220.48	0.00	156.34	797.24	384.92	1277.72	15.41	823.12	560.66	1.071	2.87	24.04	75.718	F

Main results: (16:45-17:00)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1353.15	1023.95	255.99	329.21	0.00	988.74	1055.77	1038.05	8.81	1011.04	1037.96	1.013	15.92	24.72	85.172	F
West	1010.74	1010.74	252.68	0.00	329.21	755.68	846.64	1180.15	16.52	755.99	765.53	1.337	69.12	132.88	481.343	F
South	1206.72	1050.37	262.59	156.34	0.00	1050.28	1323.91	611.92	17.62	1488.23	1474.22	0.706	2.39	2.42	8.383	A
East	881.92	881.92	220.48	0.00	156.34	815.52	383.90	1278.31	15.41	821.93	560.66	1.073	24.04	40.64	153.080	F

Main results: (17:00-17:15)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1104.85	836.05	209.01	268.79	0.00	916.10	955.78	1013.31	7.19	1042.01	1039.66	0.802	24.72	4.71	39.928	E
West	825.26	825.26	206.32	0.00	268.79	795.68	809.72	1119.69	13.48	796.57	766.65	1.036	132.88	140.28	583.470	F
South	985.28	857.63	214.41	127.66	0.00	861.58	1289.21	626.17	14.38	1479.50	1474.57	0.580	2.42	1.43	5.984	A
East	720.08	720.08	180.02	0.00	127.66	867.43	386.08	1101.67	12.59	945.67	561.18	0.761	40.64	3.81	74.688	F

Main results: (17:15-17:30)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	925.26	700.15	175.04	225.10	0.00	713.91	870.68	754.91	6.02	1276.19	1040.88	0.549	4.71	1.27	6.720	A
West	691.12	691.12	172.78	0.00	225.10	973.01	611.20	857.62	11.29	980.05	767.46	0.705	140.28	69.80	390.628	F
South	825.13	718.22	179.56	106.91	0.00	719.69	1123.91	706.73	12.05	1416.00	1474.80	0.507	1.43	1.06	5.288	A
East	603.03	603.03	150.76	0.00	106.91	612.31	413.13	1013.29	10.54	1025.80	561.57	0.588	3.81	1.49	9.074	A

Queueing Delay Results for each time segment

Queueing Delay results: (16:00-16:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	17.20	1.15	6.175	A	A
West	26.37	1.76	9.818	A	A
South	12.21	0.81	4.213	A	A
East	16.87	1.12	7.062	A	A

Queueing Delay results: (16:15-16:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	36.12	2.41	11.335	B	B
West	94.67	6.31	33.479	D	C
South	19.68	1.31	5.755	A	A
East	39.03	2.60	14.483	B	B

Queueing Delay results: (16:30-16:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	161.73	10.78	47.035	E	D
West	583.77	38.92	195.065	F	F
South	33.86	2.26	8.295	A	A
East	219.53	14.64	75.718	F	E

Queueing Delay results: (16:45-17:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	308.05	20.54	85.172	F	F
West	1515.10	101.01	481.343	F	F
South	36.10	2.41	8.383	A	A
East	486.72	32.45	153.080	F	F

Queueing Delay results: (17:00-17:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	146.69	9.78	39.928	E	D
West	2048.70	136.58	583.470	F	F
South	22.33	1.49	5.984	A	A
East	259.66	17.31	74.688	F	E

Queueing Delay results: (17:15-17:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	20.74	1.38	6.720	A	A
West	1575.59	105.04	390.628	F	F
South	16.39	1.09	5.288	A	A
East	24.11	1.61	9.074	A	A

Queue Variation Results for each time segment

Queue Variation results: (16:00-16:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.20	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	1.90	0.00	0.00	3.04	6.09			N/A	N/A
South	0.84	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.18	0.00	0.00	1.02	2.04			N/A	N/A

Queue Variation results: (16:15-16:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	2.61	0.00	0.00	5.13	9.23			N/A	N/A
West	8.22	0.00	2.03	21.31	30.45			N/A	N/A
South	1.36	0.00	0.00	2.04	3.06			N/A	N/A
East	2.87	0.00	0.00	6.12	10.20			N/A	N/A

Queue Variation results: (16:30-16:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	15.92	0.00	9.23	37.94	50.25			N/A	N/A
West	69.12	36.53	65.96	97.42	108.59			N/A	N/A
South	2.39	0.00	0.00	0.00	3.06			N/A	N/A
East	24.04	3.06	19.39	45.92	56.13			N/A	N/A

Queue Variation results: (16:45-17:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	24.72	0.00	14.36	59.48	79.99			N/A	N/A
West	132.88	85.25	129.90	172.52	186.73			N/A	N/A
South	2.42	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	40.64	8.16	33.68	75.51	90.82			N/A	N/A

Queue Variation results: (17:00-17:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	4.71	0.00	0.00	11.28	17.43			N/A	N/A
West	140.28	87.28	135.99	184.70	>199			N/A	N/A
South	1.43	0.00	0.00	2.04	3.06			N/A	N/A
East	3.81	0.00	0.00	7.14	14.29			N/A	N/A

Queue Variation results: (17:15-17:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.27	0.00	0.00	0.00	2.05			N/A	N/A
West	69.80	36.53	65.96	99.45	109.60			N/A	N/A
South	1.06	0.00	0.00	2.04	2.04			N/A	N/A
East	1.49	0.00	0.00	0.00	2.04			N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Erbsville Road-Ira-Needles Boulavard & Erb Street.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Without Extension
Report generation date: 2019-07-31 4:16:33 PM

Summary of intersection performance

There are warnings associated with this model run - see the 'Data Errors and Warnings' tables.

	Sat						
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	Default - Existing						
Leg North	15.10	58.48	63.72	0.97	F	219.00	F
Leg West	204.78	200.00	743.59	1.43	F		
Leg South	3.68	10.05	11.45	0.79	B		
Leg East	1.89	1.01	8.83	0.65	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - Existing, Sat " model duration: 12:00 PM - 1:30 PM
"D4 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D7 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM
"D8 - Total 2031, PM" model duration: 4:00 PM - 5:30 PM
"D9 - Total 2031, Sat" model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 4:16:32 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-22
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Default - Existing, Sat

Data Errors and Warnings

Severity	Area	Item	Description
Last Run	Last Run	Leg West - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment(s).
Last Run	Last Run	Leg South - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment(s).
Last Run	Last Run	Leg East - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment(s).
Warning	Pedestrian Crossing	Leg North - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Default	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Existing, Sat	Existing	Sat		ONE HOUR	12:00	13:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Erbsville Road/Ira-Needles Boulavard & Erb Street	Roundabout	North,West,South,East				219.00	F

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	(untitled)	
West	West	(untitled)	
South	South	(untitled)	
East	East	(untitled)	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	7.00	8.00	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Bypass

Leg	Leg Has Bypass	Bypass Utilisation (%)
North	✓	100
West		
South	✓	100
East		

Pedestrian Crossings

Leg	Crossing Type
North	Unsignalled Pedestrian Crossing
West	Unsignalled Pedestrian Crossing
South	Unsignalled Pedestrian Crossing
East	Unsignalled Pedestrian Crossing

Unsignalled Pedestrian Crossing Crossings

Leg	Space between crossing and intersection entry (PCE)	Vehicles queueing on exit (PCE)	Central Refuge	Crossing Data Type	Crossing length (m)	Crossing time (s)	Crossing length (entry side) (m)	Crossing time (entry side) (s)	Crossing length (exit side) (m)	Crossing time (exit side) (s)
North	1.00	1.00	✓	Distance			9.00	6.43	9.00	6.43
West	1.00	1.00	✓	Distance			9.00	6.43	9.50	6.79
South	1.00	1.00	✓	Distance			8.50	6.07	8.25	5.89
East	1.00	1.00	✓	Distance			8.50	6.07	7.50	5.36

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.723	2192.710
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	1030.00	100.000
West	ONE HOUR	✓	1074.00	100.000
South	ONE HOUR	✓	1226.00	100.000
East	ONE HOUR	✓	709.00	100.000

Pedestrian Flows

General Flows Data

Leg	Profile Type	Average Pedestrian Flow (Ped/hr)
North	ONE HOUR	4.00
West	ONE HOUR	26.00
South	ONE HOUR	10.00
East	ONE HOUR	9.00

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	227.000	666.000	137.000
	West	260.000	0.000	498.000	316.000
	South	577.000	499.000	0.000	150.000
	East	166.000	367.000	176.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.22	0.65	0.13
	West	0.24	0.00	0.46	0.29
	South	0.47	0.41	0.00	0.12
	East	0.23	0.52	0.25	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.000	1.010	1.000
	West	1.000	1.000	1.000	1.000
	South	1.010	1.000	1.000	1.020
	East	1.000	1.010	1.020	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	0.0	1.0	0.0
	West	0.0	0.0	0.0	0.0
	South	1.0	0.0	0.0	2.0
	East	0.0	1.0	2.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.97	63.72	15.10	58.48	F	945.15	1105.27	427.11	23.19	4.75	427.13	23.19
West	1.43	743.59	204.78	200.00	F	985.52	1478.28	8898.86	361.18	98.88	9518.55	386.34
South	0.79	11.45	3.68	10.05	B	1125.00	1481.03	196.93	7.98	2.19	196.97	7.98
East	0.65	8.83	1.89	1.01	A	650.59	975.89	100.06	6.15	1.11	100.07	6.15

Main Results for each time segment

Main results: (12:00-12:15)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	775.44	604.54	151.14	170.90	0.00	600.77	749.78	780.75	0.00	1243.21	703.75	0.486	0.00	0.94	5.618	A
West	808.56	808.56	202.14	0.00	170.90	798.16	648.82	732.70	19.57	1105.02	903.92	0.732	0.00	2.60	11.378	B
South	923.00	810.07	202.52	112.93	0.00	805.83	1000.30	530.56	7.53	1569.84	1495.06	0.516	0.00	1.06	4.712	A
East	533.77	533.77	133.44	0.00	112.93	531.49	337.34	999.05	6.78	1470.30	953.62	0.363	0.00	0.57	3.864	A

Main results: (12:15-12:30)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	925.95	721.88	180.47	204.07	0.00	718.11	886.45	934.27	0.00	1096.79	701.02	0.658	0.94	1.88	9.492	A
West	965.50	965.50	241.38	0.00	204.07	910.71	776.39	876.00	23.37	958.08	904.55	1.008	2.60	16.30	50.828	F
South	1102.15	967.30	241.83	134.85	0.00	964.23	1175.76	610.94	8.99	1488.25	1494.79	0.650	1.06	1.83	6.865	A
East	637.38	637.38	159.34	0.00	134.85	636.02	390.47	1184.70	8.09	1336.07	953.69	0.477	0.57	0.91	5.186	A

Main results: (12:30-12:45)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1134.05	884.12	221.03	249.93	0.00	846.35	1016.52	1141.07	0.00	914.73	697.23	0.967	1.88	11.33	40.460	E
West	1182.50	1182.50	295.62	0.00	249.93	839.22	948.23	1039.19	28.63	840.62	905.40	1.407	16.30	102.12	265.833	F
South	1349.85	1184.70	296.17	165.15	0.00	1177.59	1283.93	594.48	11.01	1497.14	1494.40	0.791	1.83	3.61	11.080	B
East	780.62	780.62	195.16	0.00	165.15	776.85	391.32	1380.75	9.91	1194.33	953.79	0.654	0.91	1.86	8.633	A

Main results: (12:45-13:00)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1134.05	884.12	221.03	249.93	0.00	869.05	1017.66	1147.02	0.00	909.81	697.23	0.972	11.33	15.10	63.718	F
West	1182.50	1182.50	295.62	0.00	249.93	825.33	953.27	1062.80	28.63	825.46	905.40	1.433	102.12	191.41	621.249	F
South	1349.85	1184.70	296.17	165.15	0.00	1184.39	1297.22	590.90	11.01	1499.46	1494.40	0.790	3.61	3.68	11.452	B
East	780.62	780.62	195.16	0.00	165.15	780.49	391.10	1384.19	9.91	1191.84	953.79	0.655	1.86	1.89	8.833	A

Main results: (13:00-13:15)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	925.95	721.88	180.47	204.07	0.00	774.05	893.33	942.85	0.00	1088.96	701.02	0.663	15.10	2.05	13.408	B
West	965.50	965.50	241.38	0.00	204.07	912.02	783.69	933.21	23.37	912.38	904.55	1.058	191.41	204.78	743.592	F
South	1102.15	967.30	241.83	134.85	0.00	974.23	1224.04	621.19	8.99	1476.32	1494.79	0.655	3.68	1.95	7.306	A
East	637.38	637.38	159.34	0.00	134.85	641.16	400.40	1195.01	8.09	1328.62	953.69	0.480	1.89	0.94	5.319	A

Main results: (13:15-13:30)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	775.44	604.54	151.14	170.90	0.00	608.86	812.85	786.70	0.00	1237.39	703.75	0.489	2.05	0.98	5.813	A
West	808.56	808.56	202.14	0.00	170.90	1039.99	653.87	741.69	19.57	1045.07	903.92	0.774	204.78	146.93	609.577	F
South	923.00	810.07	202.52	112.93	0.00	812.69	1120.04	661.64	7.53	1446.81	1495.06	0.560	1.95	1.30	5.730	A
East	533.77	533.77	133.44	0.00	112.93	535.10	409.87	1064.46	6.78	1423.02	953.62	0.375	0.94	0.61	4.101	A

Queueing Delay Results for each time segment

Queueing Delay results: (12:00-12:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	13.58	0.91	5.618	A	A
West	35.34	2.36	11.378	B	B
South	15.33	1.02	4.712	A	A
East	8.35	0.56	3.864	A	A

Queueing Delay results: (12:15-12:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	26.58	1.77	9.492	A	A
West	163.22	10.88	50.828	F	D
South	26.17	1.74	6.865	A	A
East	13.28	0.89	5.186	A	A

Queueing Delay results: (12:30-12:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	121.41	8.09	40.460	E	D
West	889.49	59.30	265.833	F	F
South	49.57	3.30	11.080	B	B
East	26.26	1.75	8.633	A	A

Queueing Delay results: (12:45-13:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	200.80	13.39	63.718	F	E
West	2201.53	146.77	621.249	F	F
South	54.78	3.65	11.452	B	B
East	28.14	1.88	8.833	A	A

Queueing Delay results: (13:00-13:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	49.51	3.30	13.408	B	B
West	2971.47	198.10	743.592	F	F
South	30.93	2.06	7.306	A	A
East	14.65	0.98	5.319	A	A

Queueing Delay results: (13:15-13:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	15.23	1.02	5.813	A	A
West	2637.81	175.85	609.577	F	F
South	20.16	1.34	5.730	A	A
East	9.38	0.63	4.101	A	A

Queue Variation Results for each time segment

Queue Variation results: (12:00-12:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.94	0.00	0.00	0.00	1.01			N/A	N/A
West	2.60	0.00	0.00	1.00	6.00			N/A	N/A
South	1.06	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.57	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (12:15-12:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.88	0.00	0.00	4.03	6.05			N/A	N/A
West	16.30	0.00	8.00	41.00	56.00			N/A	N/A
South	1.83	0.00	0.00	4.02	6.03			N/A	N/A
East	0.91	0.00	0.00	1.01	1.01			N/A	N/A

Queue Variation results: (12:30-12:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	11.33	0.00	4.03	29.24	40.33			N/A	N/A
West	102.12	58.00	98.00	140.00	153.00			N/A	N/A
South	3.61	0.00	0.00	2.01	10.05			N/A	N/A
East	1.86	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (12:45-13:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	15.10	0.00	3.02	40.33	58.48			N/A	N/A
West	191.41	134.00	188.00	>199	>199			N/A	N/A
South	3.68	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.89	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (13:00-13:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	2.05	0.00	0.00	3.02	7.06			N/A	N/A
West	204.78	139.00	>199	>199	>199			N/A	N/A
South	1.95	0.00	0.00	4.02	6.03			N/A	N/A
East	0.94	0.00	0.00	1.01	1.01			N/A	N/A

Queue Variation results: (13:15-13:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.98	0.00	0.00	0.00	2.02			N/A	N/A
West	146.93	82.00	142.00	>199	>199			N/A	N/A
South	1.30	0.00	0.00	2.01	4.02			N/A	N/A
East	0.61	0.00	0.00	0.00	1.01			N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Ira-Needles Boulavard & The BoardwalkThorndale Drive.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Without Extension
Report generation date: 2019-07-31 4:10:42 PM

Summary of intersection performance

	AM					
	Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	Default - Existing					
Leg North	1.14	3.75	0.52	A	3.64	A
Leg West	0.08	2.98	0.07	A		
Leg South	0.71	3.02	0.41	A		
Leg East	0.30	6.21	0.23	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM " model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - Existing, Sat" model duration: 12:00 PM - 1:30 PM
"D4 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D7 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM
"D8 - Total 2031, PM" model duration: 4:00 PM - 5:30 PM
"D9 - Total 2031, Sat" model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 4:10:41 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-22
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Default - Existing, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Pedestrian Crossing	Leg North - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg West - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg South - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Default	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Existing, AM	Existing	AM		ONE HOUR	08:00	09:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Ira Needles Boulevard & The BoardwalkThorndale Drive	Roundabout	North,West,South,East				3.64	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Ira Needles Boulevard	
West	West	The Boardwalk	
South	South	Ira Needles Boulevard	
East	East	Thorndale Drive	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	7.00	8.00	30.00	20.00	55.00	25.00	
East	3.50	4.50	30.00	20.00	55.00	25.00	

Pedestrian Crossings

Leg	Crossing Type
North	Unsignalled Pedestrian Crossing
West	Unsignalled Pedestrian Crossing
South	Unsignalled Pedestrian Crossing
East	Unsignalled Pedestrian Crossing

Unsignalled Pedestrian Crossing Crossings

Leg	Space between crossing and intersection entry (PCE)	Vehicles queueing on exit (PCE)	Central Refuge	Crossing Data Type	Crossing length (m)	Crossing time (s)	Crossing length (entry side) (m)	Crossing time (entry side) (s)	Crossing length (exit side) (m)	Crossing time (exit side) (s)
North	1.00	1.00	✓	Distance			8.00	5.71	8.00	5.71
West	1.00	1.00	✓	Distance			7.50	5.36	6.50	4.64
South	1.00	1.00	✓	Distance			7.75	5.54	8.00	5.71
East	1.00	1.00	✓	Distance			5.50	3.93	5.25	3.75

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.723	2192.710
East		(calculated)	(calculated)	0.527	1221.701

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	1000.00	100.000

West	ONE HOUR	✓	89.00	100.000
South	ONE HOUR	✓	766.00	100.000
East	ONE HOUR	✓	161.00	100.000

Pedestrian Flows

General Flows Data

Leg	Profile Type	Average Pedestrian Flow (Ped/hr)
North	ONE HOUR	3.00
West	ONE HOUR	2.00
South	ONE HOUR	2.00
East	ONE HOUR	5.00

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	109.000	855.000	36.000
	West	71.000	0.000	2.000	16.000
	South	719.000	2.000	0.000	45.000
	East	68.000	21.000	72.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.11	0.86	0.04
	West	0.80	0.00	0.02	0.18
	South	0.94	0.00	0.00	0.06
	East	0.42	0.13	0.45	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.040	1.060	1.110
	West	1.130	1.000	1.000	1.000
	South	1.040	1.000	1.000	1.020
	East	1.010	1.000	1.010	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	4.0	6.0	11.0
	West	13.0	0.0	0.0	0.0
	South	4.0	0.0	0.0	2.0
	East	1.0	0.0	1.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.52	3.75	1.14	?	A	917.62	1376.43	74.23	3.24	0.82	74.23	3.24
West	0.07	2.98	0.08	~1	A	81.67	122.50	5.57	2.73	0.06	5.57	2.73
South	0.41	3.02	0.71	1.04	A	702.89	1054.34	47.75	2.72	0.53	47.75	2.72
East	0.23	6.21	0.30	~1	A	147.74	221.60	19.89	5.39	0.22	19.89	5.39

Main Results for each time segment

Main results: (08:00-08:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	752.85	188.21	750.57	644.09	71.16	0.00	2141.27	2131.63	0.352	0.00	0.57	2.738	A
West	67.00	16.75	66.82	99.04	722.68	0.00	1670.25	774.57	0.040	0.00	0.05	2.471	A
South	576.68	144.17	575.14	697.16	92.34	0.00	2119.36	1526.07	0.272	0.00	0.39	2.419	A
East	121.21	30.30	120.59	72.82	594.66	3.76	908.38	139.35	0.133	0.00	0.15	4.609	A

Main results: (08:15-08:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	898.98	224.74	898.19	770.76	85.28	0.00	2131.06	2131.61	0.422	0.57	0.77	3.092	A
West	80.01	20.00	79.96	118.55	864.92	0.00	1567.41	774.57	0.051	0.05	0.06	2.664	A
South	688.62	172.15	688.15	834.38	110.49	0.00	2103.83	1525.99	0.327	0.39	0.50	2.641	A
East	144.74	36.18	144.53	87.14	711.51	4.49	846.81	139.40	0.171	0.15	0.21	5.169	A

Main results: (08:30-08:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1101.02	275.26	1099.54	943.69	104.37	0.00	2117.25	2131.59	0.520	0.77	1.14	3.743	A
West	97.99	24.50	97.90	145.12	1058.79	0.00	1427.26	774.56	0.069	0.06	0.08	2.981	A
South	843.38	210.85	842.58	1021.41	135.29	0.00	2082.13	1525.88	0.405	0.50	0.70	3.015	A
East	177.26	44.32	176.88	106.68	871.19	5.51	762.68	139.45	0.232	0.21	0.30	6.194	A

Main results: (08:45-09:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1101.02	275.26	1101.00	944.67	104.59	0.00	2117.09	2131.59	0.520	1.14	1.14	3.752	A
West	97.99	24.50	97.99	145.33	1060.26	0.00	1426.19	774.56	0.069	0.08	0.08	2.983	A
South	843.38	210.85	843.37	1022.83	135.42	0.00	2082.00	1525.88	0.405	0.70	0.71	3.018	A
East	177.26	44.32	177.26	106.80	872.00	5.51	762.25	139.45	0.233	0.30	0.30	6.206	A

Main results: (09:00-09:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	898.98	224.74	900.44	772.30	85.62	0.00	2130.81	2131.61	0.422	1.14	0.78	3.105	A
West	80.01	20.00	80.10	118.88	867.19	0.00	1565.78	774.57	0.051	0.08	0.06	2.669	A
South	688.62	172.15	689.41	836.57	110.71	0.00	2103.64	1525.99	0.327	0.71	0.51	2.645	A
East	144.74	36.18	145.11	87.32	712.80	4.49	846.13	139.40	0.171	0.30	0.21	5.184	A

Main results: (09:15-09:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	752.85	188.21	753.65	646.52	71.64	0.00	2140.91	2131.63	0.352	0.78	0.58	2.750	A
West	67.00	16.75	67.06	99.49	725.81	0.00	1667.99	774.57	0.040	0.06	0.05	2.477	A

South	576.68	144.17	577.16	700.18	92.68	0.00	2119.07	1526.07	0.272	0.51	0.39	2.427	A
East	121.21	30.30	121.42	73.09	596.75	3.76	907.28	139.35	0.134	0.21	0.16	4.621	A

Queueing Delay Results for each time segment

Queueing Delay results: (08:00-08:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	8.41	0.56	2.738	A	A
West	0.68	0.05	2.471	A	A
South	5.71	0.38	2.419	A	A
East	2.26	0.15	4.609	A	A

Queueing Delay results: (08:15-08:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	11.33	0.76	3.092	A	A
West	0.88	0.06	2.664	A	A
South	7.45	0.50	2.641	A	A
East	3.04	0.20	5.169	A	A

Queueing Delay results: (08:30-08:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	16.67	1.11	3.743	A	A
West	1.20	0.08	2.981	A	A
South	10.37	0.69	3.015	A	A
East	4.43	0.30	6.194	A	A

Queueing Delay results: (08:45-09:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	17.12	1.14	3.752	A	A
West	1.22	0.08	2.983	A	A
South	10.57	0.70	3.018	A	A
East	4.56	0.30	6.206	A	A

Queueing Delay results: (09:00-09:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	11.90	0.79	3.105	A	A
West	0.90	0.06	2.669	A	A
South	7.73	0.52	2.645	A	A
East	3.21	0.21	5.184	A	A

Queueing Delay results: (09:15-09:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	8.79	0.59	2.750	A	A
West	0.70	0.05	2.477	A	A
South	5.92	0.39	2.427	A	A
East	2.39	0.16	4.621	A	A

Queue Variation Results for each time segment

Queue Variation results: (08:00-08:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.57	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.05	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.39	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.15	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:15-08:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.77	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.50	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.21	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:30-08:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.14	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.08	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.70	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.30	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:45-09:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.14	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.08	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.71	0.00	0.00	0.00	1.04			N/A	N/A
East	0.30	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:00-09:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.78	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.51	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.21	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:15-09:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.58	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or		N/A	N/A

						very big.			
West	0.05	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.39	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.16	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Ira-Needles Boulavard & The BoardwalkThorndale Drive.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Without Extension
Report generation date: 2019-07-31 4:12:44 PM

Summary of intersection performance

	PM					
	Queue (PCE)	**Delay (s)**	**V/C Ratio**	**LOS**	**Intersection Delay (s)**	**Intersection LOS**
	Default - Existing					
Leg North	2.35	5.79	0.70	A	5.15	A
Leg West	0.28	4.01	0.21	A		
Leg South	1.16	4.14	0.53	A		
Leg East	0.31	7.67	0.24	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM " model duration: 4:00 PM - 5:30 PM
"D3 - Existing, Sat" model duration: 12:00 PM - 1:30 PM
"D4 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D7 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM
"D8 - Total 2031, PM" model duration: 4:00 PM - 5:30 PM
"D9 - Total 2031, Sat" model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 4:12:44 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-22
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Default - Existing, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Pedestrian Crossing	Leg North - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg West - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg South - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Default	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Existing, PM	Existing	PM		ONE HOUR	16:00	17:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Ira Needles Boulevard & The BoardwalkThorndale Drive	Roundabout	North,West,South,East				5.15	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Ira Needles Boulevard	
West	West	The Boardwalk	
South	South	Ira Needles Boulevard	
East	East	Thorndale Drive	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	7.00	8.00	30.00	20.00	55.00	25.00	
East	3.50	4.50	30.00	20.00	55.00	25.00	

Pedestrian Crossings

Leg	Crossing Type
North	Unsignalled Pedestrian Crossing
West	Unsignalled Pedestrian Crossing
South	Unsignalled Pedestrian Crossing
East	Unsignalled Pedestrian Crossing

Unsignalled Pedestrian Crossing Crossings

Leg	Space between crossing and intersection entry (PCE)	Vehicles queueing on exit (PCE)	Central Refuge	Crossing Data Type	Crossing length (m)	Crossing time (s)	Crossing length (entry side) (m)	Crossing time (entry side) (s)	Crossing length (exit side) (m)	Crossing time (exit side) (s)
North	1.00	1.00	✓	Distance			8.00	5.71	8.00	5.71
West	1.00	1.00	✓	Distance			7.50	5.36	6.50	4.64
South	1.00	1.00	✓	Distance			7.75	5.54	8.00	5.71
East	1.00	1.00	✓	Distance			5.50	3.93	5.25	3.75

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.723	2192.710
East		(calculated)	(calculated)	0.527	1221.701

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	1342.00	100.000

West	ONE HOUR	✓	231.00	100.000
South	ONE HOUR	✓	918.00	100.000
East	ONE HOUR	✓	134.00	100.000

Pedestrian Flows

General Flows Data

Leg	Profile Type	Average Pedestrian Flow (Ped/hr)
North	ONE HOUR	3.00
West	ONE HOUR	4.00
South	ONE HOUR	3.00
East	ONE HOUR	6.00

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	129.000	1128.000	85.000
	West	186.000	0.000	7.000	38.000
	South	841.000	10.000	0.000	67.000
	East	54.000	30.000	50.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.10	0.84	0.06
	West	0.81	0.00	0.03	0.16
	South	0.92	0.01	0.00	0.07
	East	0.40	0.22	0.37	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.020	1.040	1.010
	West	1.050	1.000	1.000	1.000
	South	1.030	1.000	1.000	1.000
	East	1.000	1.030	1.000	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	2.0	4.0	1.0
	West	5.0	0.0	0.0	0.0
	South	3.0	0.0	0.0	0.0
	East	0.0	3.0	0.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.70	5.79	2.35	3.11	A	1231.44	1847.16	136.79	4.44	1.52	136.80	4.44
West	0.21	4.01	0.28	~1	A	211.97	317.95	18.01	3.40	0.20	18.01	3.40
South	0.53	4.14	1.16	?	A	842.37	1263.56	72.74	3.45	0.81	72.75	3.45
East	0.24	7.67	0.31	~1	A	122.96	184.44	19.45	6.33	0.22	19.45	6.33

Main Results for each time segment

Main results: (16:00-16:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1010.33	252.58	1006.66	811.20	67.39	0.00	2143.99	2104.14	0.471	0.00	0.92	3.268	A
West	173.91	43.48	173.37	126.73	947.33	0.00	1507.84	769.61	0.115	0.00	0.14	2.803	A
South	691.12	172.78	688.96	888.82	231.88	0.00	2002.78	1467.62	0.345	0.00	0.54	2.810	A
East	100.88	25.22	100.31	142.56	778.28	4.52	811.64	178.42	0.124	0.00	0.14	5.089	A

Main results: (16:15-16:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1206.43	301.61	1204.76	970.81	80.77	0.00	2134.32	2104.11	0.565	0.92	1.33	4.005	A
West	207.66	51.92	207.47	151.71	1133.82	0.00	1373.01	769.62	0.151	0.14	0.18	3.211	A
South	825.26	206.32	824.45	1063.80	277.49	0.00	1962.07	1467.48	0.421	0.54	0.74	3.250	A
East	120.46	30.12	120.24	170.61	931.33	5.39	731.00	178.48	0.165	0.14	0.20	5.932	A

Main results: (16:30-16:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1477.57	369.39	1473.58	1188.21	98.80	0.00	2121.28	2104.07	0.697	1.33	2.33	5.723	A
West	254.34	63.58	253.95	185.57	1386.82	0.00	1190.11	769.62	0.214	0.18	0.28	3.997	A
South	1010.74	252.68	1009.10	1301.18	339.59	0.00	1905.39	1467.29	0.530	0.74	1.15	4.119	A
East	147.54	36.88	147.08	208.76	1139.93	6.61	621.09	178.57	0.238	0.20	0.31	7.638	A

Main results: (16:45-17:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1477.57	369.39	1477.47	1190.17	99.09	0.00	2121.08	2104.07	0.697	2.33	2.35	5.793	A
West	254.34	63.58	254.33	186.06	1390.50	0.00	1187.45	769.62	0.214	0.28	0.28	4.011	A
South	1010.74	252.68	1010.71	1304.63	340.20	0.00	1904.80	1467.29	0.531	1.15	1.16	4.136	A
East	147.54	36.88	147.53	209.19	1141.73	6.61	620.15	178.57	0.238	0.31	0.31	7.666	A

Main results: (17:00-17:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1206.43	301.61	1210.40	973.77	81.19	0.00	2134.01	2104.11	0.565	2.35	1.36	4.056	A
West	207.66	51.92	208.05	152.43	1139.17	0.00	1369.15	769.62	0.152	0.28	0.19	3.226	A
South	825.26	206.32	826.88	1068.81	278.41	0.00	1961.22	1467.48	0.421	1.16	0.75	3.267	A
East	120.46	30.12	120.91	171.24	934.05	5.39	729.56	178.48	0.165	0.31	0.20	5.957	A

Main results: (17:15-17:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1010.33	252.58	1012.05	814.84	67.90	0.00	2143.62	2104.14	0.471	1.36	0.93	3.303	A
West	173.91	43.48	174.11	127.46	952.50	0.00	1504.10	769.61	0.116	0.19	0.14	2.814	A

South	691.12	172.78	691.95	893.67	232.94	0.00	2001.84	1467.62	0.345	0.75	0.54	2.827	A
East	100.88	25.22	101.11	143.24	781.64	4.52	809.86	178.42	0.125	0.20	0.14	5.115	A

Queueing Delay Results for each time segment

Queueing Delay results: (16:00-16:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	13.40	0.89	3.268	A	A
West	1.99	0.13	2.803	A	A
South	7.92	0.53	2.810	A	A
East	2.07	0.14	5.089	A	A

Queueing Delay results: (16:15-16:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	19.49	1.30	4.005	A	A
West	2.73	0.18	3.211	A	A
South	10.92	0.73	3.250	A	A
East	2.89	0.19	5.932	A	A

Queueing Delay results: (16:30-16:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	33.39	2.23	5.723	A	A
West	4.14	0.28	3.997	A	A
South	16.80	1.12	4.119	A	A
East	4.52	0.30	7.638	A	A

Queueing Delay results: (16:45-17:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	35.17	2.34	5.793	A	A
West	4.23	0.28	4.011	A	A
South	17.30	1.15	4.136	A	A
East	4.67	0.31	7.666	A	A

Queueing Delay results: (17:00-17:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	21.08	1.41	4.056	A	A
West	2.85	0.19	3.226	A	A
South	11.51	0.77	3.267	A	A
East	3.09	0.21	5.957	A	A

Queueing Delay results: (17:15-17:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	14.26	0.95	3.303	A	A
West	2.07	0.14	2.814	A	A
South	8.30	0.55	2.827	A	A
East	2.21	0.15	5.115	A	A

Queue Variation Results for each time segment

Queue Variation results: (16:00-16:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.92	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.14	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.54	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.14	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:15-16:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.33	0.00	0.00	2.07	3.11			N/A	N/A
West	0.18	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.74	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.20	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:30-16:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	2.33	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.28	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.15	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.31	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:45-17:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	2.35	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.28	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.16	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.31	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:00-17:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.36	0.00	0.00	2.07	2.07			N/A	N/A
West	0.19	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.75	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.20	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:15-17:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.93	0.00	0.00	1.04	2.07			N/A	N/A
West	0.14	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

South	0.54	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.14	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Ira-Needles Boulavard & The BoardwalkThorndale Drive.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Without Extension
Report generation date: 2019-07-31 4:14:07 PM

Summary of intersection performance

	Sat					
	Queue (PCE)	**Delay (s)**	**V/C Ratio**	**LOS**	**Intersection Delay (s)**	**Intersection LOS**
	Default - Existing					
Leg North	2.75	6.38	0.73	A	5.47	A
Leg West	0.35	4.15	0.26	A		
Leg South	1.27	4.23	0.56	A		
Leg East	0.25	8.34	0.20	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - Existing, Sat " model duration: 12:00 PM - 1:30 PM
"D4 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D7 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM
"D8 - Total 2031, PM" model duration: 4:00 PM - 5:30 PM
"D9 - Total 2031, Sat" model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 4:14:06 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-22
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Default - Existing, Sat

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Pedestrian Crossing	Leg North - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg West - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg South - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg East - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Default	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Existing, Sat	Existing	Sat		ONE HOUR	12:00	13:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Ira Needles Boulevard & The BoardwalkThorndale Drive	Roundabout	North,West,South,East				5.47	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Ira Needles Boulevard	
West	West	The Boardwalk	
South	South	Ira Needles Boulevard	
East	East	Thorndale Drive	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	7.00	8.00	30.00	20.00	55.00	25.00	
East	3.50	4.50	30.00	20.00	55.00	25.00	

Pedestrian Crossings

Leg	Crossing Type
North	Unsignalled Pedestrian Crossing
West	Unsignalled Pedestrian Crossing
South	Unsignalled Pedestrian Crossing
East	Unsignalled Pedestrian Crossing

Unsignalled Pedestrian Crossing Crossings

Leg	Space between crossing and intersection entry (PCE)	Vehicles queueing on exit (PCE)	Central Refuge	Crossing Data Type	Crossing length (m)	Crossing time (s)	Crossing length (entry side) (m)	Crossing time (entry side) (s)	Crossing length (exit side) (m)	Crossing time (exit side) (s)
North	1.00	1.00	✓	Distance			8.00	5.71	8.00	5.71
West	1.00	1.00	✓	Distance			7.50	5.36	6.50	4.64
South	1.00	1.00	✓	Distance			7.75	5.54	8.00	5.71
East	1.00	1.00	✓	Distance			5.50	3.93	5.25	3.75

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.723	2192.710
East		(calculated)	(calculated)	0.527	1221.701

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	1429.00	100.000
West	ONE HOUR	✓	276.00	100.000
South	ONE HOUR	✓	990.00	100.000
East	ONE HOUR	✓	100.00	100.000

Pedestrian Flows

General Flows Data

Leg	Profile Type	Average Pedestrian Flow (Ped/hr)
North	ONE HOUR	2.00
West	ONE HOUR	3.00
South	ONE HOUR	0.00
East	ONE HOUR	0.00

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	201.000	1187.000	41.000
	West	228.000	0.000	11.000	37.000
	South	941.000	3.000	0.000	46.000
	East	39.000	23.000	38.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.14	0.83	0.03
	West	0.83	0.00	0.04	0.13
	South	0.95	0.00	0.00	0.05
	East	0.39	0.23	0.38	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.000	1.010	1.000
	West	1.020	1.000	1.000	1.000
	South	1.010	1.000	1.000	1.000
	East	1.000	1.000	1.000	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	0.0	1.0	0.0
	West	2.0	0.0	0.0	0.0
	South	1.0	0.0	0.0	0.0
	East	0.0	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.73	6.38	2.75	4.03	A	1311.28	1966.91	154.84	4.72	1.72	154.85	4.72
West	0.26	4.15	0.35	~1	A	253.26	379.89	21.98	3.47	0.24	21.98	3.47
South	0.56	4.23	1.27	1.01	A	908.44	1362.66	79.61	3.51	0.88	79.61	3.51
East	0.20	8.34	0.25	~1	A	91.76	137.64	15.44	6.73	0.17	15.45	6.73

Main Results for each time segment

Main results: (12:00-12:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1075.83	268.96	1071.85	906.52	47.91	0.00	2158.08	2158.14	0.499	0.00	0.99	3.329	A
West	207.79	51.95	207.14	170.23	949.52	0.00	1506.25	832.55	0.138	0.00	0.16	2.815	A
South	745.32	186.33	742.99	927.03	229.64	0.00	2026.69	1570.04	0.368	0.00	0.58	2.826	A
East	75.29	18.82	74.85	93.04	879.58	0.00	758.29	70.59	0.099	0.00	0.11	5.264	A

Main results: (12:15-12:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1284.64	321.16	1282.71	1084.84	57.42	0.00	2151.20	2158.14	0.597	0.99	1.48	4.170	A
West	248.12	62.03	247.87	203.75	1136.38	0.00	1371.17	832.55	0.181	0.16	0.22	3.257	A
South	889.99	222.50	889.09	1109.46	274.80	0.00	1994.05	1570.04	0.446	0.58	0.81	3.285	A
East	89.90	22.47	89.72	111.34	1052.55	0.00	667.16	70.59	0.135	0.11	0.15	6.233	A

Main results: (12:30-12:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1573.36	393.34	1568.39	1327.73	70.22	0.00	2141.94	2158.14	0.735	1.48	2.72	6.273	A
West	303.88	75.97	303.39	249.14	1389.48	0.00	1188.19	832.55	0.256	0.22	0.35	4.134	A
South	1090.01	272.50	1088.18	1356.57	336.30	0.00	1949.59	1570.04	0.559	0.81	1.27	4.211	A
East	110.10	27.53	109.71	136.23	1288.24	0.00	542.98	70.59	0.203	0.15	0.25	8.301	A

Main results: (12:45-13:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1573.36	393.34	1573.22	1330.00	70.46	0.00	2141.77	2158.14	0.735	2.72	2.75	6.380	A
West	303.88	75.97	303.87	249.91	1393.77	0.00	1185.08	832.55	0.256	0.35	0.35	4.152	A
South	1090.01	272.50	1089.98	1360.74	336.90	0.00	1949.15	1570.04	0.559	1.27	1.27	4.229	A
East	110.10	27.53	110.09	136.52	1290.36	0.00	541.86	70.59	0.203	0.25	0.25	8.337	A

Main results: (13:00-13:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1284.64	321.16	1289.61	1088.25	57.77	0.00	2150.94	2158.14	0.597	2.75	1.51	4.239	A
West	248.12	62.03	248.61	204.86	1142.52	0.00	1366.72	832.55	0.182	0.35	0.23	3.273	A
South	889.99	222.50	891.81	1115.43	275.70	0.00	1993.39	1570.04	0.446	1.27	0.82	3.303	A
East	89.90	22.47	90.28	111.77	1055.74	0.00	665.47	70.59	0.135	0.25	0.16	6.264	A

Main results: (13:15-13:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1075.83	268.96	1077.84	910.60	48.30	0.00	2157.79	2158.14	0.499	1.51	1.01	3.369	A

West	207.79	51.95	208.04	171.23	954.91	0.00	1502.36	832.55	0.138	0.23	0.16	2.827	A
South	745.32	186.33	746.24	932.27	230.67	0.00	2025.95	1570.04	0.368	0.82	0.59	2.843	A
East	75.29	18.82	75.47	93.49	883.42	0.00	756.26	70.59	0.100	0.16	0.11	5.290	A

Queueing Delay Results for each time segment

Queueing Delay results: (12:00-12:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	14.51	0.97	3.329	A	A
West	2.39	0.16	2.815	A	A
South	8.58	0.57	2.826	A	A
East	1.60	0.11	5.264	A	A

Queueing Delay results: (12:15-12:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	21.55	1.44	4.170	A	A
West	3.31	0.22	3.257	A	A
South	11.90	0.79	3.285	A	A
East	2.27	0.15	6.233	A	A

Queueing Delay results: (12:30-12:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	38.66	2.58	6.273	A	A
West	5.11	0.34	4.134	A	A
South	18.48	1.23	4.211	A	A
East	3.66	0.24	8.301	A	A

Queueing Delay results: (12:45-13:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	41.12	2.74	6.380	A	A
West	5.23	0.35	4.152	A	A
South	19.07	1.27	4.229	A	A
East	3.79	0.25	8.337	A	A

Queueing Delay results: (13:00-13:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	23.49	1.57	4.239	A	A
West	3.45	0.23	3.273	A	A
South	12.57	0.84	3.303	A	A
East	2.42	0.16	6.264	A	A

Queueing Delay results: (13:15-13:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	15.51	1.03	3.369	A	A
West	2.49	0.17	2.827	A	A
South	9.00	0.60	2.843	A	A
East	1.70	0.11	5.290	A	A

Queue Variation Results for each time segment

Queue Variation results: (12:00-12:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.99	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
						Percentiles could not be calculated. This may			

West	0.16	~1	~1	~1	~1	be because the mean queue is very small or very big.		N/A	N/A
South	0.58	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.11	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (12:15-12:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.48	0.00	0.00	3.02	4.03			N/A	N/A
West	0.22	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.81	0.00	0.00	1.01	1.01			N/A	N/A
East	0.15	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (12:30-12:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	2.72	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.35	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.27	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.25	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (12:45-13:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	2.75	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.35	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.27	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.25	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (13:00-13:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.51	0.00	0.00	2.02	3.02			N/A	N/A
West	0.23	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.82	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.16	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (13:15-13:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.01	0.00	0.00	1.01	2.02			N/A	N/A
West	0.16	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

South	0.59	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.11	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Ira-Needles Boulavard & University Avenue West.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Without Extension
Report generation date: 2019-07-31 4:09:00 PM

Summary of intersection performance

There are warnings associated with this model run - see the 'Data Errors and Warnings' tables.

	AM					
	Queue (PCE)	**Delay (s)**	**V/C Ratio**	**LOS**	**Intersection Delay (s)**	**Intersection LOS**
	Default - Existing					
Leg North	1.18	4.31	0.53	A	17.64	C
Leg West	0.14	6.00	0.10	A		
Leg South	11.96	33.02	0.94	D		
Leg East	0.52	3.61	0.33	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM " model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - Existing, Sat" model duration: 12:00 PM - 1:30 PM
"D4 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D7 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM
"D8 - Total 2031, PM" model duration: 4:00 PM - 5:30 PM
"D9 - Total 2031, Sat" model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 4:08:59 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-22
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Default - Existing, AM

Data Errors and Warnings

Severity	Area	Item	Description
Last Run	Last Run	Leg South - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment (s).
Last Run	Last Run	Leg East - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment (s).
Warning	Pedestrian Crossing	Leg North - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg West - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Default	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Existing, AM	Existing	AM		ONE HOUR	08:00	09:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Ira-Needles Boulavard & University Avenue West	Roundabout	North,West,South,East				17.64	C

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Ira Needles Boulevard	
West	West	University Avenue West	
South	South	Ira Needles Boulevard	
East	East	University Avenue West	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	7.00	8.00	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Pedestrian Crossings

Leg	Crossing Type
North	Unsignalled Pedestrian Crossing
West	Unsignalled Pedestrian Crossing
South	Unsignalled Pedestrian Crossing
East	Unsignalled Pedestrian Crossing

Unsignalled Pedestrian Crossing Crossings

Leg	Space between crossing and intersection entry (PCE)	Vehicles queueing on exit (PCE)	Central Refuge	Crossing Data Type	Crossing length (m)	Crossing time (s)	Crossing length (entry side) (m)	Crossing time (entry side) (s)	Crossing length (exit side) (m)	Crossing time (exit side) (s)
North	1.00	1.00	✓	Distance			7.50	5.36	7.50	5.36
West	1.00	1.00	✓	Distance			7.50	5.36	7.50	5.36
South	1.00	1.00	✓	Distance			7.50	5.36	7.50	5.36
East	1.00	1.00	✓	Distance			7.50	5.36	7.50	5.36

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.723	2192.710
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	898.00	100.000

West	ONE HOUR	✓	75.00	100.000
South	ONE HOUR	✓	1263.00	100.000
East	ONE HOUR	✓	470.00	100.000

Pedestrian Flows

General Flows Data

Leg	Profile Type	Average Pedestrian Flow (Ped/hr)
North	ONE HOUR	3.00
West	ONE HOUR	2.00
South	ONE HOUR	7.00
East	ONE HOUR	7.00

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	28.000	715.000	155.000
	West	15.000	0.000	15.000	45.000
	South	710.000	66.000	0.000	487.000
	East	111.000	76.000	283.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.03	0.80	0.17
	West	0.20	0.00	0.20	0.60
	South	0.56	0.05	0.00	0.39
	East	0.24	0.16	0.60	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.040	1.040	1.020
	West	1.470	1.000	1.330	1.090
	South	1.040	1.150	1.000	1.020
	East	1.070	1.070	1.040	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	4.0	4.0	2.0
	West	47.0	0.0	33.0	9.0
	South	4.0	15.0	0.0	2.0
	East	7.0	7.0	4.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.53	4.31	1.18	?	A	824.02	1236.03	73.71	3.58	0.82	73.71	3.58
West	0.10	6.00	0.14	~1	A	68.82	103.23	8.54	4.96	0.09	8.54	4.96
South	0.94	33.02	11.96	48.75	D	1158.95	1738.43	413.33	14.27	4.59	413.36	14.27
East	0.33	3.61	0.52	1.05	A	431.28	646.92	33.86	3.14	0.38	33.86	3.14

Main Results for each time segment

Main results: (08:00-08:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	676.06	169.02	673.89	626.07	318.88	0.00	1962.18	1275.68	0.345	0.00	0.54	2.891	A
West	56.46	14.12	56.22	127.47	865.30	0.00	1144.42	240.38	0.049	0.00	0.06	3.952	A
South	950.85	237.71	945.49	760.23	161.29	5.27	1677.52	1323.05	0.567	0.00	1.34	5.066	A
East	353.84	88.46	352.79	514.62	592.16	5.27	1764.45	1570.16	0.201	0.00	0.26	2.681	A

Main results: (08:15-08:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	807.28	201.82	806.45	748.85	381.55	0.00	1916.87	1275.61	0.421	0.54	0.75	3.359	A
West	67.42	16.86	67.32	152.50	1035.51	0.00	990.48	239.91	0.068	0.06	0.09	4.659	A
South	1135.41	283.85	1130.79	909.77	193.06	6.29	1593.81	1322.72	0.712	1.34	2.49	7.985	A
East	422.52	105.63	422.16	615.62	708.24	6.29	1680.51	1570.34	0.251	0.26	0.35	3.009	A

Main results: (08:30-08:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	988.72	247.18	987.03	903.12	465.85	0.00	1855.92	1275.49	0.533	0.75	1.17	4.287	A
West	82.58	20.64	82.38	185.42	1267.46	0.00	800.43	239.25	0.103	0.09	0.14	5.989	A
South	1390.59	347.65	1360.10	1113.57	236.27	7.71	1489.84	1322.28	0.933	2.49	10.12	24.532	C
East	517.48	129.37	516.84	744.24	852.14	7.71	1576.43	1570.55	0.328	0.35	0.51	3.571	A

Main results: (08:45-09:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	988.72	247.18	988.69	916.31	467.53	0.00	1854.71	1275.49	0.533	1.17	1.18	4.308	A
West	82.58	20.64	82.57	186.78	1269.44	0.00	798.92	239.25	0.103	0.14	0.14	6.004	A
South	1390.59	347.65	1383.23	1115.30	236.71	7.71	1484.00	1322.28	0.937	10.12	11.96	33.024	D
East	517.48	129.37	517.46	753.56	866.39	7.71	1566.13	1570.55	0.330	0.51	0.52	3.609	A

Main results: (09:00-09:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	807.28	201.82	808.95	772.50	384.48	0.00	1914.75	1275.61	0.422	1.18	0.76	3.378	A
West	67.42	16.86	67.62	154.91	1038.52	0.00	987.88	239.91	0.068	0.14	0.09	4.676	A
South	1135.41	283.85	1172.35	912.41	193.73	6.29	1582.99	1322.72	0.717	11.96	2.72	9.871	A
East	422.52	105.63	423.15	632.25	733.83	6.29	1662.01	1570.34	0.254	0.52	0.36	3.059	A

Main results: (09:15-09:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	676.06	169.02	676.91	632.50	320.53	0.00	1960.98	1275.69	0.345	0.76	0.55	2.907	A
West	56.46	14.12	56.57	128.35	869.09	0.00	1140.86	240.38	0.049	0.09	0.06	3.967	A

South	950.85	237.71	956.21	763.56	162.09	5.27	1673.88	1323.04	0.568	2.72	1.38	5.243	A
East	353.84	88.46	354.22	519.48	598.82	5.27	1759.65	1570.17	0.201	0.36	0.27	2.696	A

Queueing Delay Results for each time segment

Queueing Delay results: (08:00-08:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	7.97	0.53	2.891	A	A
West	0.91	0.06	3.952	A	A
South	19.27	1.28	5.066	A	A
East	3.88	0.26	2.681	A	A

Queueing Delay results: (08:15-08:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	11.04	0.74	3.359	A	A
West	1.28	0.09	4.659	A	A
South	35.25	2.35	7.985	A	A
East	5.20	0.35	3.009	A	A

Queueing Delay results: (08:30-08:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	17.08	1.14	4.287	A	A
West	2.00	0.13	5.989	A	A
South	118.75	7.92	24.532	C	C
East	7.53	0.50	3.571	A	A

Queueing Delay results: (08:45-09:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	17.62	1.17	4.308	A	A
West	2.05	0.14	6.004	A	A
South	167.63	11.18	33.024	D	C
East	7.73	0.52	3.609	A	A

Queueing Delay results: (09:00-09:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	11.66	0.78	3.378	A	A
West	1.35	0.09	4.676	A	A
South	50.87	3.39	9.871	A	A
East	5.49	0.37	3.059	A	A

Queueing Delay results: (09:15-09:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	8.36	0.56	2.907	A	A
West	0.95	0.06	3.967	A	A
South	21.57	1.44	5.243	A	A
East	4.04	0.27	2.696	A	A

Queue Variation Results for each time segment

Queue Variation results: (08:00-08:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.54	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or		N/A	N/A

						very big.			
South	1.34	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.26	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:15-08:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.75	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.09	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	2.49	0.00	0.00	5.19	8.30			N/A	N/A
East	0.35	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:30-08:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.17	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.14	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	10.12	0.00	0.00	24.90	40.46			N/A	N/A
East	0.51	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:45-09:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.18	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.14	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	11.96	0.00	0.00	25.93	48.75			N/A	N/A
East	0.52	0.00	0.00	0.00	1.05			N/A	N/A

Queue Variation results: (09:00-09:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.76	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.09	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	2.72	0.00	0.00	5.19	9.34			N/A	N/A
East	0.36	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:15-09:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.55	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.38	0.00	0.00	1.04	4.15			N/A	N/A
East	0.27	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or		N/A	N/A

						very big.				

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Ira-Needles Boulavard & University Avenue West.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Without Extension
Report generation date: 2019-07-31 4:09:48 PM

Summary of intersection performance

There are warnings associated with this model run - see the 'Data Errors and Warnings' tables.

	PM					
	Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	Default - Existing					
Leg North	19.87	52.90	0.98	F	31.17	D
Leg West	0.99	13.25	0.49	B		
Leg South	6.56	19.08	0.87	C		
Leg East	3.28	17.46	0.77	C		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM " model duration: 4:00 PM - 5:30 PM
"D3 - Existing, Sat" model duration: 12:00 PM - 1:30 PM
"D4 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D7 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM
"D8 - Total 2031, PM" model duration: 4:00 PM - 5:30 PM
"D9 - Total 2031, Sat" model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 4:09:47 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-22
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Default - Existing, PM

Data Errors and Warnings

Severity	Area	Item	Description
Last Run	Last Run	Leg North - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment (s).
Last Run	Last Run	Leg West - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment (s).
Last Run	Last Run	Leg South - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment (s).
Last Run	Last Run	Leg East - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment (s).

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Default	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Existing, PM	Existing	PM		ONE HOUR	16:00	17:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Ira-Needles Boulavard & University Avenue West	Roundabout	North,West,South,East				31.17	D

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Ira Needles Boulevard	
West	West	University Avenue West	
South	South	Ira Needles Boulevard	
East	East	University Avenue West	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	7.00	8.00	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Pedestrian Crossings

Leg	Crossing Type
North	Unsignalled Pedestrian Crossing
West	Unsignalled Pedestrian Crossing
South	Unsignalled Pedestrian Crossing
East	Unsignalled Pedestrian Crossing

Unsignalled Pedestrian Crossing Crossings

Leg	Space between crossing and intersection entry (PCE)	Vehicles queueing on exit (PCE)	Central Refuge	Crossing Data Type	Crossing length (m)	Crossing time (s)	Crossing length (entry side) (m)	Crossing time (entry side) (s)	Crossing length (exit side) (m)	Crossing time (exit side) (s)
North	1.00	1.00	✓	Distance			7.50	5.36	7.50	5.36
West	1.00	1.00	✓	Distance			7.50	5.36	7.50	5.36
South	1.00	1.00	✓	Distance			7.50	5.36	7.50	5.36
East	1.00	1.00	✓	Distance			7.50	5.36	7.50	5.36

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.723	2192.710
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	1265.00	100.000

West	ONE HOUR	✓	249.00	100.000
South	ONE HOUR	✓	1182.00	100.000
East	ONE HOUR	✓	638.00	100.000

Pedestrian Flows

General Flows Data

Leg	Profile Type	Average Pedestrian Flow (Ped/hr)
North	ONE HOUR	11.00
West	ONE HOUR	8.00
South	ONE HOUR	6.00
East	ONE HOUR	6.00

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	79.000	1022.000	164.000
	West	64.000	0.000	68.000	117.000
	South	758.000	132.000	0.000	292.000
	East	175.000	199.000	264.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.06	0.81	0.13
	West	0.26	0.00	0.27	0.47
	South	0.64	0.11	0.00	0.25
	East	0.27	0.31	0.41	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.010	1.030	1.010
	West	1.090	1.000	1.060	1.030
	South	1.020	1.080	1.000	1.000
	East	1.010	1.020	1.010	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	1.0	3.0	1.0
	West	9.0	0.0	6.0	3.0
	South	2.0	8.0	0.0	0.0
	East	1.0	2.0	1.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.98	52.90	19.87	79.01	F	1160.79	1741.18	579.06	19.95	6.43	579.10	19.96
West	0.49	13.25	0.99	2.11	B	228.49	342.73	49.86	8.73	0.55	49.87	8.73
South	0.87	19.08	6.56	22.47	C	1084.62	1626.94	271.27	10.00	3.01	271.29	10.01
East	0.77	17.46	3.28	9.12	C	585.44	878.16	143.58	9.81	1.60	143.59	9.81

Main Results for each time segment

Main results: (16:00-16:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	952.36	238.09	946.72	746.70	445.58	8.28	1636.36	1344.37	0.582	0.00	1.41	5.315	A
West	187.46	46.87	186.40	307.01	1085.29	6.02	928.42	523.73	0.202	0.00	0.26	5.101	A
South	889.87	222.47	885.32	1013.46	258.23	4.52	1679.59	1323.63	0.530	0.00	1.14	4.604	A
East	480.32	120.08	477.76	429.03	714.52	4.52	1234.11	828.67	0.389	0.00	0.64	4.805	A

Main results: (16:15-16:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1137.21	284.30	1131.76	893.41	533.16	9.89	1543.52	1344.35	0.737	1.41	2.77	8.854	A
West	223.85	55.96	223.16	367.28	1297.64	7.19	757.11	523.41	0.296	0.26	0.44	7.091	A
South	1062.59	265.65	1059.18	1211.86	308.94	5.39	1595.78	1323.35	0.666	1.14	1.99	6.808	A
East	573.55	143.39	571.68	513.24	854.88	5.39	1090.40	827.88	0.526	0.64	1.11	7.006	A

Main results: (16:30-16:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1392.79	348.20	1344.81	1084.72	647.61	12.11	1428.34	1344.33	0.975	2.77	14.77	33.308	D
West	274.15	68.54	272.20	444.17	1548.25	8.81	578.08	522.97	0.474	0.44	0.93	12.316	B
South	1301.41	325.35	1285.29	1448.23	372.21	6.61	1494.66	1322.95	0.871	1.99	6.02	16.432	C
East	702.45	175.61	694.60	619.76	1037.73	6.61	918.35	826.78	0.765	1.11	3.07	15.779	C

Main results: (16:45-17:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1392.79	348.20	1372.38	1096.04	654.25	12.11	1421.32	1344.33	0.980	14.77	19.87	52.904	F
West	274.15	68.54	273.90	449.64	1576.99	8.81	559.66	522.97	0.490	0.93	0.99	13.248	B
South	1301.41	325.35	1299.27	1473.87	377.02	6.61	1487.38	1322.95	0.875	6.02	6.56	19.080	C
East	702.45	175.61	701.59	627.59	1048.70	6.61	908.71	826.78	0.773	3.07	3.28	17.462	C

Main results: (17:00-17:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1137.21	284.30	1204.30	910.40	542.97	9.89	1531.43	1344.35	0.743	19.87	3.09	13.525	B
West	223.85	55.96	225.82	377.36	1369.91	7.19	704.57	523.41	0.318	0.99	0.50	7.951	A
South	1062.59	265.65	1080.22	1275.44	320.28	5.39	1579.41	1323.35	0.673	6.56	2.15	7.615	A
East	573.55	143.39	581.96	529.09	871.41	5.39	1074.42	827.88	0.534	3.28	1.18	7.527	A

Main results: (17:15-17:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	952.36	238.09	958.90	753.91	449.90	8.28	1631.60	1344.37	0.584	3.09	1.46	5.542	A
West	187.46	46.87	188.36	310.17	1098.63	6.02	917.19	523.74	0.204	0.50	0.27	5.209	A

South	889.87	222.47	893.79	1025.75	261.23	4.52	1674.81	1323.62	0.531	2.15	1.17	4.730	A
East	480.32	120.08	482.41	433.62	721.40	4.52	1226.85	828.65	0.392	1.18	0.66	4.912	A

Queueing Delay Results for each time segment

Queueing Delay results: (16:00-16:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	20.21	1.35	5.315	A	A
West	3.86	0.26	5.101	A	A
South	16.45	1.10	4.604	A	A
East	9.30	0.62	4.805	A	A

Queueing Delay results: (16:15-16:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	38.82	2.59	8.854	A	A
West	6.36	0.42	7.091	A	A
South	28.47	1.90	6.808	A	A
East	15.96	1.06	7.006	A	A

Queueing Delay results: (16:30-16:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	158.62	10.57	33.308	D	C
West	13.12	0.87	12.316	B	B
South	77.38	5.16	16.432	C	B
East	41.16	2.74	15.779	C	B

Queueing Delay results: (16:45-17:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	263.16	17.54	52.904	F	D
West	14.57	0.97	13.248	B	B
South	95.20	6.35	19.080	C	B
East	48.07	3.20	17.462	C	B

Queueing Delay results: (17:00-17:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	75.35	5.02	13.525	B	B
West	7.76	0.52	7.951	A	A
South	35.61	2.37	7.615	A	A
East	18.93	1.26	7.527	A	A

Queueing Delay results: (17:15-17:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	22.89	1.53	5.542	A	A
West	4.20	0.28	5.209	A	A
South	18.17	1.21	4.730	A	A
East	10.16	0.68	4.912	A	A

Queue Variation Results for each time segment

Queue Variation results: (16:00-16:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.41	0.00	0.00	1.03	2.05			N/A	N/A
West	0.26	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
						Percentiles could not be calculated. This may			

South	1.14	?	?	?	?	be because the mean queue is very small or very big.		N/A	N/A
East	0.64	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:15-16:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	2.77	0.00	0.00	6.16	9.23			N/A	N/A
West	0.44	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.99	0.00	0.00	4.09	6.13			N/A	N/A
East	1.11	0.00	0.00	2.03	3.04			N/A	N/A

Queue Variation results: (16:30-16:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	14.77	0.00	5.13	37.97	54.38			N/A	N/A
West	0.93	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	6.02	0.00	0.00	10.21	22.47			N/A	N/A
East	3.07	0.00	0.00	2.03	9.12			N/A	N/A

Queue Variation results: (16:45-17:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	19.87	0.00	5.13	53.36	79.01			N/A	N/A
West	0.99	0.00	0.00	0.00	2.11			N/A	N/A
South	6.56	0.00	0.00	5.11	20.43			N/A	N/A
East	3.28	0.00	0.00	1.01	8.10			N/A	N/A

Queue Variation results: (17:00-17:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	3.09	0.00	0.00	6.16	11.29			N/A	N/A
West	0.50	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	2.15	0.00	0.00	4.09	7.15			N/A	N/A
East	1.18	0.00	0.00	2.03	3.04			N/A	N/A

Queue Variation results: (17:15-17:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.46	0.00	0.00	0.00	3.08			N/A	N/A
West	0.27	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.17	0.00	0.00	1.02	3.06			N/A	N/A
East	0.66	0.00	0.00	0.00	1.01			N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Ira-Needles Boulavard & University Avenue West.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Without Extension
Report generation date: 2019-07-31 4:10:09 PM

Summary of intersection performance

There are warnings associated with this model run - see the 'Data Errors and Warnings' tables.

	Sat					
	Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	Default - Existing					
Leg North	2.40	6.93	0.71	A	7.56	A
Leg West	0.38	3.93	0.28	A		
Leg South	2.48	6.67	0.71	A		
Leg East	2.07	13.24	0.68	B		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - Existing, Sat " model duration: 12:00 PM - 1:30 PM
"D4 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D7 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM
"D8 - Total 2031, PM" model duration: 4:00 PM - 5:30 PM
"D9 - Total 2031, Sat" model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 4:10:09 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-22
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Default - Existing, Sat

Data Errors and Warnings

Severity	Area	Item	Description
Last Run	Last Run	Leg North - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment (s).
Warning	Pedestrian Crossing	Leg West - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg South - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg East - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Default	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Existing, Sat	Existing	Sat		ONE HOUR	12:00	13:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Ira-Needles Boulavard & University Avenue West	Roundabout	North,West,South,East				7.56	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Ira Needles Boulevard	
West	West	University Avenue West	
South	South	Ira Needles Boulevard	
East	East	University Avenue West	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	7.00	8.00	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Pedestrian Crossings

Leg	Crossing Type
North	Unsignalled Pedestrian Crossing
West	Unsignalled Pedestrian Crossing
South	Unsignalled Pedestrian Crossing
East	Unsignalled Pedestrian Crossing

Unsignalled Pedestrian Crossing Crossings

Leg	Space between crossing and intersection entry (PCE)	Vehicles queueing on exit (PCE)	Central Refuge	Crossing Data Type	Crossing length (m)	Crossing time (s)	Crossing length (entry side) (m)	Crossing time (entry side) (s)	Crossing length (exit side) (m)	Crossing time (exit side) (s)
North	1.00	1.00	✓	Distance			7.50	5.36	7.50	5.36
West	1.00	1.00	✓	Distance			7.50	5.36	7.50	5.36
South	1.00	1.00	✓	Distance			7.50	5.36	7.50	5.36
East	1.00	1.00	✓	Distance			7.50	5.36	7.50	5.36

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.723	2192.710
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	1149.00	100.000
West	ONE HOUR	✓	321.00	100.000
South	ONE HOUR	✓	1233.00	100.000
East	ONE HOUR	✓	523.00	100.000

Pedestrian Flows

General Flows Data

Leg	Profile Type	Average Pedestrian Flow (Ped/hr)
North	ONE HOUR	6.00
West	ONE HOUR	1.00
South	ONE HOUR	3.00
East	ONE HOUR	0.00

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	131.000	869.000	149.000
	West	96.000	0.000	106.000	119.000
	South	773.000	166.000	0.000	294.000
	East	182.000	217.000	124.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.11	0.76	0.13
	West	0.30	0.00	0.33	0.37
	South	0.63	0.13	0.00	0.24
	East	0.35	0.41	0.24	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.010	1.010	1.010
	West	1.010	1.000	1.020	1.020
	South	1.010	1.020	1.000	1.010
	East	1.010	1.010	1.020	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	1.0	1.0	1.0
	West	1.0	0.0	2.0	2.0
	South	1.0	2.0	0.0	1.0
	East	1.0	1.0	2.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.71	6.93	2.40	3.03	A	1054.34	1581.51	132.29	5.02	1.47	132.30	5.02
West	0.28	3.93	0.38	~1	A	294.56	441.83	24.52	3.33	0.27	24.52	3.33
South	0.71	6.67	2.48	4.05	A	1131.42	1697.13	138.19	4.89	1.54	138.20	4.89
East	0.68	13.24	2.07	3.04	B	479.91	719.87	99.27	8.27	1.10	99.27	8.27

Main Results for each time segment

Main results: (12:00-12:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	865.03	216.26	861.73	788.14	379.92	4.52	1917.93	1756.86	0.451	0.00	0.82	3.433	A
West	241.67	60.42	240.93	385.29	856.36	0.00	1573.60	964.19	0.154	0.00	0.18	2.746	A
South	928.27	232.07	924.77	824.18	273.12	0.00	1995.26	1561.12	0.465	0.00	0.87	3.390	A
East	393.74	98.44	391.75	421.57	776.32	0.00	1186.32	602.05	0.332	0.00	0.50	4.576	A

Main results: (12:15-12:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1032.93	258.23	1031.25	943.20	454.69	5.39	1863.84	1757.08	0.554	0.82	1.24	4.358	A
West	288.57	72.14	288.30	461.10	1024.84	0.00	1451.80	964.14	0.199	0.18	0.25	3.146	A
South	1108.44	277.11	1106.70	986.31	326.83	0.00	1956.43	1561.13	0.567	0.87	1.31	4.276	A
East	470.17	117.54	468.85	504.50	929.04	0.00	1037.18	601.55	0.453	0.50	0.83	6.399	A

Main results: (12:30-12:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1265.07	316.27	1260.57	1152.50	554.51	6.61	1791.62	1757.35	0.706	1.24	2.37	6.788	A
West	353.43	88.36	352.90	562.83	1252.26	0.00	1287.39	964.09	0.275	0.25	0.38	3.916	A
South	1357.56	339.39	1352.98	1205.32	399.84	0.00	1903.65	1561.13	0.713	1.31	2.45	6.556	A
East	575.83	143.96	571.10	616.90	1135.91	0.00	853.56	600.84	0.675	0.83	2.01	12.696	B

Main results: (12:45-13:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1265.07	316.27	1264.92	1157.01	558.04	6.61	1789.07	1757.35	0.707	2.37	2.40	6.932	A
West	353.43	88.36	353.42	565.79	1257.18	0.00	1283.84	964.09	0.275	0.38	0.38	3.934	A
South	1357.56	339.39	1357.43	1209.85	400.75	0.00	1902.99	1561.13	0.713	2.45	2.48	6.669	A
East	575.83	143.96	575.60	618.72	1139.46	0.00	850.25	600.84	0.677	2.01	2.07	13.240	B

Main results: (13:00-13:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1032.93	258.23	1037.45	949.55	459.57	5.39	1860.31	1757.08	0.555	2.40	1.27	4.443	A
West	288.57	72.14	289.09	465.22	1031.79	0.00	1446.78	964.14	0.199	0.38	0.25	3.165	A
South	1108.44	277.11	1113.03	992.72	328.16	0.00	1955.46	1561.13	0.567	2.48	1.34	4.344	A
East	470.17	117.54	475.02	507.10	934.09	0.00	1031.94	601.55	0.456	2.07	0.86	6.598	A

Main results: (13:15-13:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	865.03	216.26	866.78	792.95	382.85	4.52	1915.81	1756.86	0.452	1.27	0.84	3.473	A
West	241.67	60.42	241.94	387.99	861.64	0.00	1569.79	964.19	0.154	0.25	0.19	2.757	A

South	928.27	232.07	930.07	829.13	274.45	0.00	1994.30	1561.12	0.465	1.34	0.89	3.428	A
East	393.74	98.44	395.14	423.86	780.66	0.00	1181.75	602.05	0.333	0.86	0.51	4.642	A

Queueing Delay Results for each time segment

Queueing Delay results: (12:00-12:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	12.03	0.80	3.433	A	A
West	2.71	0.18	2.746	A	A
South	12.76	0.85	3.390	A	A
East	7.27	0.48	4.576	A	A

Queueing Delay results: (12:15-12:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	18.12	1.21	4.358	A	A
West	3.72	0.25	3.146	A	A
South	19.08	1.27	4.276	A	A
East	12.03	0.80	6.399	A	A

Queueing Delay results: (12:30-12:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	33.64	2.24	6.788	A	A
West	5.63	0.38	3.916	A	A
South	34.89	2.33	6.556	A	A
East	27.86	1.86	12.696	B	B

Queueing Delay results: (12:45-13:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	35.86	2.39	6.932	A	A
West	5.76	0.38	3.934	A	A
South	37.09	2.47	6.669	A	A
East	30.75	2.05	13.240	B	B

Queueing Delay results: (13:00-13:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	19.79	1.32	4.443	A	A
West	3.88	0.26	3.165	A	A
South	20.77	1.38	4.344	A	A
East	13.51	0.90	6.598	A	A

Queueing Delay results: (13:15-13:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	12.85	0.86	3.473	A	A
West	2.82	0.19	2.757	A	A
South	13.61	0.91	3.428	A	A
East	7.85	0.52	4.642	A	A

Queue Variation Results for each time segment

Queue Variation results: (12:00-12:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.82	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.18	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or		N/A	N/A

						very big.			
South	0.87	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.50	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (12:15-12:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.24	0.00	0.00	2.02	3.03			N/A	N/A
West	0.25	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.31	0.00	0.00	2.02	4.05			N/A	N/A
East	0.83	0.00	0.00	1.01	1.01			N/A	N/A

Queue Variation results: (12:30-12:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	2.37	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.38	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	2.45	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	2.01	0.00	0.00	0.00	3.04			N/A	N/A

Queue Variation results: (12:45-13:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	2.40	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.38	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	2.48	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	2.07	0.00	0.00	0.00	3.04			N/A	N/A

Queue Variation results: (13:00-13:15)

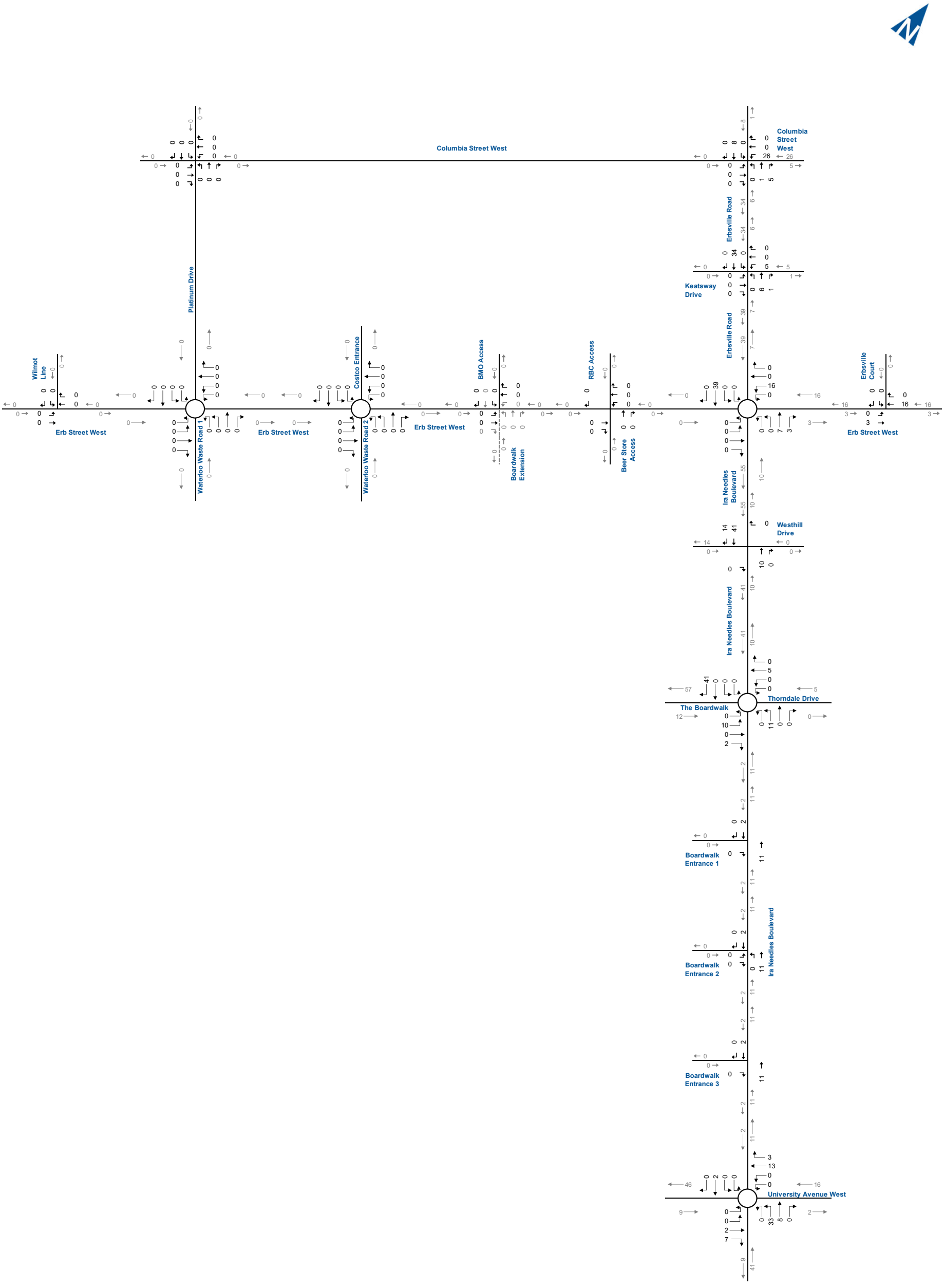
Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.27	0.00	0.00	2.02	2.02			N/A	N/A
West	0.25	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.34	0.00	0.00	2.02	3.03			N/A	N/A
East	0.86	0.00	0.00	1.01	1.01			N/A	N/A

Queue Variation results: (13:15-13:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.84	0.00	0.00	1.01	2.02			N/A	N/A
West	0.19	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.89	0.00	0.00	1.01	2.02			N/A	N/A
East	0.51	0.00	0.00	0.00	1.01			N/A	N/A

Appendix C

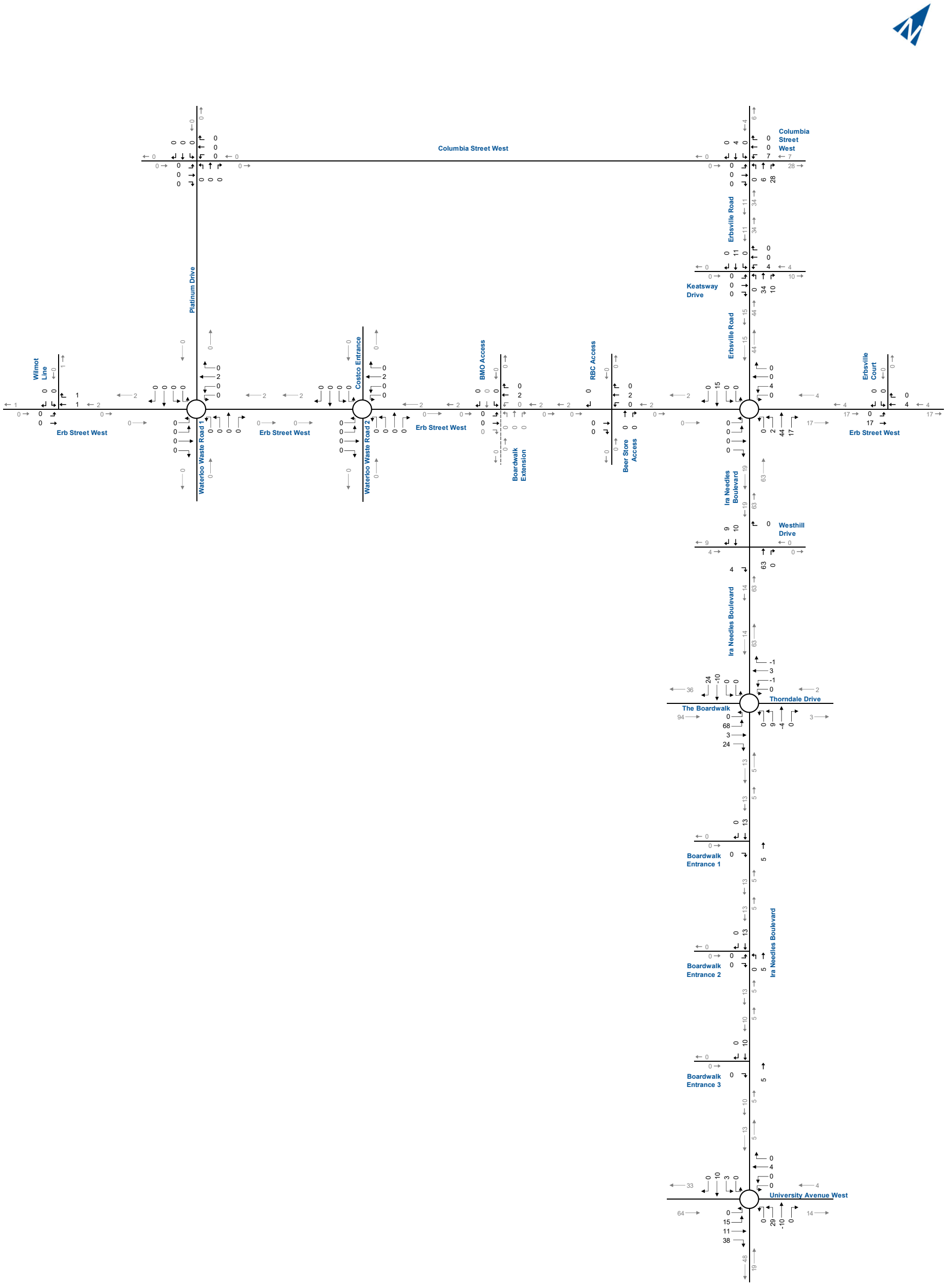
Trip Assignment for The Boardwalk



The Boardwalk Site Generated Traffic – AM Peak Hour – Do-Nothing Case

Westhill District TNS
180136

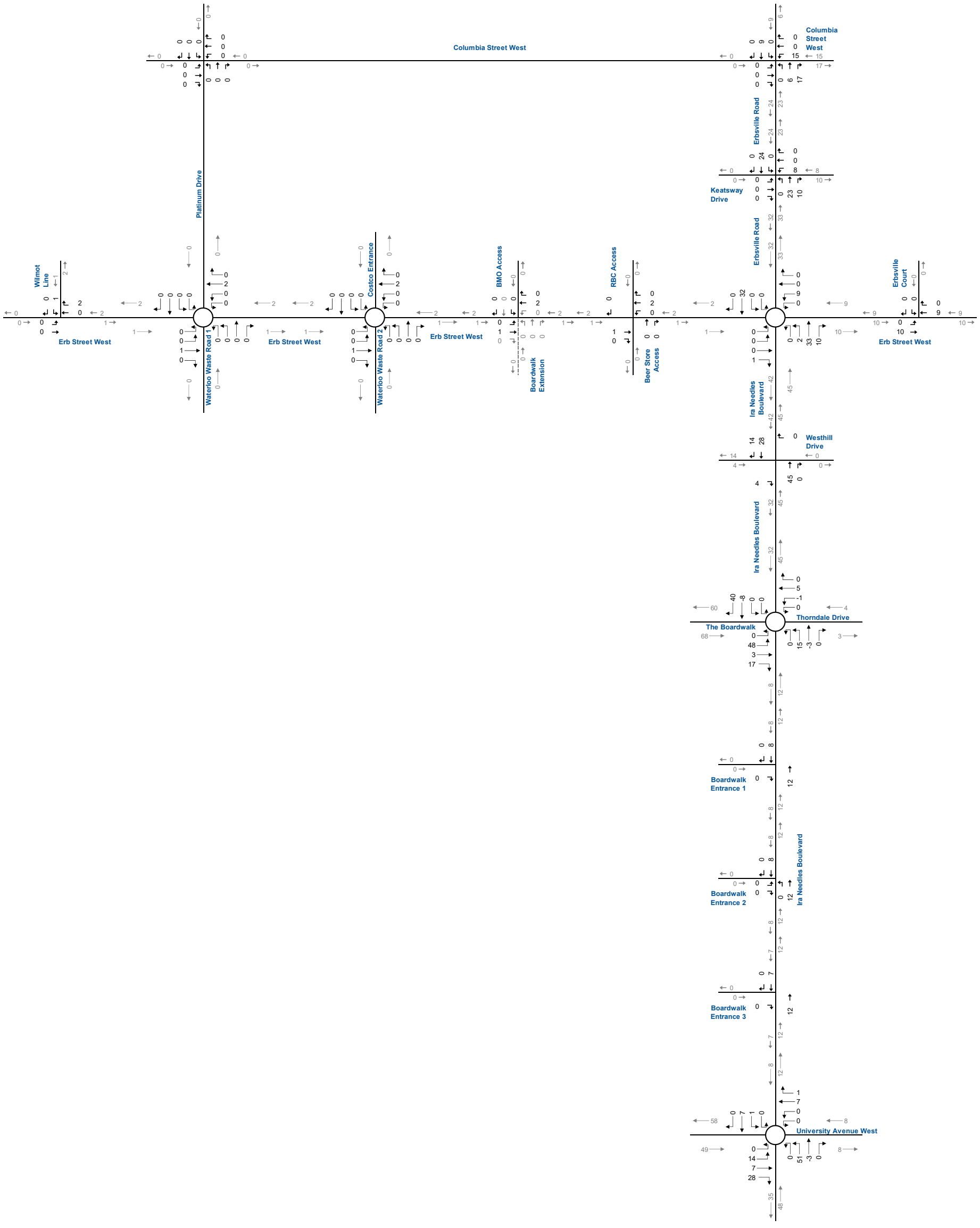
Figure C.1



The Boardwalk Site Generated Traffic – PM Peak Hour – Do-Nothing Case

Westhill District TNS
180136

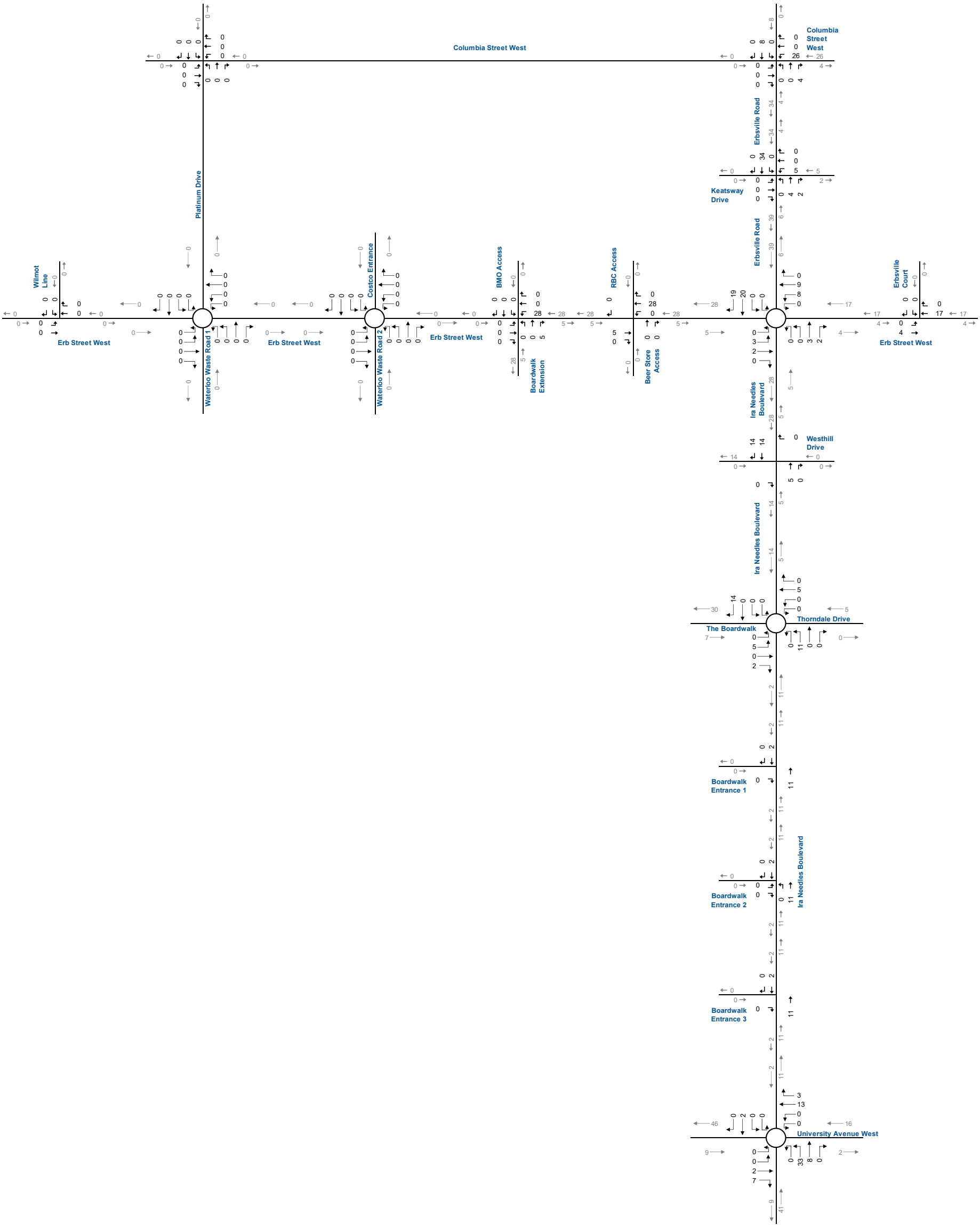
Figure C.2



The Boardwalk Site Generated Traffic – Saturday Peak Hour – Do-Nothing Case

Westhill District TNS
180136

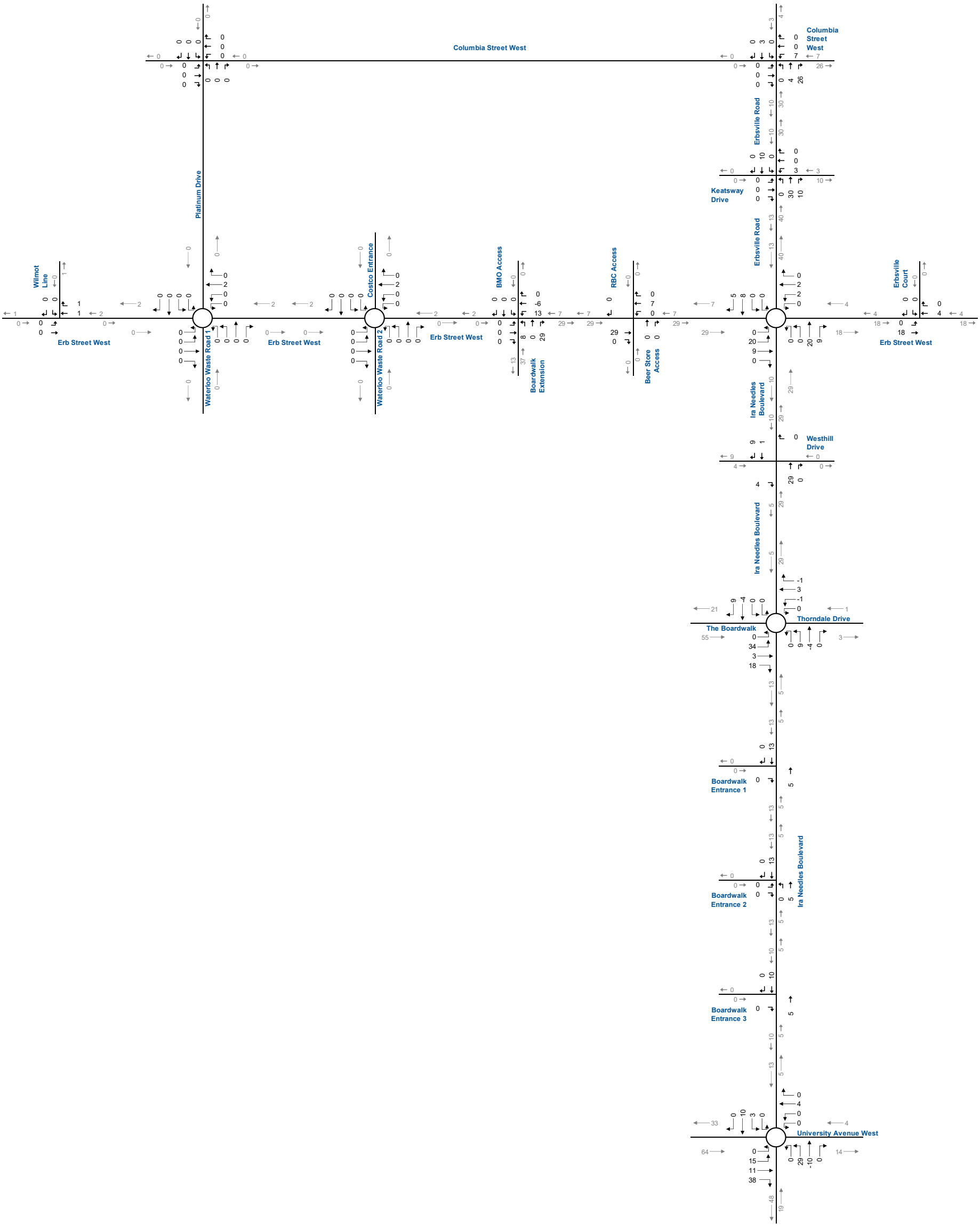
Figure C.3



The Boardwalk Site Generated Traffic – AM Peak Hour – Alternative A Extension

Westhill District TNS
180136

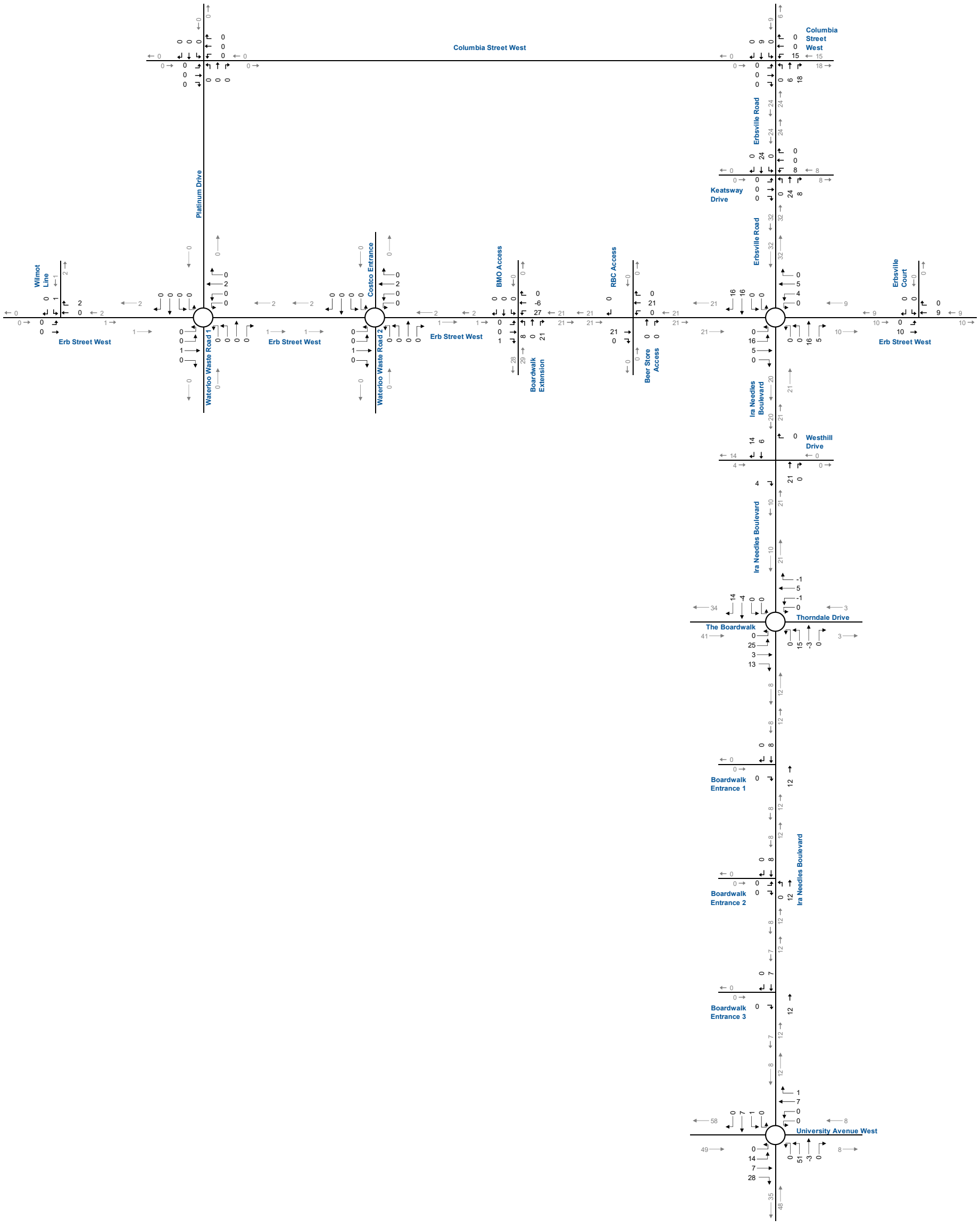
Figure C.4



The Boardwalk Site Generated Traffic – PM Peak Hour – Alternative A Extension

Westhill District TNS
180136

Figure C.5



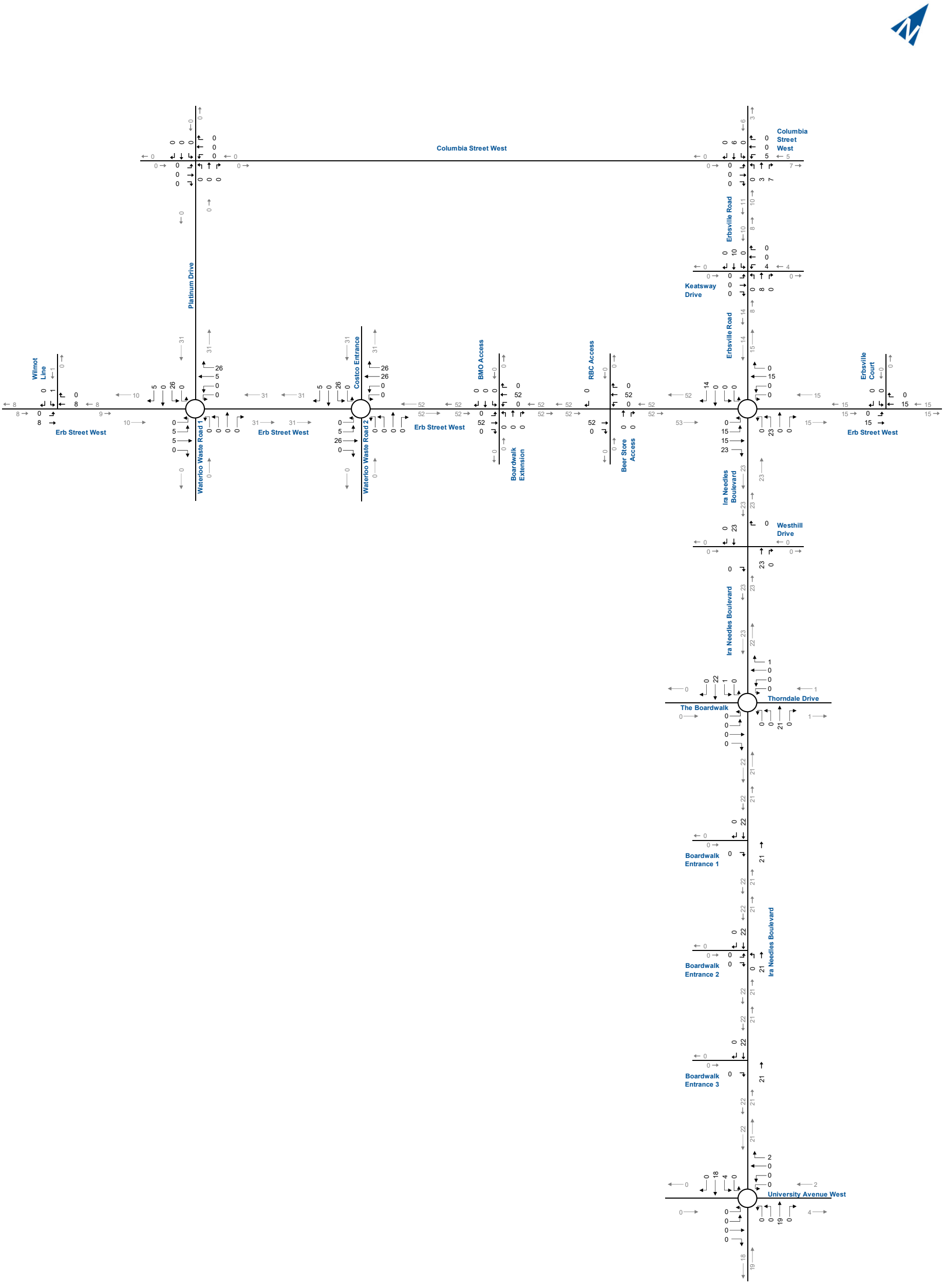
The Boardwalk Site Generated Traffic – Sat Peak Hour – Alternative A Extension

Westhill District TNS
180136

Figure C.6

Appendix D

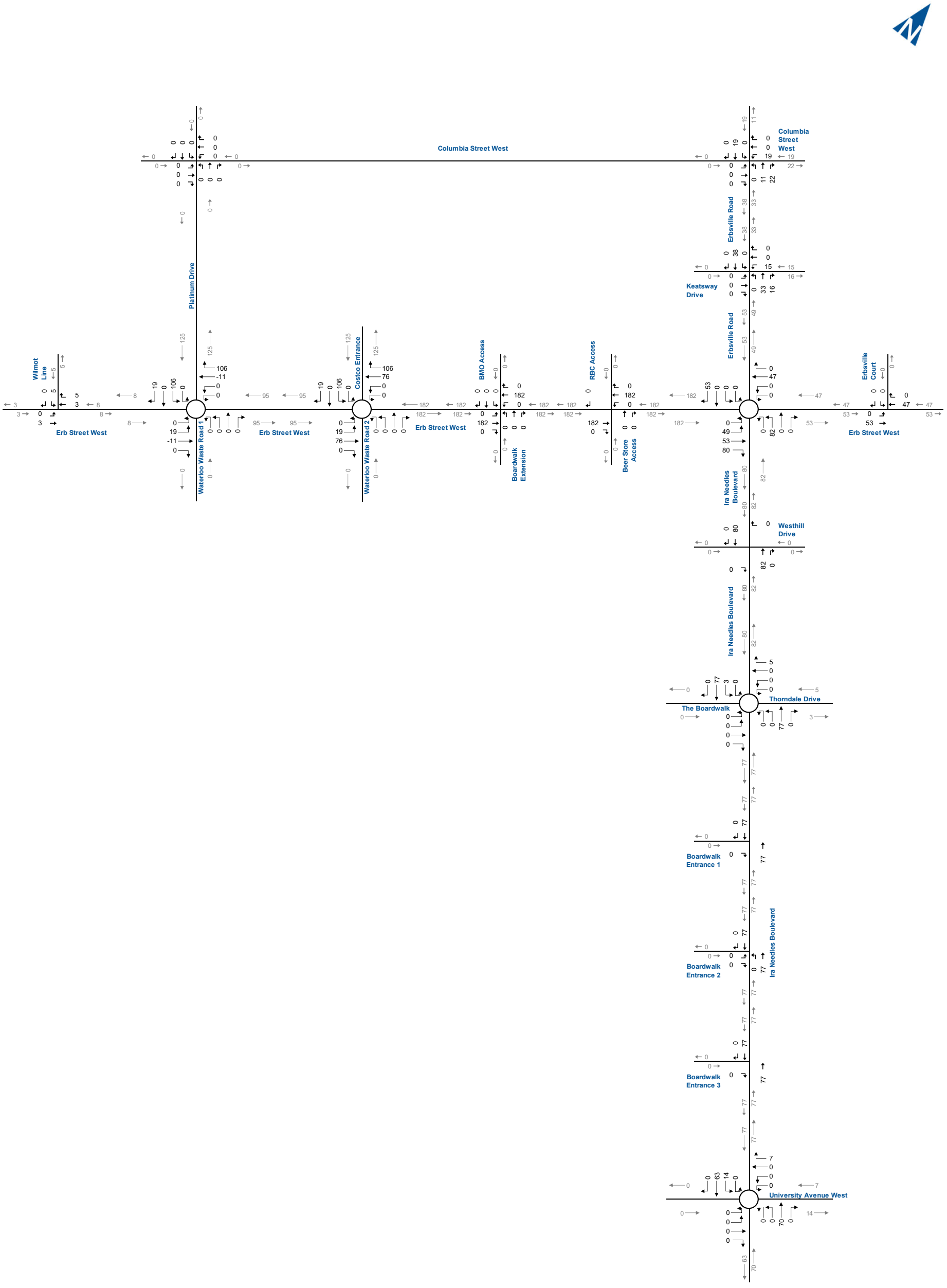
Trip Assignment for Costco Site Infill



Costco Site Infill Site Generated Traffic – AM Peak Hour

Westhill District TNS
180136

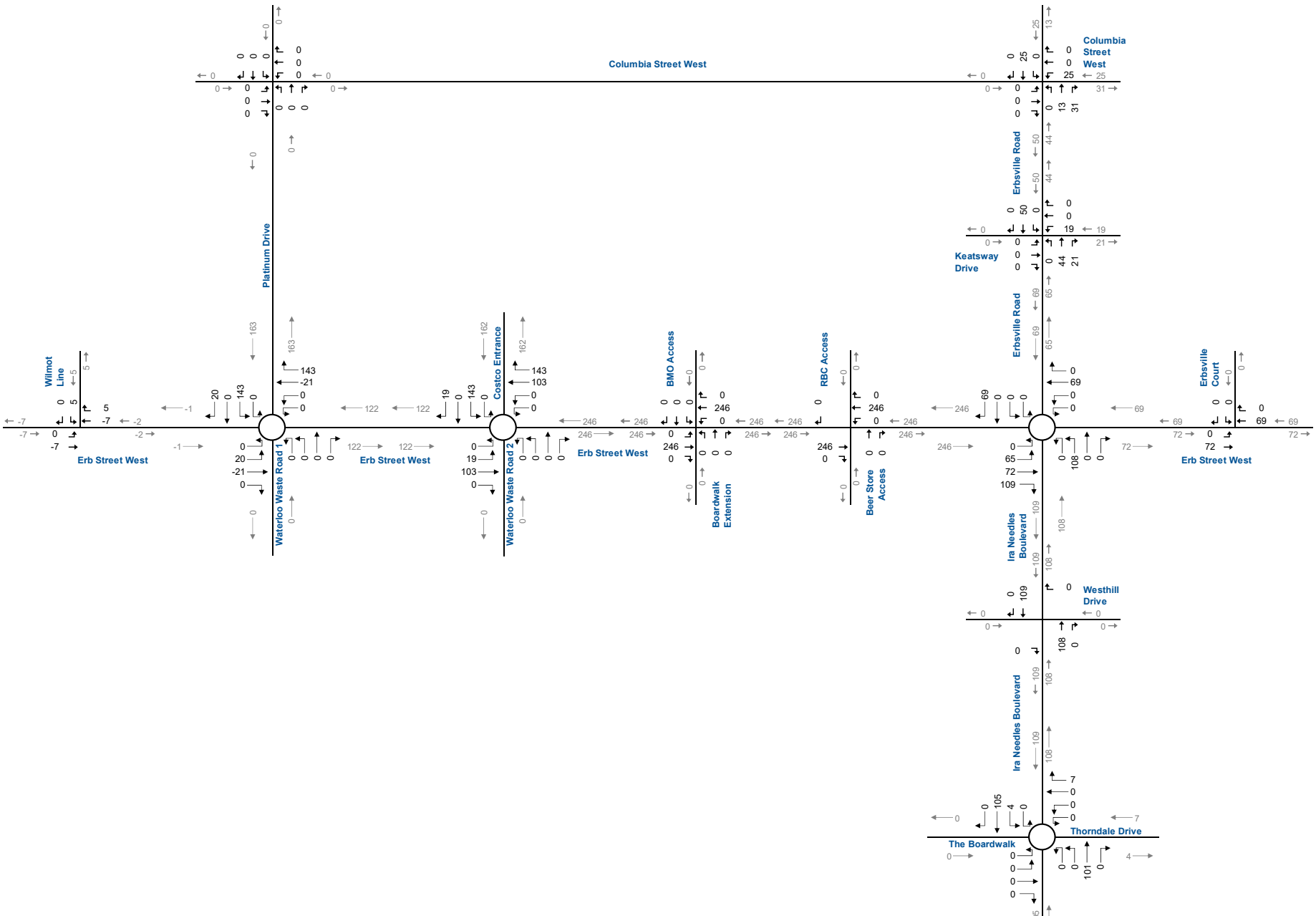
Figure D.1



Costco Site Infill Site Generated Traffic – PM Peak Hour

Westhill District TNS
180136

Figure D.2



Costco Site Infill Site Generated Traffic – Sat Peak Hour

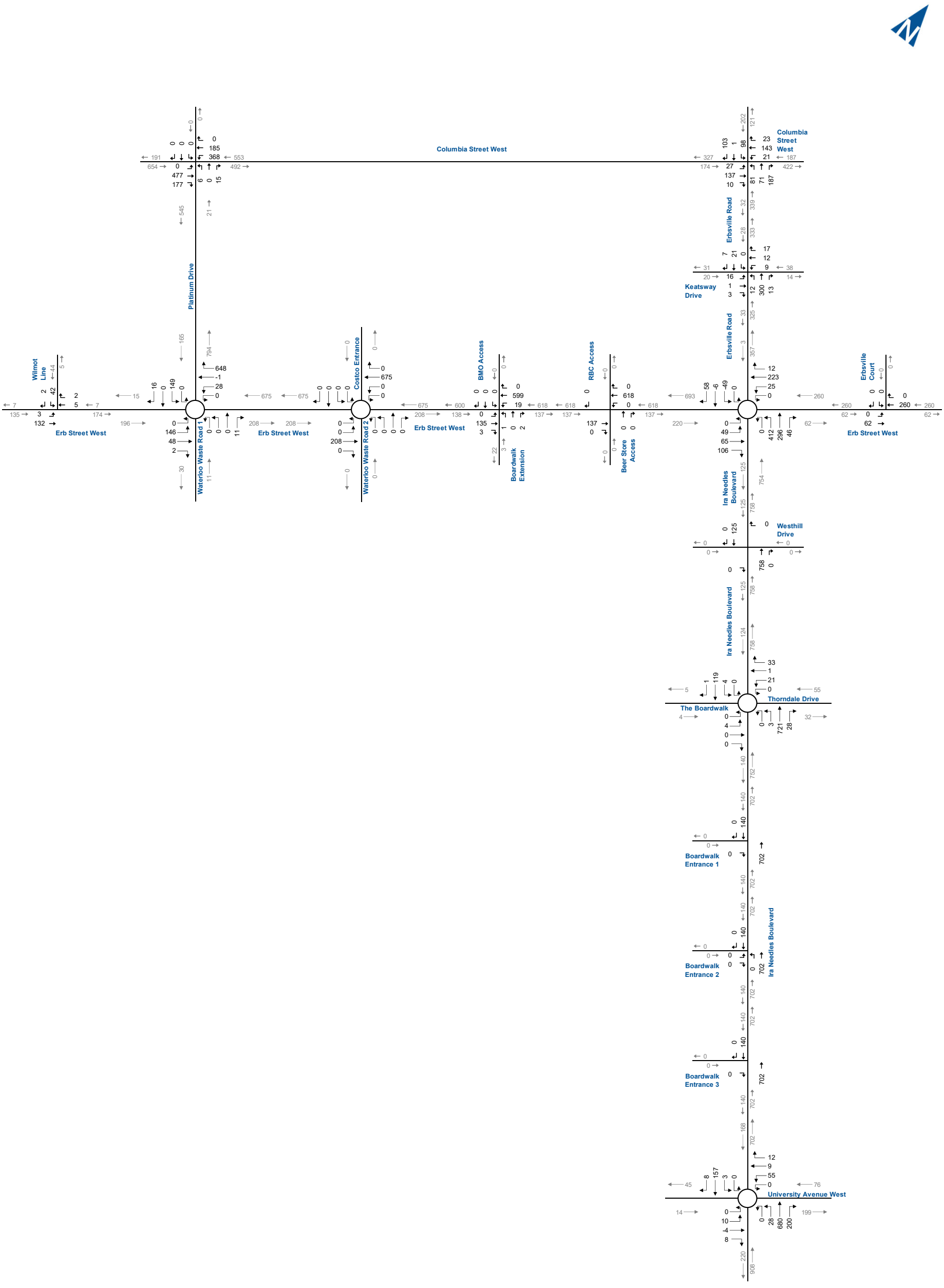
Westhill District TNS
180136

Figure D.3

Appendix E

Trip Assignment for Waterloo Employment Lands

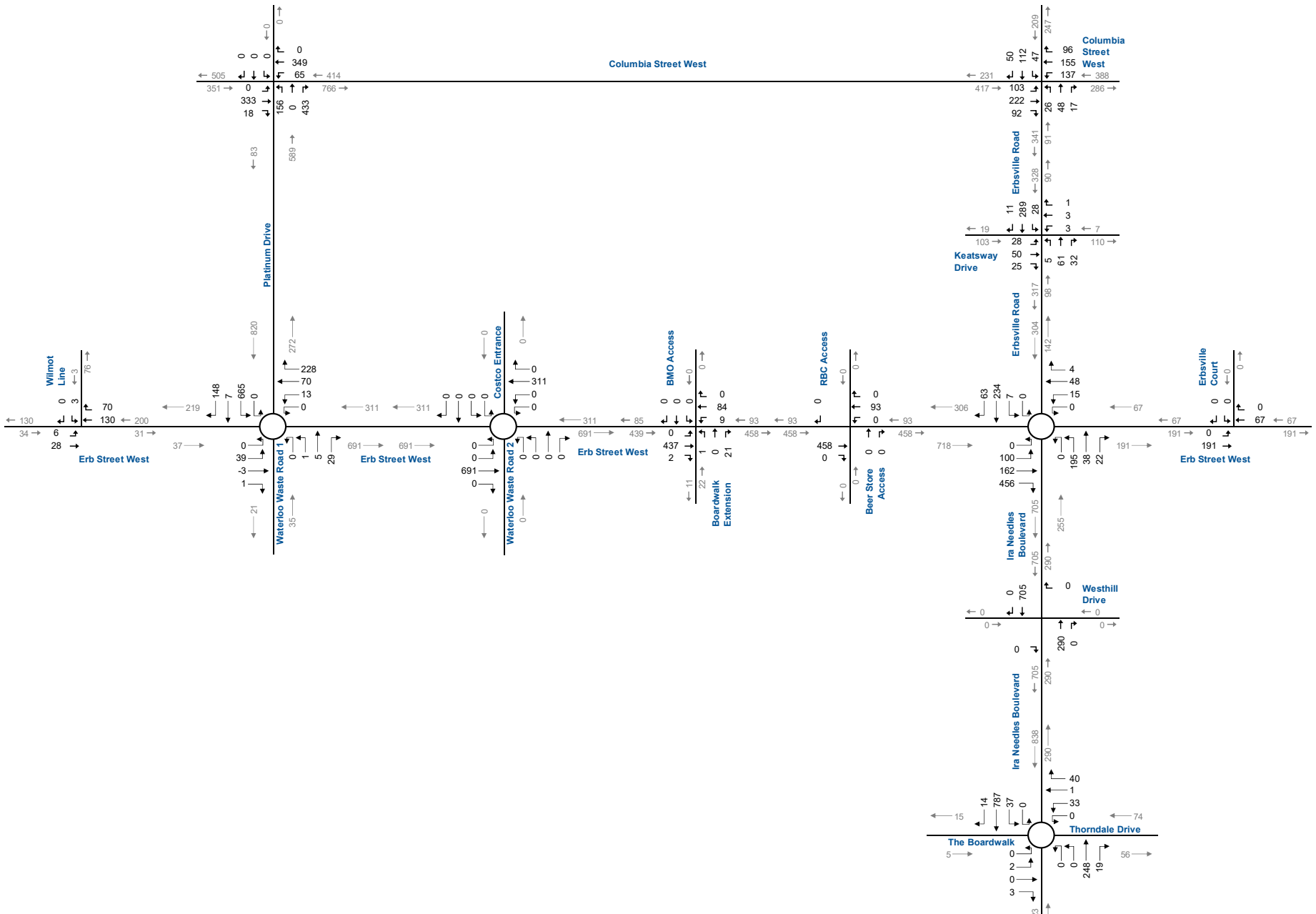




Waterloo Employment Lands Site Generated Traffic and Background Growth – AM Peak Hour

Westhill District TNS
180136

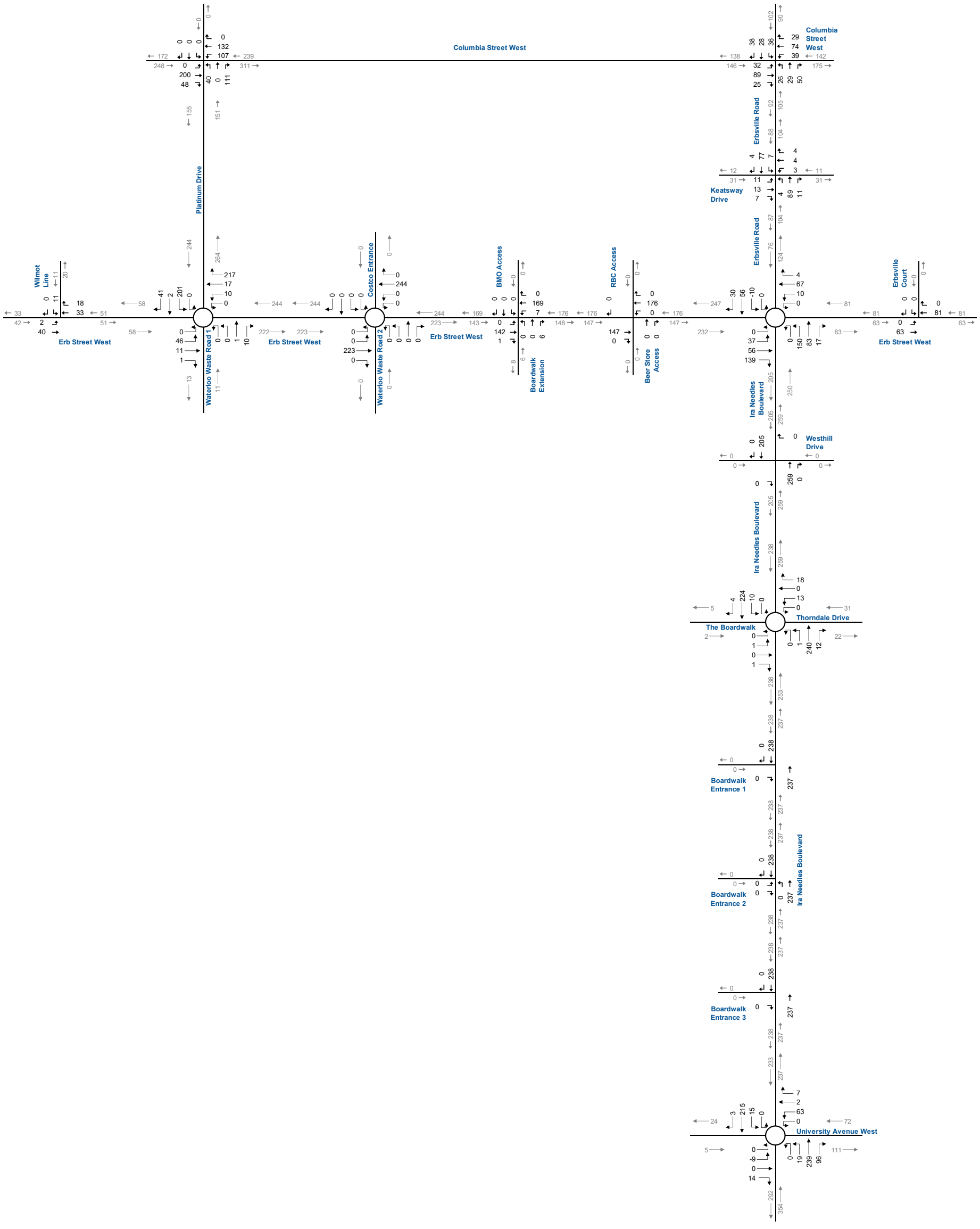
Figure E.1



Waterloo Employment Lands Site Generated Traffic and Background Growth – PM Peak Hour

Westhill District TNS
180136

Figure E.2



Waterloo Employment Lands Site Generated Traffic and Background Growth – Sat Peak Hour

Westhill District TNS
180136

Figure E.3

Appendix F

Internal Capture Calculations

NCHRP 8-51 Internal Trip Capture Estimation Tool			
Project Name:	180136	**Organization:**	PTSL
Project Location:	Westhills, Waterloo	**Performed By:**	AMo
Scenario Description:	Site Plan	**Date:**	May-19
Analysis Year:	2031	**Checked By:**	MB
Analysis Period:	**AM Street Peak Hour**	**Date:**	Feb-19

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office	710	1,172	1000 Sq. ft	1181	1016	165
Retail	812, 820	65	1000 Sq. ft	157	98	59
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses[2]						
Total				1338	1114	224

Table 2-A: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% Transit	% Non-Motorized
Office	1.05			1.08		
Retail	1.13			1.18		
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses[2]						

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		36	0	0	0	0
Retail	20		0	0	0	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	0	0	0	0	0	

Table 5-A: Computations Summary

	Total	Entering	Exiting
All Person-Trips	1,426	1,178	248
Internal Capture Percentage	8%	5%	23%
External Vehicle-Trips[3]	1,236	1,063	173
External Transit-Trips[4]	0	0	0
External Non-Motorized Trips[4]	0	0	0

Table 6-A: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	2%	20%
Retail	32%	29%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	N/A	N/A
Hotel	N/A	N/A

[1]Land Use Codes (LUCs) from *Trip Generation Informational Report*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

[3]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

[4]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas Transportation Institute

Project Name:	180136
Analysis Period:	**AM Street Peak Hour**

Table 7-A: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-A (D): Entering Trips			Table 7-A (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.05	1016	1067	1.08	165	178
Retail	1.13	98	111	1.18	59	70
Restaurant	1.00	0	0	1.00	0	0
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	0	0	1.00	0	0
Hotel	1.00	0	0	1.00	0	0

Table 8-A (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		50	112	0	2	0
Retail	20		9	0	10	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	0	0	0	0	0	

Table 8-A (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		36	0	0	0	0
Retail	43		0	0	0	0
Restaurant	149	9		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	32	19	0	0		0
Hotel	32	4	0	0	0	

Table 9-A (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	20	1047	1067	997	0	0
Retail	36	75	111	66	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	0	0	0	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

Table 9-A (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	36	142	178	131	0	0
Retail	20	50	70	42	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	0	0	0	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

NCHRP 8-51 Internal Trip Capture Estimation Tool			
Project Name:	180136	**Organization:**	PTSL
Project Location:	Westhills, Waterloo	**Performed By:**	AMo
Scenario Description:	Site Plan	**Date:**	May-19
Analysis Year:	2031	**Checked By:**	MB
Analysis Period:	**PM Street Peak Hour**	**Date:**	Feb-19

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office	710	1,172	1000 Sq. ft	1238	197	1041
Retail	812, 820	65	1000 Sq. ft	279	131	148
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses[2]						
Total				1517	328	1189

Table 2-A: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% Transit	% Non-Motorized
Office	1.05			1.08		
Retail	1.13			1.18		
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses[2]						

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		47	0	0	0	0
Retail	8		0	0	0	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	0	0	0	0	0	

Table 5-A: Computations Summary

	Total	Entering	Exiting
All Person-Trips	1,654	355	1,299
Internal Capture Percentage	7%	15%	4%
External Vehicle-Trips[3]	1,418	279	1,139
External Transit-Trips[4]	0	0	0
External Non-Motorized Trips[4]	0	0	0

Table 6-A: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	4%	4%
Retail	32%	5%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	N/A	N/A
Hotel	N/A	N/A

[1]Land Use Codes (LUCs) from *Trip Generation Informational Report*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

[3]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

[4]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas Transportation Institute

Project Name:	180136
Analysis Period:	**PM Street Peak Hour**

Table 7-A: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-A (D): Entering Trips			Table 7-A (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.05	197	207	1.08	1041	1124
Retail	1.13	131	148	1.18	148	175
Restaurant	1.00	0	0	1.00	0	0
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	0	0	1.00	0	0
Hotel	1.00	0	0	1.00	0	0

Table 8-A (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		315	708	0	11	0
Retail	51		23	0	25	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	0	0	0	0	0	

Table 8-A (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		47	0	0	0	0
Retail	8		0	0	0	0
Restaurant	29	12		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	6	25	0	0		0
Hotel	6	6	0	0	0	

Table 9-A (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	8	199	207	190	0	0
Retail	47	101	148	89	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	0	0	0	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

Table 9-A (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	47	1077	1124	997	0	0
Retail	8	167	175	142	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	0	0	0	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

NCHRP 8-51 Internal Trip Capture Estimation Tool			
Project Name:	180136	**Organization:**	PTSL
Project Location:	Westhills, Waterloo	**Performed By:**	AMo
Scenario Description:	Site Plan	**Date:**	May-19
Analysis Year:	2031	**Checked By:**	MB
Analysis Period:	**Sat Street Peak Hour**	**Date:**	Feb-19

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office	710	1,172	1000 Sq. ft	621	335	286
Retail	812, 820	65	1000 Sq. ft	817	420	397
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses[2]						
Total				1438	755	683

Table 2-A: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% Transit	% Non-Motorized
Office	1.05			1.08		
Retail	1.13			1.18		
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses[2]						

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		87	0	0	0	0
Retail	14		0	0	0	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	0	0	0	0	0	

Table 5-A: Computations Summary

	Total	Entering	Exiting
All Person-Trips	1,604	827	777
Internal Capture Percentage	13%	12%	13%
External Vehicle-Trips[3]	1,256	665	591
External Transit-Trips[4]	0	0	0
External Non-Motorized Trips[4]	0	0	0

Table 6-A: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	4%	28%
Retail	18%	3%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	N/A	N/A
Hotel	N/A	N/A

[1]Land Use Codes (LUCs) from *Trip Generation Informational Report*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

[3]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

[4]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas Transportation Institute

Project Name:	180136
Analysis Period:	**Sat Street Peak Hour**

Table 7-A: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-A (D): Entering Trips			Table 7-A (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.05	335	352	1.08	286	309
Retail	1.13	420	475	1.18	397	468
Restaurant	1.00	0	0	1.00	0	0
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	0	0	1.00	0	0
Hotel	1.00	0	0	1.00	0	0

Table 8-A (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		87	195	0	3	0
Retail	136		61	0	66	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	0	0	0	0	0	

Table 8-A (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		152	0	0	0	0
Retail	14		0	0	0	0
Restaurant	49	38		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	11	81	0	0		0
Hotel	11	19	0	0	0	

Table 9-A (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	14	338	352	322	0	0
Retail	87	388	475	343	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	0	0	0	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

Table 9-A (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	87	222	309	206	0	0
Retail	14	454	468	385	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	0	0	0	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

Appendix G

2031 Total Traffic Operations Reports – Do-Nothing Assessment



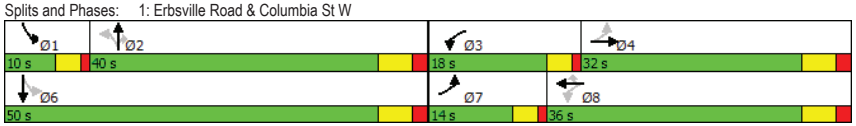
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	189	443	64	385	225	115	116	429	644	275	484	182
Future Volume (vph)	189	443	64	385	225	115	116	429	644	275	484	182
Ideal Flow (vphpl)	1775	1650	1650	1775	1900	1750	1775	1900	1750	1775	1650	1650
Storage Length (m)	0.0		0.0	0.0		75.0	0.0		170.0	0.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	0.0			7.5			80.0			0.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00				0.97	1.00				0.99	
Frt		0.981				0.850			0.850		0.959	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1637	1561	0	1653	1727	1390	1561	1810	1473	1621	1475	0
Flt Permitted	0.585			0.133			0.197			0.242		
Satd. Flow (perm)	1002	1561	0	231	1727	1351	323	1810	1473	413	1475	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7				120			359		25	
Link Speed (k/h)		50			60			60			60	
Link Distance (m)		118.8			135.9			921.3			152.9	
Travel Time (s)		8.6			8.2			55.3			9.2	
Confl. Peds. (#/hr)	3		1	1		3	4					4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	7%	2%	10%	7%	8%	5%	1%	4%	5%	10%
Adj. Flow (vph)	189	443	64	385	225	115	116	429	644	275	484	182
Shared Lane Traffic (%)												
Lane Group Flow (vph)	189	507	0	385	225	115	116	429	644	275	666	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	7	4		3	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	22.8		5.0	22.8	22.8	26.4	26.4	26.4	5.0	26.4	
Minimum Split (s)	9.0	28.8		9.0	28.8	28.8	32.4	32.4	32.4	9.0	32.4	
Total Split (s)	14.0	32.0		18.0	36.0	36.0	40.0	40.0	40.0	10.0	50.0	
Total Split (%)	14.0%	32.0%		18.0%	36.0%	36.0%	40.0%	40.0%	40.0%	10.0%	50.0%	
Maximum Green (s)	10.0	26.0		14.0	30.0	30.0	34.0	34.0	34.0	6.0	44.0	
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	
All-Red Time (s)	1.0	2.0		1.0	2.0	2.0	2.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	-2.0		0.0	-2.0	-2.0	0.0	-2.0	-2.0	0.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	6.0	4.0	4.0	4.0	4.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Max		None	Max	Max	Max	Max	Max	None	Max	
Walk Time (s)		7.0			7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0		11.0	
Pedestrian Calls (#/hr)		0			0	0	0	0	0		0	
Act Effct Green (s)	37.7	28.0		46.0	32.3	32.3	34.0	36.0	36.0	46.0	46.0	
Actuated g/C Ratio	0.38	0.28		0.46	0.32	0.32	0.34	0.36	0.36	0.46	0.46	
v/c Ratio	0.43	1.15		1.26	0.40	0.22	1.06	0.66	0.85	1.05	0.96	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	20.7	123.8		167.2	29.2	5.5	140.5	32.7	24.9	94.4	52.9	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	20.7	123.8		167.2	29.2	5.5	140.5	32.7	24.9	94.4	52.9	
LOS	C	F		F	C	A	F	C	C	F	D	
Approach Delay		95.8			98.7			39.0			65.0	
Approach LOS		F			F			D			E	
Queue Length 50th (m)	22.8	~121.5		~83.5	35.6	0.0	~26.1	72.5	56.9	~38.3	124.1	
Queue Length 95th (m)	38.1	#186.4		#142.7	57.6	11.6	#62.0	107.4	#130.8	#90.4	#204.4	
Internal Link Dist (m)		94.8			111.9			897.3			128.9	
Turn Bay Length (m)						75.0			170.0			
Base Capacity (vph)	444	442		305	558	517	109	651	760	262	692	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.43	1.15		1.26	0.40	0.22	1.06	0.66	0.85	1.05	0.96	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Natural Cycle: 110			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.26			
Intersection Signal Delay: 69.2		Intersection LOS: E	
Intersection Capacity Utilization 132.3%		ICU Level of Service H	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Erbsville Road & Columbia St W

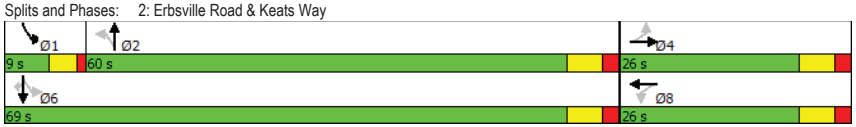


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	94	59	124	34	59	30	1002	77	46	864	20
Future Volume (vph)	84	94	59	124	34	59	30	1002	77	46	864	20
Ideal Flow (vphpl)	1775	1650	1650	1775	1650	1650	1775	1650	1650	1775	1900	1750
Storage Length (m)	0.0		0.0	0.0		0.0	20.0		0.0	25.0		25.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	0.0			0.0			65.0			50.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor	1.00	0.99		0.99	0.99		1.00	1.00		1.00		0.98
Frt		0.942			0.905			0.989				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1637	1478	0	1637	1311	0	1519	2973	0	1653	3438	1488
Flt Permitted	0.694			0.548			0.328			0.201		
Satd. Flow (perm)	1191	1478	0	939	1311	0	524	2973	0	350	3438	1456
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		31			59			14				34
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		155.7			226.8			139.9			921.3	
Travel Time (s)		11.2			16.3			8.4			55.3	
Confl. Peds. (#/hr)	4		7	7		4	1		2	2		1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	4%	5%	3%	14%	12%	11%	4%	6%	2%	5%	0%
Adj. Flow (vph)	84	94	59	124	34	59	30	1002	77	46	864	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	84	153	0	124	93	0	30	1079	0	46	864	20
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		1	6	6
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		53.0	53.0		4.5	53.0	53.0
Minimum Split (s)	14.0	14.0		14.0	14.0		59.0	59.0		9.0	68.0	68.0
Total Split (s)	26.0	26.0		26.0	26.0		60.0	60.0		9.0	69.0	69.0
Total Split (%)	27.4%	27.4%		27.4%	27.4%		63.2%	63.2%		9.5%	72.6%	72.6%
Maximum Green (s)	20.0	20.0		20.0	20.0		54.0	54.0		5.0	63.0	63.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		3.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		1.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		0.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		Max	Max		None	Max	Max
Walk Time (s)	10.0	10.0		10.0	10.0		40.0	40.0			40.0	40.0
Flash Dont Walk (s)	16.0	16.0		16.0	16.0		13.0	13.0			13.0	13.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0			0	0
Act Effct Green (s)	17.4	17.4		17.4	17.4		59.9	59.9		65.2	65.2	65.2
Actuated g/C Ratio	0.19	0.19		0.19	0.19		0.66	0.66		0.72	0.72	0.72
v/c Ratio	0.37	0.50		0.69	0.31		0.09	0.55		0.14	0.35	0.02

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	36.2	31.2		53.8	16.6		8.8	10.9		5.5	5.7	0.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	36.2	31.2		53.8	16.6		8.8	10.9		5.5	5.7	0.9
LOS	D	C		D	B		A	B		A	A	A
Approach Delay		33.0			37.9			10.8			5.6	
Approach LOS		C			D			B			A	
Queue Length 50th (m)	13.5	19.8		21.3	5.2		2.1	57.7		2.2	27.8	0.0
Queue Length 95th (m)	27.3	38.8		41.0	18.5		6.6	84.7		5.9	42.2	1.4
Internal Link Dist (m)		131.7			202.8			115.9			897.3	
Turn Bay Length (m)							20.0			25.0		25.0
Base Capacity (vph)	289	383		228	363		346	1971		323	2472	1056
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.29	0.40		0.54	0.26		0.09	0.55		0.14	0.35	0.02

Intersection Summary		
Area Type:	Other	
Cycle Length: 95		
Actuated Cycle Length: 90.6		
Natural Cycle: 85		
Control Type: Semi Act-Uncoord		
Maximum v/c Ratio: 0.69		
Intersection Signal Delay: 13.3		Intersection LOS: B
Intersection Capacity Utilization 106.9%		ICU Level of Service G
Analysis Period (min) 15		

Splits and Phases: 2: Erbsville Road & Keats Way



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	329	362	394	375	385	118	674	848	233	247	944	187
Future Volume (vph)	329	362	394	375	385	118	674	848	233	247	944	187
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1775	1775	1750	1775	1775	1750
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	1.00	0.95	0.95	1.00
Frt		0.946			0.980				0.850			0.850
Flt Protected		0.985			0.979			0.978			0.990	
Satd. Flow (prot)	0	2759	0	0	2849	0	0	3109	1444	0	3223	1430
Flt Permitted		0.985			0.979			0.978			0.990	
Satd. Flow (perm)	0	2759	0	0	2849	0	0	3109	1444	0	3223	1430
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		147.8			470.9			152.2			97.5	
Travel Time (s)		8.9			28.3			9.1			5.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	2%	11%	4%	7%	6%	10%	3%	3%	2%	4%	4%
Adj. Flow (vph)	329	362	394	375	385	118	674	848	233	247	944	187
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1085	0	0	878	0	0	1522	233	0	1191	187
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization	161.2%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized									MOYes			MOYes
Traffic Volume (veh/h)	329	362	394	375	385	118	674	848	233	247	944	187
Future Volume (veh/h)	329	362	394	375	385	118	674	848	233	247	944	187
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	329	362	394	375	385	118	674	848	233	247	944	187
Approach Volume (veh/h)		1085			878			1522			1191	
Crossing Volume (veh/h)		1566#			1851#			938			1434#	
High Capacity (veh/h)		389			305			655			434	
High v/c (veh/h)		2.79			2.88			2.32			2.74	
Low Capacity (veh/h)		286			218			511			324	
Low v/c (veh/h)		3.79			4.02			2.98			3.68	

Intersection Summary			
Maximum v/c High	2.88		
Maximum v/c Low	4.02		
Intersection Capacity Utilization	161.2%	ICU Level of Service	H
# Crossing flow exceeds 1200, method is not applicable			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	740	38	34	1389	64	0	0	45	0	0	26
Future Volume (vph)	0	740	38	34	1389	64	0	0	45	0	0	26
Ideal Flow (vphpl)	1900	1650	1650	1900	1650	1650	1900	1650	1650	1650	1650	1900
Storage Length (m)	0.0		0.0	25.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		1	0		1
Taper Length (m)	0.0			60.0			0.0			0.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.993			0.993				0.865			0.865
Flt Protected				0.950								
Satd. Flow (prot)	0	2904	0	1752	2938	0	0	0	1334	0	0	1644
Flt Permitted				0.950								
Satd. Flow (perm)	0	2904	0	1752	2938	0	0	0	1334	0	0	1644
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		83.2			147.8			60.1			74.6	
Travel Time (s)		5.0			8.9			4.3			5.4	
Confl. Peds. (#/hr)			1	1								
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	7%	11%	3%	6%	5%	0%	0%	7%	0%	0%	0%
Adj. Flow (vph)	0	740	38	34	1389	64	0	0	45	0	0	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	778	0	34	1453	0	0	0	45	0	0	26
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 56.6%		ICU Level of Service B	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	740	38	34	1389	64	0	0	45	0	0	26
Future Volume (Veh/h)	0	740	38	34	1389	64	0	0	45	0	0	26
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	740	38	34	1389	64	0	0	45	0	0	26
Pedestrians								1				
Lane Width (m)								3.6				
Walking Speed (m/s)								1.2				
Percent Blockage								0				
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		83										
pX, platoon unblocked				0.96			0.96	0.96	0.96	0.96	0.96	
vC, conflicting volume	1453			779			1548	2281	390	1904	2268	726
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1453			684			1487	2250	279	1857	2237	726
tC, single (s)	4.1			4.2			7.5	6.5	7.0	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.4	3.5	4.0	3.3
p0 queue free %	100			96			100	100	93	100	100	93
cM capacity (veh/h)	472			861			76	39	674	40	40	371

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	493	285	34	926	527	45	26
Volume Left	0	0	34	0	0	0	0
Volume Right	0	38	0	0	64	45	26
cSH	1700	1700	861	1700	1700	674	371
Volume to Capacity	0.29	0.17	0.04	0.54	0.31	0.07	0.07
Queue Length 95th (m)	0.0	0.0	1.0	0.0	0.0	1.7	1.8
Control Delay (s)	0.0	0.0	9.4	0.0	0.0	10.7	15.4
Lane LOS			A			B	C
Approach Delay (s)	0.0		0.2			10.7	15.4
Approach LOS						B	C

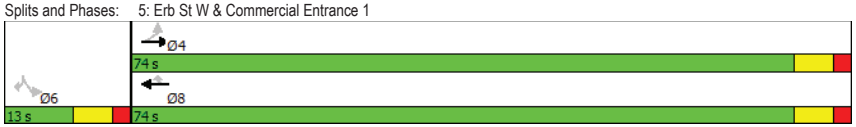
Intersection Summary				
Average Delay	0.5			
Intersection Capacity Utilization	56.6%	ICU Level of Service	B	
Analysis Period (min)	15			

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	59	710	1351	40	62	73
Future Volume (vph)	59	710	1351	40	62	73
Ideal Flow (vphpl)	1775	1900	1900	1750	1775	1750
Storage Length (m)	30.0			0.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	55.0				0.0	
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor	1.00			0.98		
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1606	3406	3406	1316	1466	1473
Flt Permitted	0.185				0.950	
Satd. Flow (perm)	313	3406	3406	1287	1466	1473
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				40		73
Link Speed (k/h)		60	60		50	
Link Distance (m)		435.4	83.2		96.6	
Travel Time (s)		26.1	5.0		7.0	
Confl. Peds. (#/hr)	3			3		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	6%	6%	13%	15%	1%
Adj. Flow (vph)	59	710	1351	40	62	73
Shared Lane Traffic (%)						
Lane Group Flow (vph)	59	710	1351	40	62	73
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4	8			
Permitted Phases	4			8	6	6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	60.0	60.0	60.0	60.0	7.0	7.0
Minimum Split (s)	66.0	66.0	66.0	66.0	13.0	13.0
Total Split (s)	74.0	74.0	74.0	74.0	13.0	13.0
Total Split (%)	85.1%	85.1%	85.1%	85.1%	14.9%	14.9%
Maximum Green (s)	68.0	68.0	68.0	68.0	7.0	7.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	Max	None	None
Walk Time (s)	50.0	50.0	50.0	50.0	7.0	7.0
Flash Dont Walk (s)	10.0	10.0	10.0	10.0	15.0	15.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	73.7	73.7	73.7	73.7	9.0	9.0
Actuated g/C Ratio	0.84	0.84	0.84	0.84	0.10	0.10
v/c Ratio	0.22	0.25	0.47	0.04	0.41	0.34

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Control Delay	4.3	2.1	3.0	0.7	45.5	14.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.3	2.1	3.0	0.7	45.5	14.1
LOS	A	A	A	A	D	B
Approach Delay		2.2	2.9		28.5	
Approach LOS		A	A		C	
Queue Length 50th (m)	1.8	11.5	28.8	0.0	10.4	0.0
Queue Length 95th (m)	5.2	15.6	37.4	1.4	23.0	12.5
Internal Link Dist (m)		411.4	59.2		72.6	
Turn Bay Length (m)	30.0					
Base Capacity (vph)	263	2873	2873	1092	150	216
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.25	0.47	0.04	0.41	0.34

Intersection Summary			
Area Type:	Other		
Cycle Length: 87			
Actuated Cycle Length: 87.4			
Natural Cycle: 80			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.47			
Intersection Signal Delay: 4.2		Intersection LOS: A	
Intersection Capacity Utilization 106.7%		ICU Level of Service G	
Analysis Period (min) 15			

Splits and Phases: 5: Erb St W & Commercial Entrance 1



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	593	5	31	959	495	5	2	25	230	0	15
Future Volume (vph)	18	593	5	31	959	495	5	2	25	230	0	15
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1550	1550	1550	1550	1550	1750
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.999			0.950			0.895			0.981	
Flt Protected		0.999			0.999			0.992		0.950	0.958	
Satd. Flow (prot)	0	2994	0	0	2838	0	0	773	0	1399	1384	0
Flt Permitted		0.999			0.999			0.992		0.950	0.958	
Satd. Flow (perm)	0	2994	0	0	2838	0	0	773	0	1399	1384	0
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		149.9			435.4			54.9			87.3	
Travel Time (s)		9.0			26.1			4.0			6.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	4%	80%	77%	5%	0%	60%	0%	88%	0%	0%	0%
Adj. Flow (vph)	18	593	5	31	959	495	5	2	25	230	0	15
Shared Lane Traffic (%)										46%		
Lane Group Flow (vph)	0	616	0	0	1485	0	0	32	0	124	121	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization	94.5%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Traffic Volume (veh/h)	18	593	5	31	959	495	5	2	25	230	0	15
Future Volume (veh/h)	18	593	5	31	959	495	5	2	25	230	0	15
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	18	593	5	31	959	495	5	2	25	230	0	15
Approach Volume (veh/h)		616			1485			32			245	
Crossing Volume (veh/h)		261			25			841			995	
High Capacity (veh/h)		1129			1358			709			625	
High v/c (veh/h)		0.55			1.09			0.05			0.39	
Low Capacity (veh/h)		929			1137			557			485	
Low v/c (veh/h)		0.66			1.31			0.06			0.51	

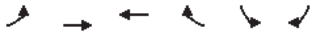
Intersection Summary					
Maximum v/c High		1.09			
Maximum v/c Low		1.31			
Intersection Capacity Utilization		94.5%	ICU Level of Service		F

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	173	651	7	53	229	709	4	1	30	223	0	29
Future Volume (vph)	173	651	7	53	229	709	4	1	30	223	0	29
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1550	1550	1550	1550	1550	1750
Storage Length (m)	30.0		30.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (m)	85.0			0.0			0.0			0.0		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.999			0.893			0.884			0.965	
Flt Protected		0.990			0.997			0.994		0.950	0.963	
Satd. Flow (prot)	0	3005	0	0	2754	0	0	1198	0	777	848	0
Flt Permitted		0.990			0.997			0.994		0.950	0.963	
Satd. Flow (perm)	0	3005	0	0	2754	0	0	1198	0	777	848	0
Link Speed (k/h)		70			60			50			50	
Link Distance (m)		346.1			149.9			61.3			415.1	
Travel Time (s)		17.8			9.0			4.4			29.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	3%	0%	8%	4%	0%	0%	0%	16%	80%	0%	0%
Adj. Flow (vph)	173	651	7	53	229	709	4	1	30	223	0	29
Shared Lane Traffic (%)										43%		
Lane Group Flow (vph)	0	831	0	0	991	0	0	35	0	127	125	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization	87.5%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Traffic Volume (veh/h)	173	651	7	53	229	709	4	1	30	223	0	29
Future Volume (veh/h)	173	651	7	53	229	709	4	1	30	223	0	29
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	173	651	7	53	229	709	4	1	30	223	0	29
Approach Volume (veh/h)		831			991			35			252	
Crossing Volume (veh/h)		276			178			1047			286	
High Capacity (veh/h)		1115			1205			599			1106	
High v/c (veh/h)		0.75			0.82			0.06			0.23	
Low Capacity (veh/h)		917			998			462			909	
Low v/c (veh/h)		0.91			0.99			0.08			0.28	

Intersection Summary			
Maximum v/c High	0.82		
Maximum v/c Low	0.99		
Intersection Capacity Utilization	87.5%	ICU Level of Service	E



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	10	714	247	19	90	13
Future Volume (vph)	10	714	247	19	90	13
Ideal Flow (vphpl)	1650	1650	1650	1650	1765	1765
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.990		0.983	
Flt Protected		0.999			0.958	
Satd. Flow (prot)	0	1613	1575	0	1643	0
Flt Permitted		0.999			0.958	
Satd. Flow (perm)	0	1613	1575	0	1643	0
Link Speed (k/h)		70	70		60	
Link Distance (m)		189.3	346.1		103.7	
Travel Time (s)		9.7	17.8		6.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	14%	2%	4%	0%	0%	9%
Adj. Flow (vph)	10	714	247	19	90	13
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	724	266	0	103	0
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 65.4%		ICU Level of Service C	
Analysis Period (min) 15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	10	714	247	19	90	13
Future Volume (Veh/h)	10	714	247	19	90	13
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	10	714	247	19	90	13
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	266				990	256
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	266				990	256
tC, single (s)	4.2				6.4	6.3
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.4
p0 queue free %	99				67	98
cM capacity (veh/h)	1231				273	765

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	724	266	103
Volume Left	10	0	90
Volume Right	0	19	13
cSH	1231	1700	297
Volume to Capacity	0.01	0.16	0.35
Queue Length 95th (m)	0.2	0.0	12.0
Control Delay (s)	0.2	0.0	23.4
Lane LOS	A		C
Approach Delay (s)	0.2	0.0	23.4
Approach LOS			C

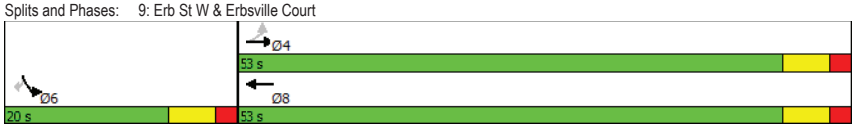
Intersection Summary				
Average Delay		2.4		
Intersection Capacity Utilization		65.4%	ICU Level of Service	C
Analysis Period (min)		15		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	69	815	740	48	118	86
Future Volume (vph)	69	815	740	48	118	86
Ideal Flow (vphpl)	1775	1900	1750	1750	1775	1750
Storage Length (m)	25.0			0.0	50.0	0.0
Storage Lanes	1			0	1	1
Taper Length (m)	75.0				55.0	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor	1.00		1.00		1.00	0.98
Frt			0.991			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1686	3505	3054	0	1637	1473
Flt Permitted	0.342				0.950	
Satd. Flow (perm)	607	3505	3054	0	1634	1446
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			20			86
Link Speed (k/h)		60	60		50	
Link Distance (m)		470.9	231.7		128.8	
Travel Time (s)		28.3	13.9		9.3	
Confl. Peds. (#/hr)	2			2	2	6
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	3%	8%	4%	3%	1%
Adj. Flow (vph)	69	815	740	48	118	86
Shared Lane Traffic (%)						
Lane Group Flow (vph)	69	815	788	0	118	86
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4					6
Detector Phase	4	4	8		6	6
Switch Phase						
Minimum Initial (s)	40.0	40.0	40.0		8.0	8.0
Minimum Split (s)	47.0	47.0	47.0		14.0	14.0
Total Split (s)	53.0	53.0	53.0		20.0	20.0
Total Split (%)	72.6%	72.6%	72.6%		27.4%	27.4%
Maximum Green (s)	47.0	47.0	47.0		14.0	14.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0		-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0		4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	Max	Max	Max		None	None
Walk Time (s)	26.0	26.0	26.0		7.0	7.0
Flash Dont Walk (s)	14.0	14.0	14.0		15.0	15.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)	52.9	52.9	52.9		12.5	12.5
Actuated g/C Ratio	0.76	0.76	0.76		0.18	0.18
v/c Ratio	0.15	0.31	0.34		0.40	0.26

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Control Delay	4.9	4.2	4.3		29.5	8.5
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	4.9	4.2	4.3		29.5	8.5
LOS	A	A	A		C	A
Approach Delay		4.2	4.3		20.6	
Approach LOS		A	A		C	
Queue Length 50th (m)	2.5	17.6	17.1		14.4	0.0
Queue Length 95th (m)	8.0	30.7	30.5		28.7	10.6
Internal Link Dist (m)		446.9	207.7		104.8	
Turn Bay Length (m)	25.0				50.0	
Base Capacity (vph)	460	2660	2323		375	398
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.15	0.31	0.34		0.31	0.22

Intersection Summary		
Area Type:	Other	
Cycle Length: 73		
Actuated Cycle Length: 69.7		
Natural Cycle: 65		
Control Type: Semi Act-Uncoord		
Maximum v/c Ratio: 0.40		
Intersection Signal Delay: 6.0		Intersection LOS: A
Intersection Capacity Utilization 77.1%		ICU Level of Service D
Analysis Period (min) 15		

Splits and Phases: 9: Erb St W & Erbsville Court



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	29	0	0	4	0	1750	12	0	1432	298
Future Volume (vph)	0	0	29	0	0	4	0	1750	12	0	1432	298
Ideal Flow (vphpl)	0	0	1750	0	0	1750	0	1775	1775	0	1775	1775
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor												
Frt			0.865			0.865		0.999			0.974	
Flt Protected												
Satd. Flow (prot)	0	0	1514	0	0	1009	0	3206	0	0	3129	0
Flt Permitted												
Satd. Flow (perm)	0	0	1514	0	0	1009	0	3206	0	0	3129	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		40.5			37.7			83.9			220.2	
Travel Time (s)		2.9			2.7			5.0			13.2	
Confl. Peds. (#/hr)									2	2		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	50%	0%	5%	17%	0%	6%	0%
Adj. Flow (vph)	0	0	29	0	0	4	0	1750	12	0	1432	298
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	29	0	0	4	0	1762	0	0	1730	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 62.5%		ICU Level of Service B	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	29	0	0	4	0	1750	12	0	1432	298
Future Volume (Veh/h)	0	0	29	0	0	4	0	1750	12	0	1432	298
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	0	29	0	0	4	0	1750	12	0	1432	298
Pedestrians					2							
Lane Width (m)					3.6							
Walking Speed (m/s)					1.2							
Percent Blockage					0							
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	2460	3345	865	2503	3488	883	1730			1764		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2460	3345	865	2503	3488	883	1730			1764		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	7.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.8	2.2			2.2		
p0 queue free %	100	100	90	100	100	98	100			100		
cM capacity (veh/h)	16	8	301	13	7	209	370			358		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	29	4	1167	595	955	775
Volume Left	0	0	0	0	0	0
Volume Right	29	4	0	12	0	298
cSH	301	209	1700	1700	1700	1700
Volume to Capacity	0.10	0.02	0.69	0.35	0.56	0.46
Queue Length 95th (m)	2.5	0.5	0.0	0.0	0.0	0.0
Control Delay (s)	18.2	22.5	0.0	0.0	0.0	0.0
Lane LOS	C	C				
Approach Delay (s)	18.2	22.5	0.0		0.0	
Approach LOS	C	C				

Intersection Summary				
Average Delay	0.2			
Intersection Capacity Utilization	62.5%	ICU Level of Service		B
Analysis Period (min)	15			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	199	21	33	93	68	102	373	1450	73	41	1011	400
Future Volume (vph)	199	21	33	93	68	102	373	1450	73	41	1011	400
Ideal Flow (vphpl)	1775	1650	1650	1550	1550	1550	1650	1650	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.908			0.948			0.994			0.959	
Flt Protected	0.950				0.983			0.990			0.999	
Satd. Flow (prot)	1492	1498	0	0	1434	0	0	2991	0	0	2844	0
Flt Permitted	0.950				0.983			0.990			0.999	
Satd. Flow (perm)	1492	1498	0	0	1434	0	0	2991	0	0	2844	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		115.1			101.1			188.2			237.1	
Travel Time (s)		8.3			7.3			11.3			14.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	13%	0%	0%	1%	0%	1%	0%	4%	2%	11%	6%	4%
Adj. Flow (vph)	199	21	33	93	68	102	373	1450	73	41	1011	400
Shared Lane Traffic (%)												
Lane Group Flow (vph)	199	54	0	0	263	0	0	1896	0	0	1452	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization	147.7%	ICU Level of Service	H
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Traffic Volume (veh/h)	199	21	33	93	68	102	373	1450	73	41	1011	400
Future Volume (veh/h)	199	21	33	93	68	102	373	1450	73	41	1011	400
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	199	21	33	93	68	102	373	1450	73	41	1011	400
Approach Volume (veh/h)		253			263			1896			1452	
Crossing Volume (veh/h)		1145			2022#			261			534	
High Capacity (veh/h)		552			263			1129			908	
High v/c (veh/h)		0.46			1.00			1.68			1.60	
Low Capacity (veh/h)		423			185			929			732	
Low v/c (veh/h)		0.60			1.42			2.04			1.98	

Intersection Summary					
Maximum v/c High		1.68			
Maximum v/c Low		2.04			
Intersection Capacity Utilization		147.7%	ICU Level of Service	H	
# Crossing flow exceeds 1200, method is not applicable					

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	18	0	1848	1100	36
Future Volume (vph)	0	18	0	1848	1100	36
Ideal Flow (vphpl)	0	1750	0	1900	1750	1750
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Frt		0.865			0.995	
Flt Protected						
Satd. Flow (prot)	0	1514	0	3471	3139	0
Flt Permitted						
Satd. Flow (perm)	0	1514	0	3471	3139	0
Link Speed (k/h)	50			60	60	
Link Distance (m)	55.4			149.5	188.2	
Travel Time (s)	4.0			9.0	11.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	4%	5%	17%
Adj. Flow (vph)	0	18	0	1848	1100	36
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	18	0	1848	1136	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	54.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	18	0	1848	1100	36
Future Volume (Veh/h)	0	18	0	1848	1100	36
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	18	0	1848	1100	36
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	2042	568	1136			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2042	568	1136			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	96	100			
cM capacity (veh/h)	50	471	622			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	18	924	924	733	403
Volume Left	0	0	0	0	0
Volume Right	18	0	0	0	36
cSH	471	1700	1700	1700	1700
Volume to Capacity	0.04	0.54	0.54	0.43	0.24
Queue Length 95th (m)	1.0	0.0	0.0	0.0	0.0
Control Delay (s)	12.9	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	12.9	0.0		0.0	
Approach LOS	B				

Intersection Summary				
Average Delay		0.1		
Intersection Capacity Utilization		54.4%	ICU Level of Service	A
Analysis Period (min)		15		



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	11	35	114	1822	1072	43
Future Volume (vph)	11	35	114	1822	1072	43
Ideal Flow (vphpl)	1775	1750	1775	1900	1750	1750
Storage Length (m)	0.0	0.0	85.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	0.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Frt		0.850			0.994	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1686	1444	1670	3471	3148	0
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	1686	1444	1670	3471	3148	0
Link Speed (k/h)	50			60	60	
Link Distance (m)	62.4			166.4	149.5	
Travel Time (s)	4.5			10.0	9.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	3%	1%	4%	5%	5%
Adj. Flow (vph)	11	35	114	1822	1072	43
Shared Lane Traffic (%)						
Lane Group Flow (vph)	11	35	114	1822	1115	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 60.4%		ICU Level of Service B	
Analysis Period (min) 15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	11	35	114	1822	1072	43
Future Volume (Veh/h)	11	35	114	1822	1072	43
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	11	35	114	1822	1072	43
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	2232	558	1115			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2232	558	1115			
tC, single (s)	6.8	7.0	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	64	93	82			
cM capacity (veh/h)	30	471	628			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	11	35	114	911	911	715	400
Volume Left	11	0	114	0	0	0	0
Volume Right	0	35	0	0	0	0	43
cSH	30	471	628	1700	1700	1700	1700
Volume to Capacity	0.36	0.07	0.18	0.54	0.54	0.42	0.24
Queue Length 95th (m)	9.2	1.9	5.3	0.0	0.0	0.0	0.0
Control Delay (s)	179.5	13.3	12.0	0.0	0.0	0.0	0.0
Lane LOS	F	B	B				
Approach Delay (s)	53.0		0.7			0.0	
Approach LOS	F						

Intersection Summary				
Average Delay		1.2		
Intersection Capacity Utilization		60.4%	ICU Level of Service	B
Analysis Period (min)		15		



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	8	0	1950	1088	12
Future Volume (vph)	0	8	0	1950	1088	12
Ideal Flow (vphpl)	0	1750	0	1900	1750	1750
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Ped Bike Factor						
Frt		0.865			0.998	
Flt Protected						
Satd. Flow (prot)	0	1514	0	3471	3159	0
Flt Permitted						
Satd. Flow (perm)	0	1514	0	3471	3159	0
Link Speed (k/h)	50			60	60	
Link Distance (m)	67.0			178.5	166.4	
Travel Time (s)	4.8			10.7	10.0	
Confl. Peds. (#/hr)			2			2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	4%	5%	8%
Adj. Flow (vph)	0	8	0	1950	1088	12
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	8	0	1950	1100	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	57.2%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	8	0	1950	1088	12
Future Volume (Veh/h)	0	8	0	1950	1088	12
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	8	0	1950	1088	12
Pedestrians	2					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	2071	552	1102			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2071	552	1102			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	98	100			
cM capacity (veh/h)	48	482	640			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	8	975	975	725	375
Volume Left	0	0	0	0	0
Volume Right	8	0	0	0	12
cSH	482	1700	1700	1700	1700
Volume to Capacity	0.02	0.57	0.57	0.43	0.22
Queue Length 95th (m)	0.4	0.0	0.0	0.0	0.0
Control Delay (s)	12.6	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	12.6	0.0		0.0	
Approach LOS	B				

Intersection Summary					
Average Delay		0.0			
Intersection Capacity Utilization		57.2%	ICU Level of Service		B
Analysis Period (min)		15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	47	41	338	126	240	189	1652	687	176	923	36
Future Volume (vph)	25	47	41	338	126	240	189	1652	687	176	923	36
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.946			0.949			0.959			0.995	
Flt Protected		0.989			0.977			0.996			0.992	
Satd. Flow (prot)	0	2326	0	0	2754	0	0	2872	0	0	2984	0
Flt Permitted		0.989			0.977			0.996			0.992	
Satd. Flow (perm)	0	2326	0	0	2754	0	0	2872	0	0	2984	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		112.4			150.8			180.3			178.5	
Travel Time (s)		8.1			10.9			10.8			10.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	47%	9%	33%	4%	7%	7%	15%	4%	2%	2%	4%	4%
Adj. Flow (vph)	25	47	41	338	126	240	189	1652	687	176	923	36
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	113	0	0	704	0	0	2528	0	0	1135	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization	159.0%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Traffic Volume (veh/h)	25	47	41	338	126	240	189	1652	687	176	923	36
Future Volume (veh/h)	25	47	41	338	126	240	189	1652	687	176	923	36
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	25	47	41	338	126	240	189	1652	687	176	923	36
Approach Volume (veh/h)		113			704			2528			1135	
Crossing Volume (veh/h)		1437#			1866#			248			653	
High Capacity (veh/h)		433			301			1140			826	
High v/c (veh/h)		0.26			2.34			2.22			1.37	
Low Capacity (veh/h)		323			215			939			659	
Low v/c (veh/h)		0.35			3.27			2.69			1.72	

Intersection Summary					
Maximum v/c High		2.34			
Maximum v/c Low		3.27			
Intersection Capacity Utilization		159.0%	ICU Level of Service		H
# Crossing flow exceeds 1200, method is not applicable					



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	477	174	368	185	0	5	0	12	0	0	0
Future Volume (vph)	0	477	174	368	185	0	5	0	12	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.964						0.905				
Flt Protected					0.968			0.986				
Satd. Flow (prot)	0	1796	0	0	1803	0	0	1662	0	0	1863	0
Flt Permitted					0.968			0.986				
Satd. Flow (perm)	0	1796	0	0	1803	0	0	1662	0	0	1863	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		59.0			65.2			468.5			55.6	
Travel Time (s)		4.2			4.7			33.7			4.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	477	174	368	185	0	5	0	12	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	651	0	0	553	0	0	17	0	0	0	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	79.1%	ICU Level of Service D	
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	477	174	368	185	0	5	0	12	0	0	0
Future Volume (Veh/h)	0	477	174	368	185	0	5	0	12	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	477	174	368	185	0	5	0	12	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	185			651			1485	1485	564	1497	1572	185
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	185			651			1485	1485	564	1497	1572	185
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			61			93	100	98	100	100	100
cM capacity (veh/h)	1390			935			71	76	525	68	67	857

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	651	553	17	0
Volume Left	0	368	5	0
Volume Right	174	0	12	0
cSH	1390	935	183	1700
Volume to Capacity	0.00	0.39	0.09	0.00
Queue Length 95th (m)	0.0	15.2	2.4	0.0
Control Delay (s)	0.0	9.2	26.7	0.0
Lane LOS		A	D	A
Approach Delay (s)	0.0	9.2	26.7	0.0
Approach LOS			D	A

Intersection Summary				
Average Delay	4.5			
Intersection Capacity Utilization	79.1%	ICU Level of Service	D	
Analysis Period (min)	15			

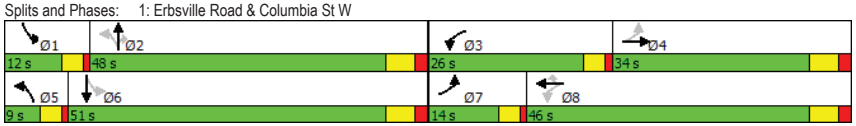
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	187	367	181	590	522	287	72	478	523	158	586	157
Future Volume (vph)	187	367	181	590	522	287	72	478	523	158	586	157
Ideal Flow (vphpl)	1775	1650	1650	1775	1900	1750	1775	1900	1750	1775	1650	1650
Storage Length (m)	0.0		0.0	0.0		75.0	0.0		170.0	0.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	0.0			7.5			80.0			0.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	0.99				0.97					1.00	
Frt		0.950				0.850			0.850		0.968	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1670	1535	0	1653	1881	1473	1686	1881	1488	1653	1565	0
Flt Permitted	0.199			0.125			0.093			0.202		
Satd. Flow (perm)	348	1535	0	218	1881	1424	165	1881	1488	352	1565	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		20				263			493		13	
Link Speed (k/h)		50			60			60			60	
Link Distance (m)		118.8			135.9			921.3			152.9	
Travel Time (s)		8.6			8.2			55.3			9.2	
Confl. Peds. (#/hr)	4		6	6		4	1					1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	2%	0%	2%	1%	1%	0%	1%	0%	2%	2%	0%
Adj. Flow (vph)	187	367	181	590	522	287	72	478	523	158	586	157
Shared Lane Traffic (%)												
Lane Group Flow (vph)	187	548	0	590	522	287	72	478	523	158	743	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	7	4		3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	17.4		5.0	17.4	17.4	5.0	31.8	31.8	5.0	31.8	
Minimum Split (s)	9.0	23.4		9.0	23.4	23.4	9.0	37.8	37.8	9.0	37.8	
Total Split (s)	14.0	34.0		26.0	46.0	46.0	9.0	48.0	48.0	12.0	51.0	
Total Split (%)	11.7%	28.3%		21.7%	38.3%	38.3%	7.5%	40.0%	40.0%	10.0%	42.5%	
Maximum Green (s)	10.0	28.0		22.0	40.0	40.0	5.0	42.0	42.0	8.0	45.0	
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	
All-Red Time (s)	1.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	-2.0		0.0	-2.0	-2.0	0.0	-2.0	-2.0	0.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Max		None	Max	Max	None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		11.0			11.0	11.0		11.0	11.0		11.0	
Pedestrian Calls (#/hr)		0			0	0		0	0		0	
Act Effct Green (s)	40.0	30.0		56.0	42.0	42.0	49.0	44.0	44.0	55.2	48.8	
Actuated g/C Ratio	0.33	0.25		0.47	0.35	0.35	0.41	0.37	0.37	0.46	0.41	
v/c Ratio	0.83	1.38		1.62	0.79	0.43	0.55	0.69	0.61	0.63	1.16	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	52.2	219.2		318.6	45.4	6.7	35.3	38.7	6.7	32.1	119.9	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	52.2	219.2		318.6	45.4	6.7	35.3	38.7	6.7	32.1	119.9	
LOS	D	F		F	D	A	D	D	A	C	F	
Approach Delay		176.7			152.7			22.8			104.5	
Approach LOS		F			F			C			F	
Queue Length 50th (m)	27.2	~177.1		~195.7	115.6	3.9	9.7	99.7	4.8	22.5	~222.1	
Queue Length 95th (m)	#61.8	#248.0		#268.1	160.8	24.6	#19.2	139.8	33.6	36.9	#299.2	
Internal Link Dist (m)		94.8			111.9			897.3			128.9	
Turn Bay Length (m)						75.0			170.0			
Base Capacity (vph)	226	398		364	658	669	130	689	857	249	643	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.83	1.38		1.62	0.79	0.43	0.55	0.69	0.61	0.63	1.16	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Natural Cycle: 150			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.62			
Intersection Signal Delay: 112.5		Intersection LOS: F	
Intersection Capacity Utilization 134.3%		ICU Level of Service H	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Erbsville Road & Columbia St W

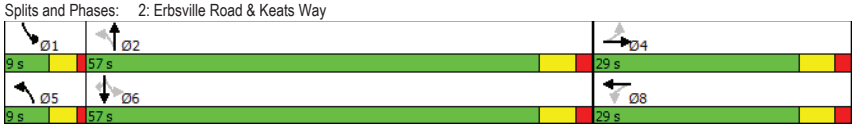


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	64	93	56	154	89	53	38	1000	175	63	1235	24
Future Volume (vph)	64	93	56	154	89	53	38	1000	175	63	1235	24
Ideal Flow (vphpl)	1775	1650	1650	1775	1650	1650	1775	1650	1650	1775	1900	1750
Storage Length (m)	0.0		0.0	0.0		0.0	20.0		0.0	25.0		25.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	0.0			0.0			65.0			50.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor	0.99	0.99		1.00	0.99		1.00					0.98
Frt		0.944			0.944			0.978				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1686	1549	0	1621	1544	0	1686	3027	0	1686	3539	1488
Flt Permitted	0.592			0.577			0.169			0.173		
Satd. Flow (perm)	1042	1549	0	982	1544	0	300	3027	0	307	3539	1454
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		31			31			34				80
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		155.7			226.8			139.9			921.3	
Travel Time (s)		11.2			16.3			8.4			55.3	
Confl. Peds. (#/hr)	10		3	3		10	3					3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	4%	0%	0%	0%	1%	3%	0%	2%	0%
Adj. Flow (vph)	64	93	56	154	89	53	38	1000	175	63	1235	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	64	149	0	154	142	0	38	1175	0	63	1235	24
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		5.0	43.5		5.0	43.5	43.5
Minimum Split (s)	14.0	14.0		14.0	14.0		9.0	49.5		9.0	49.5	49.5
Total Split (s)	29.0	29.0		29.0	29.0		9.0	57.0		9.0	57.0	57.0
Total Split (%)	30.5%	30.5%		30.5%	30.5%		9.5%	60.0%		9.5%	60.0%	60.0%
Maximum Green (s)	23.0	23.0		23.0	23.0		5.0	51.0		5.0	51.0	51.0
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		1.0	2.0		1.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		0.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		2.0	4.0		4.0	4.0	4.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max		None	Max	Max
Walk Time (s)	10.0	10.0		10.0	10.0			40.0			40.0	40.0
Flash Dont Walk (s)	16.0	16.0		16.0	16.0			13.0			13.0	13.0
Pedestrian Calls (#/hr)	0	0		0	0			0			0	0
Act Effct Green (s)	19.6	19.6		19.6	19.6		62.9	55.5		60.2	57.4	57.4
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.70	0.62		0.67	0.64	0.64
v/c Ratio	0.28	0.41		0.72	0.40		0.12	0.63		0.22	0.55	0.03

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	33.0	27.4		52.9	26.8		5.6	13.8		7.4	11.9	0.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	33.0	27.4		52.9	26.8		5.6	13.8		7.4	11.9	0.0
LOS	C	C		D	C		A	B		A	B	A
Approach Delay		29.1			40.4			13.5			11.5	
Approach LOS		C			D			B			B	
Queue Length 50th (m)	10.0	18.8		26.8	17.6		1.8	69.4		3.4	71.0	0.0
Queue Length 95th (m)	21.8	36.6		49.2	34.8		5.3	102.0		8.4	100.9	0.0
Internal Link Dist (m)		131.7			202.8			115.9			897.3	
Turn Bay Length (m)							20.0			25.0		25.0
Base Capacity (vph)	292	456		275	454		318	1879		282	2253	955
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.22	0.33		0.56	0.31		0.12	0.63		0.22	0.55	0.03

Intersection Summary		
Area Type:	Other	
Cycle Length: 95		
Actuated Cycle Length: 90.1		
Natural Cycle: 75		
Control Type: Semi Act-Uncoord		
Maximum v/c Ratio: 0.72		
Intersection Signal Delay: 16.3		Intersection LOS: B
Intersection Capacity Utilization 81.6%		ICU Level of Service D
Analysis Period (min) 15		

Splits and Phases: 2: Erbsville Road & Keats Way



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	423	502	967	239	558	152	654	1014	354	142	1124	412
Future Volume (vph)	423	502	967	239	558	152	654	1014	354	142	1124	412
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1775	1775	1750	1775	1775	1750
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	1.00	0.95	0.95	1.00
Frt		0.923			0.976				0.850			0.850
Flt Protected		0.989			0.988			0.981			0.994	
Satd. Flow (prot)	0	2804	0	0	2961	0	0	3238	1403	0	3265	1458
Flt Permitted		0.989			0.988			0.981			0.994	
Satd. Flow (perm)	0	2804	0	0	2961	0	0	3238	1403	0	3265	1458
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		147.8			470.9			152.2			97.5	
Travel Time (s)		8.9			28.3			9.1			5.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	4%	3%	2%	1%	4%	1%	6%	0%	3%	2%
Adj. Flow (vph)	423	502	967	239	558	152	654	1014	354	142	1124	412
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1892	0	0	949	0	0	1668	354	0	1266	412
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization	198.7%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized									MOYes			MOYes
Traffic Volume (veh/h)	423	502	967	239	558	152	654	1014	354	142	1124	412
Future Volume (veh/h)	423	502	967	239	558	152	654	1014	354	142	1124	412
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	423	502	967	239	558	152	654	1014	354	142	1124	412
Approach Volume (veh/h)		1892			949			1668			1266	
Crossing Volume (veh/h)		1505#			2091#			1067			1451#	
High Capacity (veh/h)		409			248			589			428	
High v/c (veh/h)		4.63			3.83			2.83			2.96	
Low Capacity (veh/h)		303			173			454			319	
Low v/c (veh/h)		6.25			5.48			3.67			3.97	

Intersection Summary					
Maximum v/c High		4.63			
Maximum v/c Low		6.25			
Intersection Capacity Utilization		198.7%	ICU Level of Service		H
# Crossing flow exceeds 1200, method is not applicable					

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1521	72	81	1300	78	0	0	118	0	0	26
Future Volume (vph)	0	1521	72	81	1300	78	0	0	118	0	0	26
Ideal Flow (vphpl)	1900	1650	1650	1900	1650	1650	1900	1650	1650	1650	1650	1900
Storage Length (m)	0.0		0.0	25.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		1	0		1
Taper Length (m)	0.0			60.0			0.0			0.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.993			0.992				0.865			0.865
Flt Protected				0.950								
Satd. Flow (prot)	0	3055	0	1787	3051	0	0	0	1427	0	0	1644
Flt Permitted				0.950								
Satd. Flow (perm)	0	3055	0	1787	3051	0	0	0	1427	0	0	1644
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		83.2			147.8			60.7			74.6	
Travel Time (s)		5.0			8.9			4.4			5.4	
Confl. Peds. (#/hr)	3		4	4		3	1		1	1		1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	2%	0%	1%	2%	1%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	1521	72	81	1300	78	0	0	118	0	0	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1593	0	81	1378	0	0	0	118	0	0	26
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 66.4%		ICU Level of Service C	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1521	72	81	1300	78	0	0	118	0	0	26
Future Volume (Veh/h)	0	1521	72	81	1300	78	0	0	118	0	0	26
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	1521	72	81	1300	78	0	0	118	0	0	26
Pedestrians		1			1			4			3	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		83										
pX, platoon unblocked				0.85			0.85	0.85	0.85	0.85	0.85	
vC, conflicting volume	1381			1597			2400	3104	802	2384	3101	693
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1381			1352			2295	3122	418	2276	3119	693
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			81			100	100	76	100	100	93
cM capacity (veh/h)	501			433			15	8	500	12	8	389

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	1014	579	81	867	511	118	26
Volume Left	0	0	81	0	0	0	0
Volume Right	0	72	0	0	78	118	26
cSH	1700	1700	433	1700	1700	500	389
Volume to Capacity	0.60	0.34	0.19	0.51	0.30	0.24	0.07
Queue Length 95th (m)	0.0	0.0	5.4	0.0	0.0	7.3	1.7
Control Delay (s)	0.0	0.0	15.2	0.0	0.0	14.4	14.9
Lane LOS			C			B	B
Approach Delay (s)	0.0		0.8			14.4	14.9
Approach LOS						B	B

Intersection Summary				
Average Delay		1.0		
Intersection Capacity Utilization		66.4%	ICU Level of Service	C
Analysis Period (min)		15		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	82	1465	1269	46	106	117
Future Volume (vph)	82	1465	1269	46	106	117
Ideal Flow (vphpl)	1775	1900	1900	1750	1775	1750
Storage Length (m)	30.0			0.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	55.0				0.0	
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor	1.00			0.98		
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1686	3539	3505	1488	1670	1473
Flt Permitted	0.200				0.950	
Satd. Flow (perm)	355	3539	3505	1457	1670	1473
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				46		117
Link Speed (k/h)		60	60		50	
Link Distance (m)		435.4	83.2		96.6	
Travel Time (s)		26.1	5.0		7.0	
Confl. Peds. (#/hr)	1			1		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	2%	3%	0%	1%	1%
Adj. Flow (vph)	82	1465	1269	46	106	117
Shared Lane Traffic (%)						
Lane Group Flow (vph)	82	1465	1269	46	106	117
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4	8			
Permitted Phases	4			8	6	6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	60.0	60.0	60.0	60.0	7.0	7.0
Minimum Split (s)	66.0	66.0	66.0	66.0	13.0	13.0
Total Split (s)	74.0	74.0	74.0	74.0	13.0	13.0
Total Split (%)	85.1%	85.1%	85.1%	85.1%	14.9%	14.9%
Maximum Green (s)	68.0	68.0	68.0	68.0	7.0	7.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	Max	None	None
Walk Time (s)	50.0	50.0	50.0	50.0	7.0	7.0
Flash Dont Walk (s)	10.0	10.0	10.0	10.0	15.0	15.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	70.0	70.0	70.0	70.0	9.0	9.0
Actuated g/C Ratio	0.80	0.80	0.80	0.80	0.10	0.10
v/c Ratio	0.29	0.51	0.45	0.04	0.62	0.46

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Control Delay	5.0	3.6	3.2	0.6	54.1	13.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.0	3.6	3.2	0.6	54.1	13.7
LOS	A	A	A	A	D	B
Approach Delay		3.7	3.1		32.9	
Approach LOS		A	A		C	
Queue Length 50th (m)	2.6	32.3	25.6	0.0	18.1	0.0
Queue Length 95th (m)	7.1	41.4	33.1	1.5	#39.7	15.5
Internal Link Dist (m)		411.4	59.2		72.6	
Turn Bay Length (m)	30.0					
Base Capacity (vph)	285	2847	2820	1181	172	257
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.51	0.45	0.04	0.62	0.46

Intersection Summary		
Area Type:	Other	
Cycle Length: 87		
Actuated Cycle Length: 87		
Natural Cycle: 80		
Control Type: Semi Act-Uncoord		
Maximum v/c Ratio: 0.62		
Intersection Signal Delay: 5.5		Intersection LOS: A
Intersection Capacity Utilization 106.7%		ICU Level of Service G
Analysis Period (min) 15		
# 95th percentile volume exceeds capacity, queue may be longer.		
Queue shown is maximum after two cycles.		

Splits and Phases: 5: Erb St W & Commercial Entrance 1



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	1276	2	28	994	588	4	1	29	310	0	29
Future Volume (vph)	30	1276	2	28	994	588	4	1	29	310	0	29
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1550	1550	1550	1550	1550	1750
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	0.95	0.95	1.00
Frt					0.945			0.885			0.974	
Flt Protected		0.999			0.999			0.994		0.950	0.960	
Satd. Flow (prot)	0	3129	0	0	2907	0	0	989	0	1399	1377	0
Flt Permitted		0.999			0.999			0.994		0.950	0.960	
Satd. Flow (perm)	0	3129	0	0	2907	0	0	989	0	1399	1377	0
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		149.9			435.4			54.9			87.3	
Travel Time (s)		9.0			26.1			4.0			6.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	50%	68%	1%	0%	25%	0%	41%	0%	0%	0%
Adj. Flow (vph)	30	1276	2	28	994	588	4	1	29	310	0	29
Shared Lane Traffic (%)										45%		
Lane Group Flow (vph)	0	1308	0	0	1610	0	0	34	0	170	169	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization	102.4%	ICU Level of Service	G
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Traffic Volume (veh/h)	30	1276	2	28	994	588	4	1	29	310	0	29
Future Volume (veh/h)	30	1276	2	28	994	588	4	1	29	310	0	29
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	30	1276	2	28	994	588	4	1	29	310	0	29
Approach Volume (veh/h)		1308			1610			34			339	
Crossing Volume (veh/h)		338			35			1616#			1026	
High Capacity (veh/h)		1062			1347			372			609	
High v/c (veh/h)		1.23			1.19			0.09			0.56	
Low Capacity (veh/h)		869			1127			273			471	
Low v/c (veh/h)		1.51			1.43			0.12			0.72	

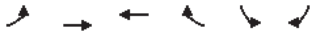
Intersection Summary					
Maximum v/c High		1.23			
Maximum v/c Low		1.51			
Intersection Capacity Utilization		102.4%	ICU Level of Service		G
# Crossing flow exceeds 1200, method is not applicable					

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	118	306	7	52	592	382	6	7	76	926	7	248
Future Volume (vph)	118	306	7	52	592	382	6	7	76	926	7	248
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1550	1550	1550	1550	1550	1750
Storage Length (m)	30.0		30.0	0.0		0.0	0.0		0.0	50.0		0.0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (m)	85.0			0.0			0.0			75.0		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.998			0.944			0.885			0.936	
Flt Protected		0.986			0.997			0.997		0.950	0.973	
Satd. Flow (prot)	0	3063	0	0	2913	0	0	1345	0	1399	1341	0
Flt Permitted		0.986			0.997			0.997		0.950	0.973	
Satd. Flow (perm)	0	3063	0	0	2913	0	0	1345	0	1399	1341	0
Link Speed (k/h)		70			60			50			50	
Link Distance (m)		346.1			149.9			61.3			415.1	
Travel Time (s)		17.8			9.0			4.4			29.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	1%	0%	3%	2%	0%	0%	0%	2%	0%	0%	0%
Adj. Flow (vph)	118	306	7	52	592	382	6	7	76	926	7	248
Shared Lane Traffic (%)										35%		
Lane Group Flow (vph)	0	431	0	0	1026	0	0	89	0	602	579	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization	106.2%	ICU Level of Service	G
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Traffic Volume (veh/h)	118	306	7	52	592	382	6	7	76	926	7	248
Future Volume (veh/h)	118	306	7	52	592	382	6	7	76	926	7	248
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	118	306	7	52	592	382	6	7	76	926	7	248
Approach Volume (veh/h)		431			1026			89			1181	
Crossing Volume (veh/h)		985			131			1350#			650	
High Capacity (veh/h)		630			1250			466			828	
High v/c (veh/h)		0.68			0.82			0.19			1.43	
Low Capacity (veh/h)		489			1039			350			661	
Low v/c (veh/h)		0.88			0.99			0.25			1.79	

Intersection Summary					
Maximum v/c High		1.43			
Maximum v/c Low		1.79			
Intersection Capacity Utilization		106.2%	ICU Level of Service	G	
# Crossing flow exceeds 1200, method is not applicable					



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	12	372	701	138	50	9
Future Volume (vph)	12	372	701	138	50	9
Ideal Flow (vphpl)	1650	1650	1650	1650	1765	1765
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.978		0.979	
Flt Protected		0.998			0.959	
Satd. Flow (prot)	0	1631	1595	0	1657	0
Flt Permitted		0.998			0.959	
Satd. Flow (perm)	0	1631	1595	0	1657	0
Link Speed (k/h)		70	70		60	
Link Distance (m)		189.3	346.1		103.7	
Travel Time (s)		9.7	17.8		6.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	1%	1%	2%	0%	0%
Adj. Flow (vph)	12	372	701	138	50	9
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	384	839	0	59	0
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 62.4%		ICU Level of Service B	
Analysis Period (min) 15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	12	372	701	138	50	9
Future Volume (Veh/h)	12	372	701	138	50	9
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	12	372	701	138	50	9
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	839				1166	770
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	839				1166	770
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				77	98
cM capacity (veh/h)	804				213	404

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	384	839	59
Volume Left	12	0	50
Volume Right	0	138	9
cSH	804	1700	230
Volume to Capacity	0.01	0.49	0.26
Queue Length 95th (m)	0.4	0.0	7.9
Control Delay (s)	0.5	0.0	26.0
Lane LOS	A		D
Approach Delay (s)	0.5	0.0	26.0
Approach LOS			D

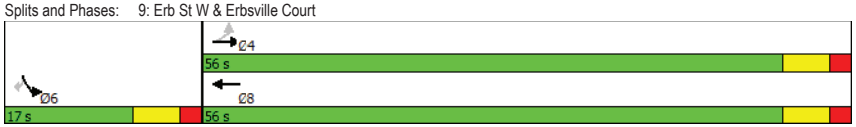
Intersection Summary				
Average Delay		1.3		
Intersection Capacity Utilization		62.4%	ICU Level of Service	B
Analysis Period (min)		15		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	39	940	943	44	64	46
Future Volume (vph)	39	940	943	44	64	46
Ideal Flow (vphpl)	1775	1900	1750	1750	1775	1750
Storage Length (m)	25.0			0.0	50.0	0.0
Storage Lanes	1			0	1	1
Taper Length (m)	75.0				55.0	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor	1.00		1.00		1.00	0.99
Frt			0.993			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1686	3539	3233	0	1653	1488
Flt Permitted	0.275				0.950	
Satd. Flow (perm)	488	3539	3233	0	1650	1465
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			16			46
Link Speed (k/h)		60	60		50	
Link Distance (m)		470.9	231.7		128.8	
Travel Time (s)		28.3	13.9		9.3	
Confl. Peds. (#/hr)	5			5	2	3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	2%	2%	2%	2%	0%
Adj. Flow (vph)	39	940	943	44	64	46
Shared Lane Traffic (%)						
Lane Group Flow (vph)	39	940	987	0	64	46
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4					6
Detector Phase	4	4	8		6	6
Switch Phase						
Minimum Initial (s)	40.0	40.0	40.0		8.0	8.0
Minimum Split (s)	47.0	47.0	47.0		14.0	14.0
Total Split (s)	56.0	56.0	56.0		17.0	17.0
Total Split (%)	76.7%	76.7%	76.7%		23.3%	23.3%
Maximum Green (s)	50.0	50.0	50.0		11.0	11.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0		-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0		4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	Max	Max	Max		None	None
Walk Time (s)	26.0	26.0	26.0		7.0	7.0
Flash Dont Walk (s)	14.0	14.0	14.0		15.0	15.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)	58.3	58.3	58.3		10.9	10.9
Actuated g/C Ratio	0.79	0.79	0.79		0.15	0.15
v/c Ratio	0.10	0.33	0.38		0.26	0.18

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Control Delay	3.7	3.4	3.7		30.0	10.5
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	3.7	3.4	3.7		30.0	10.5
LOS	A	A	A		C	B
Approach Delay		3.4	3.7		21.8	
Approach LOS		A	A		C	
Queue Length 50th (m)	1.1	18.1	19.4		8.0	0.0
Queue Length 95th (m)	4.2	30.5	33.5		18.4	8.3
Internal Link Dist (m)		446.9	207.7		104.8	
Turn Bay Length (m)	25.0				50.0	
Base Capacity (vph)	387	2806	2567		293	297
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.10	0.33	0.38		0.22	0.15

Intersection Summary			
Area Type:	Other		
Cycle Length: 73			
Actuated Cycle Length: 73.5			
Natural Cycle: 65			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.38			
Intersection Signal Delay: 4.5		Intersection LOS: A	
Intersection Capacity Utilization 49.1%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 9: Erb St W & Erbsville Court



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	202	0	0	17	0	2040	13	0	2217	140
Future Volume (vph)	0	0	202	0	0	17	0	2040	13	0	2217	140
Ideal Flow (vphpl)	0	0	1750	0	0	1750	0	1775	1775	0	1775	1775
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor												
Frt			0.865			0.865		0.999			0.991	
Flt Protected												
Satd. Flow (prot)	0	0	1514	0	0	1514	0	3272	0	0	3250	0
Flt Permitted												
Satd. Flow (perm)	0	0	1514	0	0	1514	0	3272	0	0	3250	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		40.5			37.7			83.9			220.2	
Travel Time (s)		2.9			2.7			5.0			13.2	
Confl. Peds. (#/hr)									3	3		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	3%	0%
Adj. Flow (vph)	0	0	202	0	0	17	0	2040	13	0	2217	140
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	202	0	0	17	0	2053	0	0	2357	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 90.6%		ICU Level of Service E	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	202	0	0	17	0	2040	13	0	2217	140
Future Volume (Veh/h)	0	0	202	0	0	17	0	2040	13	0	2217	140
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	0	202	0	0	17	0	2040	13	0	2217	140
Pedestrians					3							
Lane Width (m)					3.6							
Walking Speed (m/s)					1.2							
Percent Blockage					0							
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	3324	4343	1178	3360	4406	1030	2357			2056		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	3324	4343	1178	3360	4406	1030	2357			2056		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	0	0	100	93	100			100		
cM capacity (veh/h)	3	2	186	0	2	234	211			276		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	202	17	1360	693	1478	879
Volume Left	0	0	0	0	0	0
Volume Right	202	17	0	13	0	140
cSH	186	234	1700	1700	1700	1700
Volume to Capacity	1.08	0.07	0.80	0.41	0.87	0.52
Queue Length 95th (m)	77.9	1.9	0.0	0.0	0.0	0.0
Control Delay (s)	142.0	21.6	0.0	0.0	0.0	0.0
Lane LOS	F	C				
Approach Delay (s)	142.0	21.6	0.0		0.0	
Approach LOS	F	C				

Intersection Summary				
Average Delay	6.3			
Intersection Capacity Utilization	90.6%	ICU Level of Service	E	
Analysis Period (min)	15			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	811	72	238	82	46	98	135	1134	86	125	2151	258
Future Volume (vph)	811	72	238	82	46	98	135	1134	86	125	2151	258
Ideal Flow (vphpl)	1775	1650	1650	1550	1550	1550	1650	1650	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.885			0.941			0.990			0.985	
Flt Protected	0.950				0.982			0.995			0.998	
Satd. Flow (prot)	1606	1460	0	0	1424	0	0	3012	0	0	2973	0
Flt Permitted	0.950				0.982			0.995			0.998	
Satd. Flow (perm)	1606	1460	0	0	1424	0	0	3012	0	0	2973	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		115.1			101.1			188.2			237.1	
Travel Time (s)		8.3			7.3			11.3			14.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	0%	0%	0%	3%	0%	0%	3%	0%	1%	4%	2%
Adj. Flow (vph)	811	72	238	82	46	98	135	1134	86	125	2151	258
Shared Lane Traffic (%)												
Lane Group Flow (vph)	811	310	0	0	226	0	0	1355	0	0	2534	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization	203.2%	ICU Level of Service	H
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Traffic Volume (veh/h)	811	72	238	82	46	98	135	1134	86	125	2151	258
Future Volume (veh/h)	811	72	238	82	46	98	135	1134	86	125	2151	258
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	811	72	238	82	46	98	135	1134	86	125	2151	258
Approach Volume (veh/h)		1121			226			1355			2534	
Crossing Volume (veh/h)		2358#			2080#			1008			263	
High Capacity (veh/h)		197			250			618			1127	
High v/c (veh/h)		5.70			0.90			2.19			2.25	
Low Capacity (veh/h)		133			175			479			927	
Low v/c (veh/h)		8.40			1.29			2.83			2.73	

Intersection Summary					
Maximum v/c High		5.70			
Maximum v/c Low		8.40			
Intersection Capacity Utilization		203.2%	ICU Level of Service	H	
# Crossing flow exceeds 1200, method is not applicable					



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	61	0	1352	2415	39
Future Volume (vph)	0	61	0	1352	2415	39
Ideal Flow (vphpl)	0	1750	0	1900	1750	1750
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Ped Bike Factor						
Frt		0.865			0.998	
Flt Protected						
Satd. Flow (prot)	0	1514	0	3505	3213	0
Flt Permitted						
Satd. Flow (perm)	0	1514	0	3505	3213	0
Link Speed (k/h)	50			60	60	
Link Distance (m)	55.4			149.5	188.2	
Travel Time (s)	4.0			9.0	11.3	
Confl. Peds. (#/hr)			5			5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	3%	3%	21%
Adj. Flow (vph)	0	61	0	1352	2415	39
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	61	0	1352	2454	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	84.6%	ICU Level of Service	E
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	61	0	1352	2415	39
Future Volume (Veh/h)	0	61	0	1352	2415	39
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	61	0	1352	2415	39
Pedestrians	5					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	3116	1232	2459			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	3116	1232	2459			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	64	100			
cM capacity (veh/h)	9	171	191			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	61	676	676	1610	844
Volume Left	0	0	0	0	0
Volume Right	61	0	0	0	39
cSH	171	1700	1700	1700	1700
Volume to Capacity	0.36	0.40	0.40	0.95	0.50
Queue Length 95th (m)	12.0	0.0	0.0	0.0	0.0
Control Delay (s)	37.3	0.0	0.0	0.0	0.0
Lane LOS	E				
Approach Delay (s)	37.3	0.0		0.0	
Approach LOS	E				

Intersection Summary					
Average Delay		0.6			
Intersection Capacity Utilization		84.6%	ICU Level of Service		E
Analysis Period (min)		15			

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	20	116	120	1316	2402	90
Future Volume (vph)	20	116	120	1316	2402	90
Ideal Flow (vphpl)	1775	1750	1775	1900	1750	1750
Storage Length (m)	0.0	0.0	85.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	0.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Ped Bike Factor						
Frt		0.850			0.995	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1686	1473	1686	3539	3214	0
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	1686	1473	1686	3539	3214	0
Link Speed (k/h)	50			60	60	
Link Distance (m)	62.4			166.4	149.5	
Travel Time (s)	4.5			10.0	9.0	
Confl. Peds. (#/hr)		2	3			3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	1%	0%	2%	3%	1%
Adj. Flow (vph)	20	116	120	1316	2402	90
Shared Lane Traffic (%)						
Lane Group Flow (vph)	20	116	120	1316	2492	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	96.3%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	116	120	1316	2402	90
Future Volume (Veh/h)	20	116	120	1316	2402	90
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	20	116	120	1316	2402	90
Pedestrians	3			2		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.2			1.2		
Percent Blockage	0			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	3348	1251	2495			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	3348	1251	2495			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	30	35			
cM capacity (veh/h)	2	165	186			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	20	116	120	658	658	1601	891
Volume Left	20	0	120	0	0	0	0
Volume Right	0	116	0	0	0	0	90
cSH	2	165	186	1700	1700	1700	1700
Volume to Capacity	9.09	0.70	0.65	0.39	0.39	0.94	0.52
Queue Length 95th (m)	Err	33.8	30.1	0.0	0.0	0.0	0.0
Control Delay (s)	Err	67.0	54.3	0.0	0.0	0.0	0.0
Lane LOS	F	F	F				
Approach Delay (s)	1527.6		4.5			0.0	
Approach LOS	F						

Intersection Summary				
Average Delay	52.7			
Intersection Capacity Utilization	96.3%	ICU Level of Service		F
Analysis Period (min)	15			



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	67	0	1428	2435	32
Future Volume (vph)	0	67	0	1428	2435	32
Ideal Flow (vphpl)	0	1750	0	1900	1750	1750
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Ped Bike Factor						
Frt		0.865			0.998	
Flt Protected						
Satd. Flow (prot)	0	1484	0	3539	3223	0
Flt Permitted						
Satd. Flow (perm)	0	1484	0	3539	3223	0
Link Speed (k/h)	50			60	60	
Link Distance (m)	67.0			178.5	166.4	
Travel Time (s)	4.8			10.7	10.0	
Confl. Peds. (#/hr)			1			1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	2%	0%	2%	3%	0%
Adj. Flow (vph)	0	67	0	1428	2435	32
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	67	0	1428	2467	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	85.4%	ICU Level of Service	E
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	67	0	1428	2435	32
Future Volume (Veh/h)	0	67	0	1428	2435	32
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	67	0	1428	2435	32
Pedestrians	1					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	3166	1234	2468			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	3166	1234	2468			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	60	100			
cM capacity (veh/h)	8	168	191			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	67	714	714	1623	844
Volume Left	0	0	0	0	0
Volume Right	67	0	0	0	32
cSH	168	1700	1700	1700	1700
Volume to Capacity	0.40	0.42	0.42	0.95	0.50
Queue Length 95th (m)	14.0	0.0	0.0	0.0	0.0
Control Delay (s)	40.0	0.0	0.0	0.0	0.0
Lane LOS	E				
Approach Delay (s)	40.0	0.0		0.0	
Approach LOS	E				

Intersection Summary				
Average Delay		0.7		
Intersection Capacity Utilization		85.4%	ICU Level of Service	E
Analysis Period (min)		15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	156	226	463	209	222	231	1161	479	333	2085	82
Future Volume (vph)	38	156	226	463	209	222	231	1161	479	333	2085	82
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.919			0.963			0.962			0.995	
Flt Protected		0.995			0.975			0.994			0.993	
Satd. Flow (prot)	0	2726	0	0	2908	0	0	2932	0	0	3017	0
Flt Permitted		0.995			0.975			0.994			0.993	
Satd. Flow (perm)	0	2726	0	0	2908	0	0	2932	0	0	3017	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		112.4			150.8			180.3			178.5	
Travel Time (s)		8.1			10.9			10.8			10.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	9%	3%	6%	1%	2%	1%	8%	2%	0%	1%	3%	1%
Adj. Flow (vph)	38	156	226	463	209	222	231	1161	479	333	2085	82
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	420	0	0	894	0	0	1871	0	0	2500	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization 201.1%		ICU Level of Service H	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Traffic Volume (veh/h)	38	156	226	463	209	222	231	1161	479	333	2085	82
Future Volume (veh/h)	38	156	226	463	209	222	231	1161	479	333	2085	82
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	38	156	226	463	209	222	231	1161	479	333	2085	82
Approach Volume (veh/h)		420			894			1871			2500	
Crossing Volume (veh/h)		2881#			1430#			527			903	
High Capacity (veh/h)		124			436			913			674	
High v/c (veh/h)		3.39			2.05			2.05			3.71	
Low Capacity (veh/h)		79			325			737			527	
Low v/c (veh/h)		5.30			2.75			2.54			4.74	

Intersection Summary					
Maximum v/c High		3.71			
Maximum v/c Low		5.30			
Intersection Capacity Utilization		201.1%	ICU Level of Service	H	
# Crossing flow exceeds 1200, method is not applicable					



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	333	17	65	349	0	151	0	419	0	0	0
Future Volume (vph)	0	333	17	65	349	0	151	0	419	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.993						0.901				
Flt Protected					0.992			0.987				
Satd. Flow (prot)	0	1850	0	0	1848	0	0	1657	0	0	1863	0
Flt Permitted					0.992			0.987				
Satd. Flow (perm)	0	1850	0	0	1848	0	0	1657	0	0	1863	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		89.5			122.9			465.8			113.8	
Travel Time (s)		6.4			8.8			33.5			8.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	333	17	65	349	0	151	0	419	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	350	0	0	414	0	0	570	0	0	0	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	84.7%	ICU Level of Service	E
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	333	17	65	349	0	151	0	419	0	0	0
Future Volume (Veh/h)	0	333	17	65	349	0	151	0	419	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	333	17	65	349	0	151	0	419	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	349			350			820	820	342	1240	829	349
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	349			350			820	820	342	1240	829	349
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			95			46	100	40	100	100	100
cM capacity (veh/h)	1210			1209			282	293	701	59	290	694

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	350	414	570	0
Volume Left	0	65	151	0
Volume Right	17	0	419	0
cSH	1210	1209	503	1700
Volume to Capacity	0.00	0.05	1.13	0.00
Queue Length 95th (m)	0.0	1.4	155.4	0.0
Control Delay (s)	0.0	1.7	109.9	0.0
Lane LOS		A	F	A
Approach Delay (s)	0.0	1.7	109.9	0.0
Approach LOS			F	A

Intersection Summary				
Average Delay		47.5		
Intersection Capacity Utilization		84.7%	ICU Level of Service	E
Analysis Period (min)		15		

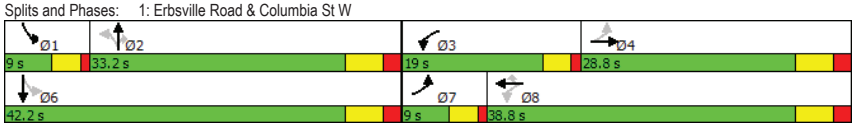
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	72	229	58	489	188	172	62	460	427	142	481	94
Future Volume (vph)	72	229	58	489	188	172	62	460	427	142	481	94
Ideal Flow (vphpl)	1775	1650	1650	1775	1900	1750	1775	1900	1750	1775	1650	1650
Storage Length (m)	0.0		0.0	75.0		0.0	0.0		170.0	0.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	0.0			7.5			80.0			0.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		1.00		0.97	1.00				1.00	
Frt		0.970				0.850			0.850		0.975	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1637	1538	0	1653	1727	1390	1561	1810	1473	1621	1513	0
Flt Permitted	0.639			0.322			0.255			0.161		
Satd. Flow (perm)	1095	1538	0	560	1727	1352	418	1810	1473	275	1513	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14				172			427		14	
Link Speed (k/h)		50			60			60			60	
Link Distance (m)		118.8			135.9			921.3			152.9	
Travel Time (s)		8.6			8.2			55.3			9.2	
Confl. Peds. (#/hr)	3		1	1		3	4					4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	7%	2%	10%	7%	8%	5%	1%	4%	5%	10%
Adj. Flow (vph)	72	229	58	489	188	172	62	460	427	142	481	94
Shared Lane Traffic (%)												
Lane Group Flow (vph)	72	287	0	489	188	172	62	460	427	142	575	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	7	4		3	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	22.8		5.0	22.8	22.8	26.4	26.4	26.4	5.0	26.4	
Minimum Split (s)	9.0	28.8		9.0	28.8	28.8	32.4	32.4	32.4	9.0	32.4	
Total Split (s)	9.0	28.8		19.0	38.8	38.8	33.2	33.2	33.2	9.0	42.2	
Total Split (%)	10.0%	32.0%		21.1%	43.1%	43.1%	36.9%	36.9%	36.9%	10.0%	46.9%	
Maximum Green (s)	5.0	22.8		15.0	32.8	32.8	27.2	27.2	27.2	5.0	36.2	
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	
All-Red Time (s)	1.0	2.0		1.0	2.0	2.0	2.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	-2.0		0.0	-2.0	-2.0	0.0	-2.0	-2.0	0.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	6.0	4.0	4.0	4.0	4.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Max		None	Max	Max	Max	Max	Max	None	Max	
Walk Time (s)		7.0			7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0		11.0	
Pedestrian Calls (#/hr)		0			0	0	0	0	0		0	
Act Effct Green (s)	29.8	24.8		43.8	36.6	36.6	27.2	29.2	29.2	38.2	38.2	
Actuated g/C Ratio	0.33	0.28		0.49	0.41	0.41	0.30	0.32	0.32	0.42	0.42	
v/c Ratio	0.18	0.66		1.08	0.27	0.26	0.49	0.78	0.56	0.74	0.88	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	14.9	36.0		85.8	19.9	4.2	41.4	38.7	5.6	43.3	41.0	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	14.9	36.0		85.8	19.9	4.2	41.4	38.7	5.6	43.3	41.0	
LOS	B	D		F	B	A	D	D	A	D	D	
Approach Delay		31.8			54.7			24.0			41.5	
Approach LOS		C			D			C			D	
Queue Length 50th (m)	6.7	43.9		~64.4	23.1	0.0	9.2	75.2	0.0	15.8	91.9	
Queue Length 95th (m)	14.1	72.5		#126.4	39.4	12.5	#25.6	#122.9	21.0	#38.4	#158.6	
Internal Link Dist (m)		94.8			111.9			897.3			128.9	
Turn Bay Length (m)				75.0					170.0			
Base Capacity (vph)	392	433		454	702	652	126	587	766	191	650	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.18	0.66		1.08	0.27	0.26	0.49	0.78	0.56	0.74	0.88	

Intersection Summary		
Area Type:	Other	
Cycle Length: 90		
Actuated Cycle Length: 90		
Natural Cycle: 90		
Control Type: Semi Act-Uncoord		
Maximum v/c Ratio: 1.08		
Intersection Signal Delay: 38.4		Intersection LOS: D
Intersection Capacity Utilization 120.8%		ICU Level of Service H
Analysis Period (min) 15		

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Erbsville Road & Columbia St W

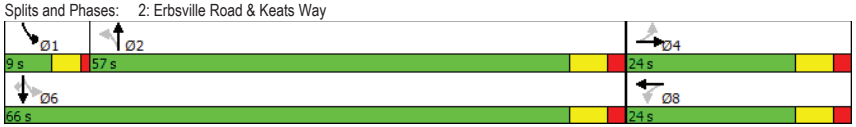


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	33	43	159	34	41	40	865	158	41	934	16
Future Volume (vph)	29	33	43	159	34	41	40	865	158	41	934	16
Ideal Flow (vphpl)	1775	1650	1650	1775	1650	1650	1775	1650	1650	1775	1900	1750
Storage Length (m)	0.0		0.0	0.0		0.0	20.0		0.0	25.0		25.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	0.0			0.0			65.0			50.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor	1.00	0.99		0.99	0.99		1.00	1.00		1.00		0.98
Frt		0.915			0.918			0.977				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1637	1428	0	1637	1330	0	1519	2926	0	1653	3438	1488
Flt Permitted	0.708			0.708			0.306			0.225		
Satd. Flow (perm)	1216	1428	0	1212	1330	0	489	2926	0	391	3438	1456
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		43			41			40				36
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		155.7			226.8			139.9			921.3	
Travel Time (s)		11.2			16.3			8.4			55.3	
Confl. Peds. (#/hr)	4		7	7		4	1		2	2		1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	4%	5%	3%	14%	12%	11%	4%	6%	2%	5%	0%
Adj. Flow (vph)	29	33	43	159	34	41	40	865	158	41	934	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	29	76	0	159	75	0	40	1023	0	41	934	16
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		1	6	6
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		42.6	42.6		5.0	42.6	42.6
Minimum Split (s)	14.0	14.0		14.0	14.0		48.6	48.6		9.0	57.6	57.6
Total Split (s)	24.0	24.0		24.0	24.0		57.0	57.0		9.0	66.0	66.0
Total Split (%)	26.7%	26.7%		26.7%	26.7%		63.3%	63.3%		10.0%	73.3%	73.3%
Maximum Green (s)	18.0	18.0		18.0	18.0		51.0	51.0		5.0	60.0	60.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		3.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		1.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		2.0	4.0	4.0
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		Max	Max		None	Max	Max
Walk Time (s)	10.0	10.0		10.0	10.0		29.6	29.6			29.6	29.6
Flash Dont Walk (s)	16.0	16.0		16.0	16.0		13.0	13.0			13.0	13.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0			0	0
Act Effct Green (s)	17.0	17.0		17.0	17.0		57.1	57.1		64.3	62.3	62.3
Actuated g/C Ratio	0.19	0.19		0.19	0.19		0.65	0.65		0.74	0.71	0.71
v/c Ratio	0.12	0.24		0.68	0.26		0.13	0.53		0.11	0.38	0.02

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	29.7	17.4		47.5	18.2		9.2	10.2		4.3	5.8	0.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	29.7	17.4		47.5	18.2		9.2	10.2		4.3	5.8	0.6
LOS	C	B		D	B		A	B		A	A	A
Approach Delay		20.8			38.1			10.2			5.6	
Approach LOS		C			D			B			A	
Queue Length 50th (m)	4.2	4.8		26.0	5.0		2.9	52.1		1.8	31.1	0.0
Queue Length 95th (m)	11.7	16.4		47.4	16.7		8.2	72.9		4.6	43.1	0.8
Internal Link Dist (m)		131.7			202.8			115.9			897.3	
Turn Bay Length (m)							20.0			25.0		25.0
Base Capacity (vph)	279	360		278	336		319	1926		389	2454	1049
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.10	0.21		0.57	0.22		0.13	0.53		0.11	0.38	0.02

Intersection Summary		
Area Type:	Other	
Cycle Length: 90		
Actuated Cycle Length: 87.3		
Natural Cycle: 75		
Control Type: Semi Act-Uncoord		
Maximum v/c Ratio: 0.68		
Intersection Signal Delay: 11.5		Intersection LOS: B
Intersection Capacity Utilization 89.5%		ICU Level of Service E
Analysis Period (min) 15		

Splits and Phases: 2: Erbsville Road & Keats Way



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	352	429	954	263	500	170	798	875	240	127	938	325
Future Volume (vph)	352	429	954	263	500	170	798	875	240	127	938	325
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1775	1775	1750	1775	1775	1750
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	1.00	0.95	0.95	1.00
Frt		0.918			0.973				0.850			0.850
Flt Protected		0.990			0.986			0.977			0.994	
Satd. Flow (prot)	0	2654	0	0	2838	0	0	3099	1444	0	3231	1430
Flt Permitted		0.990			0.986			0.977			0.994	
Satd. Flow (perm)	0	2654	0	0	2838	0	0	3099	1444	0	3231	1430
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		147.8			470.9			152.2			97.5	
Travel Time (s)		8.9			28.3			9.1			5.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	2%	11%	4%	7%	6%	10%	3%	3%	2%	4%	4%
Adj. Flow (vph)	352	429	954	263	500	170	798	875	240	127	938	325
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1735	0	0	933	0	0	1673	240	0	1065	325
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization	187.5%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized									MOYes			MOYes
Traffic Volume (veh/h)	352	429	954	263	500	170	798	875	240	127	938	325
Future Volume (veh/h)	352	429	954	263	500	170	798	875	240	127	938	325
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	352	429	954	263	500	170	798	875	240	127	938	325
Approach Volume (veh/h)		1735			933			1673			1065	
Crossing Volume (veh/h)		1328#			2025#			908			1561#	
High Capacity (veh/h)		474			263			671			390	
High v/c (veh/h)		3.66			3.55			2.49			2.73	
Low Capacity (veh/h)		357			185			525			287	
Low v/c (veh/h)		4.86			5.05			3.19			3.71	

Intersection Summary					
Maximum v/c High		3.66			
Maximum v/c Low		5.05			
Intersection Capacity Utilization		187.5%	ICU Level of Service	H	
# Crossing flow exceeds 1200, method is not applicable					

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1520	129	102	1416	99	0	0	143	0	0	43
Future Volume (vph)	0	1520	129	102	1416	99	0	0	143	0	0	43
Ideal Flow (vphpl)	1900	1650	1650	1900	1650	1650	1900	1650	1650	1650	1650	1900
Storage Length (m)	0.0		0.0	25.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (m)	0.0			60.0			0.0			0.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.988			0.990			0.865			0.865	
Flt Protected				0.950								
Satd. Flow (prot)	0	2886	0	1752	2930	0	0	1334	0	0	1427	0
Flt Permitted				0.950								
Satd. Flow (perm)	0	2886	0	1752	2930	0	0	1334	0	0	1427	0
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		83.2			147.8			60.7			74.6	
Travel Time (s)		5.0			8.9			4.4			5.4	
Confl. Peds. (#/hr)			1	1								
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	7%	11%	3%	6%	5%	0%	0%	7%	0%	0%	0%
Adj. Flow (vph)	0	1520	129	102	1416	99	0	0	143	0	0	43
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1649	0	102	1515	0	0	143	0	0	43	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 79.0%		ICU Level of Service D	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1520	129	102	1416	99	0	0	143	0	0	43
Future Volume (Veh/h)	0	1520	129	102	1416	99	0	0	143	0	0	43
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	1520	129	102	1416	99	0	0	143	0	0	43
Pedestrians								1				
Lane Width (m)								3.6				
Walking Speed (m/s)								1.2				
Percent Blockage								0				
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		83										
pX, platoon unblocked				0.80			0.80	0.80	0.80	0.80	0.80	
vC, conflicting volume	1515			1650			2540	3304	826	2572	3320	758
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1515			1307			2424	3382	274	2464	3401	758
tC, single (s)	4.1			4.2			7.5	6.5	7.0	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.4	3.5	4.0	3.3
p0 queue free %	100			75			100	100	75	100	100	88
cM capacity (veh/h)	447			414			10	5	565	8	5	354

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	1013	636	102	944	571	143	43
Volume Left	0	0	102	0	0	0	0
Volume Right	0	129	0	0	99	143	43
cSH	1700	1700	414	1700	1700	565	354
Volume to Capacity	0.60	0.37	0.25	0.56	0.34	0.25	0.12
Queue Length 95th (m)	0.0	0.0	7.7	0.0	0.0	8.0	3.3
Control Delay (s)	0.0	0.0	16.5	0.0	0.0	13.5	16.6
Lane LOS			C			B	C
Approach Delay (s)	0.0		1.0			13.5	16.6
Approach LOS						B	C

Intersection Summary				
Average Delay	1.3			
Intersection Capacity Utilization	79.0%	ICU Level of Service	D	
Analysis Period (min)	15			

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	114	1501	1404	51	148	126
Future Volume (vph)	114	1501	1404	51	148	126
Ideal Flow (vphpl)	1775	1900	1900	1750	1775	1750
Storage Length (m)	30.0			0.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	55.0				0.0	
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor	1.00			0.98		
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1606	3406	3406	1316	1466	1473
Flt Permitted	0.159				0.950	
Satd. Flow (perm)	269	3406	3406	1287	1466	1473
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				51		88
Link Speed (k/h)		60	60		50	
Link Distance (m)		435.4	83.2		96.6	
Travel Time (s)		26.1	5.0		7.0	
Confl. Peds. (#/hr)	3			3		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	6%	6%	13%	15%	1%
Adj. Flow (vph)	114	1501	1404	51	148	126
Shared Lane Traffic (%)						
Lane Group Flow (vph)	114	1501	1404	51	148	126
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4	8			
Permitted Phases	4			8	6	6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	60.0	60.0	60.0	60.0	7.0	7.0
Minimum Split (s)	66.0	66.0	66.0	66.0	13.0	13.0
Total Split (s)	71.0	71.0	71.0	71.0	19.0	19.0
Total Split (%)	78.9%	78.9%	78.9%	78.9%	21.1%	21.1%
Maximum Green (s)	65.0	65.0	65.0	65.0	13.0	13.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	Max	None	None
Walk Time (s)	50.0	50.0	50.0	50.0	7.0	7.0
Flash Dont Walk (s)	10.0	10.0	10.0	10.0	15.0	15.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	67.0	67.0	67.0	67.0	13.8	13.8
Actuated g/C Ratio	0.75	0.75	0.75	0.75	0.16	0.16
v/c Ratio	0.56	0.58	0.55	0.05	0.65	0.42

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Control Delay	18.3	6.1	5.7	1.1	49.6	17.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.3	6.1	5.7	1.1	49.6	17.2
LOS	B	A	A	A	D	B
Approach Delay		6.9	5.5		34.7	
Approach LOS		A	A		C	
Queue Length 50th (m)	7.5	53.4	47.5	0.0	25.3	6.0
Queue Length 95th (m)	#33.2	68.6	61.3	2.5	#46.6	22.3
Internal Link Dist (m)		411.4	59.2		72.6	
Turn Bay Length (m)	30.0					
Base Capacity (vph)	203	2570	2570	984	247	321
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.58	0.55	0.05	0.60	0.39

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 88.8
Natural Cycle: 80
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.65
Intersection Signal Delay: 8.6 Intersection LOS: A
Intersection Capacity Utilization 116.9% ICU Level of Service H
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: Erb St W & Commercial Entrance 1



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	1023	1	9	816	784	5	3	5	662	1	43
Future Volume (vph)	24	1023	1	9	816	784	5	3	5	662	1	43
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1550	1550	1550	1550	1550	1750
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	0.95	0.95	1.00
Frt					0.927			0.948			0.982	
Flt Protected		0.999						0.981		0.950	0.958	
Satd. Flow (prot)	0	3012	0	0	2822	0	0	919	0	1399	1385	0
Flt Permitted		0.999						0.981		0.950	0.958	
Satd. Flow (perm)	0	3012	0	0	2822	0	0	919	0	1399	1385	0
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		149.9			435.4			54.9			87.3	
Travel Time (s)		9.0			26.1			4.0			6.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	4%	80%	77%	5%	0%	60%	0%	88%	0%	0%	0%
Adj. Flow (vph)	24	1023	1	9	816	784	5	3	5	662	1	43
Shared Lane Traffic (%)										46%		
Lane Group Flow (vph)	0	1048	0	0	1609	0	0	13	0	357	349	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization	100.2%	ICU Level of Service	G
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Traffic Volume (veh/h)	24	1023	1	9	816	784	5	3	5	662	1	43
Future Volume (veh/h)	24	1023	1	9	816	784	5	3	5	662	1	43
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	24	1023	1	9	816	784	5	3	5	662	1	43
Approach Volume (veh/h)		1048			1609			13			706	
Crossing Volume (veh/h)		672			32			1709#			830	
High Capacity (veh/h)		813			1351			344			715	
High v/c (veh/h)		1.29			1.19			0.04			0.99	
Low Capacity (veh/h)		648			1130			250			563	
Low v/c (veh/h)		1.62			1.42			0.05			1.25	

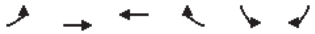
Intersection Summary					
Maximum v/c High		1.29			
Maximum v/c Low		1.62			
Intersection Capacity Utilization		100.2%	ICU Level of Service		G
# Crossing flow exceeds 1200, method is not applicable					

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	135	207	15	106	230	530	13	11	69	740	2	146
Future Volume (vph)	135	207	15	106	230	530	13	11	69	740	2	146
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1550	1550	1550	1550	1550	1750
Storage Length (m)	30.0		30.0	0.0		0.0	0.0		0.0	50.0		0.0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (m)	85.0			0.0			0.0			75.0		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.994			0.908			0.900			0.950	
Flt Protected		0.981			0.994			0.993		0.950	0.968	
Satd. Flow (prot)	0	2961	0	0	2773	0	0	1238	0	777	886	0
Flt Permitted		0.981			0.994			0.993		0.950	0.968	
Satd. Flow (perm)	0	2961	0	0	2773	0	0	1238	0	777	886	0
Link Speed (k/h)		70			60			50			50	
Link Distance (m)		346.1			149.9			61.3			415.1	
Travel Time (s)		17.8			9.0			4.4			29.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	3%	0%	8%	4%	0%	0%	0%	16%	80%	0%	0%
Adj. Flow (vph)	135	207	15	106	230	530	13	11	69	740	2	146
Shared Lane Traffic (%)										39%		
Lane Group Flow (vph)	0	357	0	0	866	0	0	93	0	451	437	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization	89.5%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Traffic Volume (veh/h)	135	207	15	106	230	530	13	11	69	740	2	146
Future Volume (veh/h)	135	207	15	106	230	530	13	11	69	740	2	146
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	135	207	15	106	230	530	13	11	69	740	2	146
Approach Volume (veh/h)		357			866			93			888	
Crossing Volume (veh/h)		848			159			1082			349	
High Capacity (veh/h)		705			1223			582			1053	
High v/c (veh/h)		0.51			0.71			0.16			0.84	
Low Capacity (veh/h)		554			1014			448			861	
Low v/c (veh/h)		0.64			0.85			0.21			1.03	

Intersection Summary					
Maximum v/c High		0.84			
Maximum v/c Low		1.03			
Intersection Capacity Utilization		89.5%	ICU Level of Service		E



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	8	340	299	68	50	10
Future Volume (vph)	8	340	299	68	50	10
Ideal Flow (vphpl)	1650	1650	1650	1650	1765	1765
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.975		0.977	
Flt Protected		0.999			0.960	
Satd. Flow (prot)	0	1612	1558	0	1631	0
Flt Permitted		0.999			0.960	
Satd. Flow (perm)	0	1612	1558	0	1631	0
Link Speed (k/h)		70	70		60	
Link Distance (m)		189.3	346.1		103.7	
Travel Time (s)		9.7	17.8		6.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	14%	2%	4%	0%	0%	9%
Adj. Flow (vph)	8	340	299	68	50	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	348	367	0	60	0
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 38.3%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	8	340	299	68	50	10
Future Volume (Veh/h)	8	340	299	68	50	10
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	8	340	299	68	50	10
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	367				689	333
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	367				689	333
tC, single (s)	4.2				6.4	6.3
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.4
p0 queue free %	99				88	99
cM capacity (veh/h)	1128				412	693

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	348	367	60
Volume Left	8	0	50
Volume Right	0	68	10
cSH	1128	1700	442
Volume to Capacity	0.01	0.22	0.14
Queue Length 95th (m)	0.2	0.0	3.7
Control Delay (s)	0.3	0.0	14.4
Lane LOS	A		B
Approach Delay (s)	0.3	0.0	14.4
Approach LOS			B

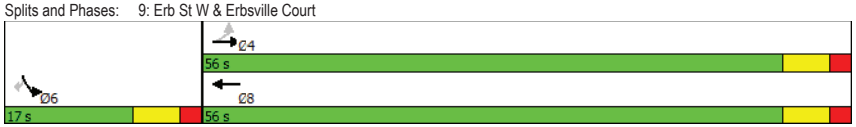
Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	38.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	28	775	872	21	26	29
Future Volume (vph)	28	775	872	21	26	29
Ideal Flow (vphpl)	1775	1900	1750	1750	1775	1750
Storage Length (m)	25.0			0.0	50.0	0.0
Storage Lanes	1			0	1	1
Taper Length (m)	75.0				55.0	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor	1.00		1.00		1.00	0.98
Frt			0.996			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1686	3505	3067	0	1637	1473
Flt Permitted	0.312				0.950	
Satd. Flow (perm)	554	3505	3067	0	1634	1446
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			8			29
Link Speed (k/h)		60	60		50	
Link Distance (m)		470.9	231.7		128.8	
Travel Time (s)		28.3	13.9		9.3	
Confl. Peds. (#/hr)	2			2	2	6
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	3%	8%	4%	3%	1%
Adj. Flow (vph)	28	775	872	21	26	29
Shared Lane Traffic (%)						
Lane Group Flow (vph)	28	775	893	0	26	29
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4					6
Detector Phase	4	4	8		6	6
Switch Phase						
Minimum Initial (s)	40.0	40.0	40.0		8.0	8.0
Minimum Split (s)	47.0	47.0	47.0		14.0	14.0
Total Split (s)	56.0	56.0	56.0		17.0	17.0
Total Split (%)	76.7%	76.7%	76.7%		23.3%	23.3%
Maximum Green (s)	50.0	50.0	50.0		11.0	11.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0		-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0		4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	Max	Max	Max		None	None
Walk Time (s)	26.0	26.0	26.0		7.0	7.0
Flash Dont Walk (s)	14.0	14.0	14.0		15.0	15.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)	62.3	62.3	62.3		10.1	10.1
Actuated g/C Ratio	0.85	0.85	0.85		0.14	0.14
v/c Ratio	0.06	0.26	0.34		0.12	0.13

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Control Delay	2.7	2.3	2.7		28.7	12.2
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	2.7	2.3	2.7		28.7	12.2
LOS	A	A	A		C	B
Approach Delay		2.3	2.7		20.0	
Approach LOS		A	A		B	
Queue Length 50th (m)	0.8	14.0	17.5		3.9	0.0
Queue Length 95th (m)	2.6	20.1	25.4		9.7	6.7
Internal Link Dist (m)		446.9	207.7		104.8	
Turn Bay Length (m)	25.0				50.0	
Base Capacity (vph)	472	2989	2617		292	282
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.06	0.26	0.34		0.09	0.10

Intersection Summary			
Area Type:	Other		
Cycle Length: 73			
Actuated Cycle Length: 73.1			
Natural Cycle: 65			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.34			
Intersection Signal Delay: 3.1		Intersection LOS: A	
Intersection Capacity Utilization 48.8%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 9: Erb St W & Erbsville Court



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	109	0	0	4	0	1551	12	0	1498	325
Future Volume (vph)	0	0	109	0	0	4	0	1551	12	0	1498	325
Ideal Flow (vphpl)	0	0	1750	0	0	1750	0	1775	1775	0	1775	1775
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor												
Frt			0.865			0.865		0.999			0.973	
Flt Protected												
Satd. Flow (prot)	0	0	1514	0	0	1009	0	3206	0	0	3127	0
Flt Permitted												
Satd. Flow (perm)	0	0	1514	0	0	1009	0	3206	0	0	3127	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		40.5			37.7			83.9			220.2	
Travel Time (s)		2.9			2.7			5.0			13.2	
Confl. Peds. (#/hr)									2	2		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	50%	0%	5%	17%	0%	6%	0%
Adj. Flow (vph)	0	0	109	0	0	4	0	1551	12	0	1498	325
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	109	0	0	4	0	1563	0	0	1823	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 69.4%		ICU Level of Service C	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	109	0	0	4	0	1551	12	0	1498	325
Future Volume (Veh/h)	0	0	109	0	0	4	0	1551	12	0	1498	325
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	0	109	0	0	4	0	1551	12	0	1498	325
Pedestrians					2							
Lane Width (m)					3.6							
Walking Speed (m/s)					1.2							
Percent Blockage					0							
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	2440	3226	912	2417	3382	784	1823			1565		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2440	3226	912	2417	3382	784	1823			1565		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	7.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.8	2.2			2.2		
p0 queue free %	100	100	61	100	100	98	100			100		
cM capacity (veh/h)	16	10	281	11	8	249	340			427		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	109	4	1034	529	999	824
Volume Left	0	0	0	0	0	0
Volume Right	109	4	0	12	0	325
cSH	281	249	1700	1700	1700	1700
Volume to Capacity	0.39	0.02	0.61	0.31	0.59	0.48
Queue Length 95th (m)	14.1	0.4	0.0	0.0	0.0	0.0
Control Delay (s)	25.8	19.7	0.0	0.0	0.0	0.0
Lane LOS	D	C				
Approach Delay (s)	25.8	19.7	0.0		0.0	
Approach LOS	D	C				

Intersection Summary					
Average Delay	0.8				
Intersection Capacity Utilization	69.4%	ICU Level of Service		C	
Analysis Period (min)	15				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	586	53	141	49	54	64	279	1254	58	55	1562	444
Future Volume (vph)	586	53	141	49	54	64	279	1254	58	55	1562	444
Ideal Flow (vphpl)	1775	1650	1650	1550	1550	1550	1650	1650	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.891			0.948			0.995			0.968	
Flt Protected	0.950				0.986			0.991			0.999	
Satd. Flow (prot)	1492	1470	0	0	1439	0	0	2995	0	0	2868	0
Flt Permitted	0.950				0.986			0.991			0.999	
Satd. Flow (perm)	1492	1470	0	0	1439	0	0	2995	0	0	2868	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		115.1			101.1			188.2			237.1	
Travel Time (s)		8.3			7.3			11.3			14.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	13%	0%	0%	1%	0%	1%	0%	4%	2%	11%	6%	4%
Adj. Flow (vph)	586	53	141	49	54	64	279	1254	58	55	1562	444
Shared Lane Traffic (%)												
Lane Group Flow (vph)	586	194	0	0	167	0	0	1591	0	0	2061	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization	178.9%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Traffic Volume (veh/h)	586	53	141	49	54	64	279	1254	58	55	1562	444
Future Volume (veh/h)	586	53	141	49	54	64	279	1254	58	55	1562	444
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	586	53	141	49	54	64	279	1254	58	55	1562	444
Approach Volume (veh/h)		780			167			1591			2061	
Crossing Volume (veh/h)		1666#			2119#			694			382	
High Capacity (veh/h)		357			242			799			1025	
High v/c (veh/h)		2.18			0.69			1.99			2.01	
Low Capacity (veh/h)		260			169			636			836	
Low v/c (veh/h)		3.00			0.99			2.50			2.46	

Intersection Summary			
Maximum v/c High	2.18		
Maximum v/c Low	3.00		
Intersection Capacity Utilization	178.9%	ICU Level of Service	H
# Crossing flow exceeds 1200, method is not applicable			

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	39	1	1490	1725	56
Future Volume (vph)	0	39	1	1490	1725	56
Ideal Flow (vphpl)	0	1750	0	1900	1750	1750
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Frt		0.865			0.995	
Flt Protected						
Satd. Flow (prot)	0	1514	0	3471	3140	0
Flt Permitted						
Satd. Flow (perm)	0	1514	0	3471	3140	0
Link Speed (k/h)	50			60	60	
Link Distance (m)	55.4			149.5	188.2	
Travel Time (s)	4.0			9.0	11.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	4%	5%	17%
Adj. Flow (vph)	0	39	1	1490	1725	56
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	39	0	1491	1781	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 63.7%		ICU Level of Service B	
Analysis Period (min) 15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	39	1	1490	1725	56
Future Volume (Veh/h)	0	39	1	1490	1725	56
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	39	1	1490	1725	56
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	2500	890	1781			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2500	890	1781			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	87	100			
cM capacity (veh/h)	24	290	353			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	39	498	993	1150	631
Volume Left	0	1	0	0	0
Volume Right	39	0	0	0	56
cSH	290	353	1700	1700	1700
Volume to Capacity	0.13	0.00	0.58	0.68	0.37
Queue Length 95th (m)	3.7	0.1	0.0	0.0	0.0
Control Delay (s)	19.4	0.1	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	19.4	0.0		0.0	
Approach LOS	C				

Intersection Summary				
Average Delay		0.2		
Intersection Capacity Utilization		63.7%	ICU Level of Service	B
Analysis Period (min)		15		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	45	85	87	1529	1597	129
Future Volume (vph)	45	85	87	1529	1597	129
Ideal Flow (vphpl)	1775	1750	1775	1900	1750	1750
Storage Length (m)	0.0	0.0	85.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	0.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Frt		0.850			0.989	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1686	1444	1670	3471	3132	0
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	1686	1444	1670	3471	3132	0
Link Speed (k/h)	50			60	60	
Link Distance (m)	62.4			166.4	149.5	
Travel Time (s)	4.5			10.0	9.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	3%	1%	4%	5%	5%
Adj. Flow (vph)	45	85	87	1529	1597	129
Shared Lane Traffic (%)						
Lane Group Flow (vph)	45	85	87	1529	1726	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	70.9%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	45	85	87	1529	1597	129
Future Volume (Veh/h)	45	85	87	1529	1597	129
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	45	85	87	1529	1597	129
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	2600	863	1726			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2600	863	1726			
tC, single (s)	6.8	7.0	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	71	76			
cM capacity (veh/h)	16	296	366			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	45	85	87	764	764	1065	661
Volume Left	45	0	87	0	0	0	0
Volume Right	0	85	0	0	0	0	129
cSH	16	296	366	1700	1700	1700	1700
Volume to Capacity	2.84	0.29	0.24	0.45	0.45	0.63	0.39
Queue Length 95th (m)	50.5	9.3	7.3	0.0	0.0	0.0	0.0
Control Delay (s)	1323.3	22.0	17.9	0.0	0.0	0.0	0.0
Lane LOS	F	C	C				
Approach Delay (s)	472.4		1.0			0.0	
Approach LOS	F						

Intersection Summary				
Average Delay	18.1			
Intersection Capacity Utilization	70.9%	ICU Level of Service		C
Analysis Period (min)	15			



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	57	0	1625	1623	39
Future Volume (vph)	0	57	0	1625	1623	39
Ideal Flow (vphpl)	0	1750	0	1900	1750	1750
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Ped Bike Factor						
Frt		0.865			0.996	
Flt Protected						
Satd. Flow (prot)	0	1514	0	3471	3152	0
Flt Permitted						
Satd. Flow (perm)	0	1514	0	3471	3152	0
Link Speed (k/h)	50			60	60	
Link Distance (m)	67.0			178.5	166.4	
Travel Time (s)	4.8			10.7	10.0	
Confl. Peds. (#/hr)			2			2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	4%	5%	8%
Adj. Flow (vph)	0	57	0	1625	1623	39
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	57	0	1625	1662	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	60.6%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	57	0	1625	1623	39
Future Volume (Veh/h)	0	57	0	1625	1623	39
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	57	0	1625	1623	39
Pedestrians	2					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	2457	833	1664			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2457	833	1664			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	82	100			
cM capacity (veh/h)	26	315	391			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	57	812	812	1082	580
Volume Left	0	0	0	0	0
Volume Right	57	0	0	0	39
cSH	315	1700	1700	1700	1700
Volume to Capacity	0.18	0.48	0.48	0.64	0.34
Queue Length 95th (m)	5.2	0.0	0.0	0.0	0.0
Control Delay (s)	18.9	0.0	0.0	0.0	0.0
Lane LOS	C				
Approach Delay (s)	18.9	0.0		0.0	
Approach LOS	C				

Intersection Summary					
Average Delay		0.3			
Intersection Capacity Utilization		60.6%	ICU Level of Service		B
Analysis Period (min)		15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	105	136	188	187	238	247	289	1284	390	226	1302	132
Future Volume (vph)	105	136	188	187	238	247	289	1284	390	226	1302	132
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.934			0.945			0.970			0.988	
Flt Protected		0.988			0.986			0.993			0.993	
Satd. Flow (prot)	0	2246	0	0	2751	0	0	2870	0	0	2965	0
Flt Permitted		0.988			0.986			0.993			0.993	
Satd. Flow (perm)	0	2246	0	0	2751	0	0	2870	0	0	2965	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		112.4			150.8			180.3			178.5	
Travel Time (s)		8.1			10.9			10.8			10.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	47%	9%	33%	4%	7%	7%	15%	4%	2%	2%	4%	4%
Adj. Flow (vph)	105	136	188	187	238	247	289	1284	390	226	1302	132
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	429	0	0	672	0	0	1963	0	0	1660	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization 169.8%		ICU Level of Service H	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Traffic Volume (veh/h)	105	136	188	187	238	247	289	1284	390	226	1302	132
Future Volume (veh/h)	105	136	188	187	238	247	289	1284	390	226	1302	132
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	105	136	188	187	238	247	289	1284	390	226	1302	132
Approach Volume (veh/h)		429			672			1963			1660	
Crossing Volume (veh/h)		1715#			1678#			467			714	
High Capacity (veh/h)		342			353			958			786	
High v/c (veh/h)		1.25			1.90			2.05			2.11	
Low Capacity (veh/h)		248			257			777			624	
Low v/c (veh/h)		1.73			2.61			2.53			2.66	

Intersection Summary					
Maximum v/c High		2.11			
Maximum v/c Low		2.66			
Intersection Capacity Utilization		169.8%	ICU Level of Service		H
# Crossing flow exceeds 1200, method is not applicable					

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	200	46	107	132	0	28	0	77	0	0	0
Future Volume (vph)	0	200	46	107	132	0	28	0	77	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.975						0.901				
Flt Protected					0.978			0.987				
Satd. Flow (prot)	0	1816	0	0	1822	0	0	1657	0	0	1863	0
Flt Permitted					0.978			0.987				
Satd. Flow (perm)	0	1816	0	0	1822	0	0	1657	0	0	1863	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		90.1			88.4			466.6			89.2	
Travel Time (s)		6.5			6.4			33.6			6.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	200	46	107	132	0	28	0	77	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	246	0	0	239	0	0	105	0	0	0	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	42.5%	ICU Level of Service A	
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	200	46	107	132	0	28	0	77	0	0	0
Future Volume (Veh/h)	0	200	46	107	132	0	28	0	77	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	200	46	107	132	0	28	0	77	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	132			246			569	569	223	646	592	132
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	132			246			569	569	223	646	592	132
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			92			93	100	91	100	100	100
cM capacity (veh/h)	1453			1320			406	397	817	327	385	917

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	246	239	105	0
Volume Left	0	107	28	0
Volume Right	46	0	77	0
cSH	1453	1320	643	1700
Volume to Capacity	0.00	0.08	0.16	0.00
Queue Length 95th (m)	0.0	2.1	4.6	0.0
Control Delay (s)	0.0	4.0	11.7	0.0
Lane LOS		A	B	A
Approach Delay (s)	0.0	4.0	11.7	0.0
Approach LOS			B	A

Intersection Summary				
Average Delay	3.7			
Intersection Capacity Utilization	42.5%	ICU Level of Service	A	
Analysis Period (min)	15			

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Columbia Street West & Platinum Drive.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Without Extension
Report generation date: 2019-07-31 6:13:12 PM

Summary of intersection performance

	AM					
	Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	A1 - Total 2031					
Leg North	0.00	0.00	0.00	A	9.80	A
Leg West	2.58	13.27	0.73	B		
Leg South	0.02	4.00	0.02	A		
Leg East	0.99	5.90	0.50	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D3 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D4 - Total 2031, AM " model duration: 8:00 AM - 9:30 AM
"D5 - Total 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Total 2031, Sat" model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 6:13:12 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-24
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

(Default Analysis Set) - Total 2031, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, AM	Total 2031	AM		ONE HOUR	08:00	09:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,South,East				9.80	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	(untitled)	
West	West	(untitled)	
South	South	(untitled)	
East	East	(untitled)	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	3.50	4.50	30.00	20.00	40.00	25.00	
West	3.50	4.50	30.00	20.00	40.00	25.00	
South	3.50	4.50	30.00	20.00	40.00	25.00	

East	3.50	4.50	30.00	20.00	40.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.579	1221.701
West		(calculated)	(calculated)	0.579	1221.701
South		(calculated)	(calculated)	0.579	1221.701
East		(calculated)	(calculated)	0.579	1221.701

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	0.00	100.000
West	ONE HOUR	✓	651.00	100.000
South	ONE HOUR	✓	17.00	100.000
East	ONE HOUR	✓	553.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	0.000	0.000	0.000
	West	0.000	0.000	174.000	477.000
	South	0.000	5.000	0.000	12.000
	East	0.000	185.000	368.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.25	0.25	0.25	0.25
	West	0.00	0.00	0.27	0.73
	South	0.00	0.29	0.00	0.71
	East	0.00	0.33	0.67	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.000	1.000	1.000
	West	1.000	1.000	1.000	1.000
	South	1.000	1.000	1.000	1.000
	East	1.000	1.000	1.000	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	0.0	0.0	0.0
	West	0.0	0.0	0.0	0.0
	South	0.0	0.0	0.0	0.0
	East	0.0	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.00	0.00	0.00	~1	A	0.00	0.00	0.00	0.00	0.00	0.00	0.00
West	0.73	13.27	2.58	6.00	B	597.37	896.05	138.61	9.28	1.54	138.64	9.28
South	0.02	4.00	0.02	~1	A	15.60	23.40	1.48	3.79	0.02	1.48	3.79
East	0.50	5.90	0.99	~1	A	507.44	761.16	65.40	5.16	0.73	65.41	5.16

Main Results for each time segment

Main results: (08:00-08:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	0.00	0.00	0.00	0.00	418.02	0.00	979.77	497.79	0.000	0.00	0.00	0.000	A
West	490.11	122.53	486.72	142.34	275.68	0.00	1062.15	616.35	0.461	0.00	0.85	6.221	A
South	12.80	3.20	12.75	405.77	356.63	0.00	1015.30	816.27	0.013	0.00	0.01	3.590	A
East	416.33	104.08	414.27	365.63	3.75	0.00	1219.53	1010.73	0.341	0.00	0.51	4.460	A

Main results: (08:15-08:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	0.00	0.00	0.00	0.00	500.96	0.00	931.77	497.79	0.000	0.00	0.00	0.000	A
West	585.24	146.31	583.46	170.58	330.38	0.00	1030.49	616.36	0.568	0.85	1.29	8.020	A
South	15.28	3.82	15.27	486.33	427.52	0.00	974.27	816.27	0.016	0.01	0.02	3.752	A
East	497.14	124.28	496.46	438.29	4.49	0.00	1219.10	1010.73	0.408	0.51	0.68	4.978	A

Main results: (08:30-08:45)

	Total	Intersection	Entry	Exit Flow	Circulating	Pedestrian	Capacity	Saturation	V/C	Start	End	Delay	

Leg	Demand (PCE/hr)	Arrivals (PCE)	Flow (PCE/hr)	(PCE/hr)	Flow (PCE/hr)	Demand (Ped/hr)	(PCE/hr)	Capacity (PCE/hr)	Ratio	Queue (PCE)	Queue (PCE)	(s)	LOS
North	0.00	0.00	0.00	0.00	613.15	0.00	866.83	497.79	0.000	0.00	0.00	0.000	A
West	716.76	179.19	711.84	208.78	404.37	0.00	987.67	616.36	0.726	1.29	2.52	12.823	B
South	18.72	4.68	18.70	594.63	521.58	0.00	919.83	816.27	0.020	0.02	0.02	3.994	A
East	608.86	152.22	607.65	534.78	5.50	0.00	1218.52	1010.73	0.500	0.68	0.99	5.881	A

Main results: (08:45-09:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	0.00	0.00	0.00	0.00	614.34	0.00	866.14	497.79	0.000	0.00	0.00	0.000	A
West	716.76	179.19	716.51	209.19	405.16	0.00	987.21	616.36	0.726	2.52	2.58	13.266	B
South	18.72	4.68	18.72	596.67	525.00	0.00	917.85	816.27	0.020	0.02	0.02	4.003	A
East	608.86	152.22	608.84	538.21	5.51	0.00	1218.51	1010.73	0.500	0.99	0.99	5.904	A

Main results: (09:00-09:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	0.00	0.00	0.00	0.00	502.83	0.00	930.69	497.79	0.000	0.00	0.00	0.000	A
West	585.24	146.31	590.19	171.21	331.62	0.00	1029.77	616.36	0.568	2.58	1.34	8.278	A
South	15.28	3.82	15.30	489.36	432.44	0.00	971.42	816.27	0.016	0.02	0.02	3.767	A
East	497.14	124.28	498.33	443.25	4.50	0.00	1219.10	1010.73	0.408	0.99	0.69	5.004	A

Main results: (09:15-09:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	0.00	0.00	0.00	0.00	420.79	0.00	978.17	497.79	0.000	0.00	0.00	0.000	A
West	490.11	122.53	492.00	143.28	277.51	0.00	1061.09	616.35	0.462	1.34	0.87	6.348	A
South	12.80	3.20	12.81	409.01	360.50	0.00	1013.06	816.27	0.013	0.02	0.01	3.601	A
East	416.33	104.08	417.02	369.54	3.77	0.00	1219.52	1010.73	0.341	0.69	0.52	4.489	A

Queueing Delay Results for each time segment

Queueing Delay results: (08:00-08:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.00	0.00	0.000	A	A
West	12.16	0.81	6.221	A	A
South	0.19	0.01	3.590	A	A
East	7.50	0.50	4.460	A	A

Queueing Delay results: (08:15-08:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.00	0.00	0.000	A	A
West	18.54	1.24	8.020	A	A
South	0.24	0.02	3.752	A	A
East	10.01	0.67	4.978	A	A

Queueing Delay results: (08:30-08:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.00	0.00	0.000	A	A
West	34.83	2.32	12.823	B	B
South	0.31	0.02	3.994	A	A
East	14.35	0.96	5.881	A	A

Queueing Delay results: (08:45-09:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service

North	0.00	0.00	0.000	A	A
West	38.36	2.56	13.266	B	B
South	0.31	0.02	4.003	A	A
East	14.85	0.99	5.904	A	A

Queueing Delay results: (09:00-09:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.00	0.00	0.000	A	A
West	21.23	1.42	8.278	A	A
South	0.24	0.02	3.767	A	A
East	10.70	0.71	5.004	A	A

Queueing Delay results: (09:15-09:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.00	0.00	0.000	A	A
West	13.50	0.90	6.348	A	A
South	0.20	0.01	3.601	A	A
East	8.00	0.53	4.489	A	A

Queue Variation Results for each time segment

Queue Variation results: (08:00-08:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.00	~1	~1	~1	~1			N/A	N/A
West	0.85	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.01	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.51	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:15-08:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.00	~1	~1	~1	~1			N/A	N/A
West	1.29	0.00	0.00	2.00	3.00			N/A	N/A
South	0.02	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.68	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:30-08:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.00	~1	~1	~1	~1			N/A	N/A
West	2.52	0.00	0.00	0.00	6.00			N/A	N/A
South	0.02	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.99	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:45-09:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.00	~1	~1	~1	~1			N/A	N/A
West	2.58	0.00	0.00	0.00	3.00			N/A	N/A
						Percentiles could not be calculated. This may			

South	0.02	~1	~1	~1	~1	be because the mean queue is very small or very big.		N/A	N/A
East	0.99	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:00-09:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.00	~1	~1	~1	~1			N/A	N/A
West	1.34	0.00	0.00	2.00	4.00			N/A	N/A
South	0.02	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.69	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:15-09:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.00	~1	~1	~1	~1			N/A	N/A
West	0.87	0.00	0.00	1.00	2.00			N/A	N/A
South	0.01	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.52	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Columbia Street West & Platinum Drive.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Without Extension
Report generation date: 2019-07-31 6:13:38 PM

Summary of intersection performance

	PM					
	Queue (PCE)	**Delay (s)**	**V/C Ratio**	**LOS**	**Intersection Delay (s)**	**Intersection LOS**
	A1 - Total 2031					
Leg North	0.00	0.00	0.00	A	6.88	A
Leg West	0.48	4.53	0.33	A		
Leg South	1.62	9.42	0.62	A		
Leg East	0.68	5.37	0.41	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D3 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D4 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Total 2031, PM " model duration: 4:00 PM - 5:30 PM
"D6 - Total 2031, Sat" model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 6:13:38 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-24
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

(Default Analysis Set) - Total 2031, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, PM	Total 2031	PM		ONE HOUR	16:00	17:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,South,East				6.88	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	(untitled)	
West	West	(untitled)	
South	South	(untitled)	
East	East	(untitled)	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	3.50	4.50	30.00	20.00	40.00	25.00	
West	3.50	4.50	30.00	20.00	40.00	25.00	
South	3.50	4.50	30.00	20.00	40.00	25.00	
East	3.50	4.50	30.00	20.00	40.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.579	1221.701
West		(calculated)	(calculated)	0.579	1221.701
South		(calculated)	(calculated)	0.579	1221.701
East		(calculated)	(calculated)	0.579	1221.701

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	0.00	100.000
West	ONE HOUR	✓	350.00	100.000
South	ONE HOUR	✓	570.00	100.000
East	ONE HOUR	✓	414.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	0.000	0.000	0.000
	West	0.000	0.000	17.000	333.000
	South	0.000	151.000	0.000	419.000
	East	0.000	349.000	65.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.25	0.25	0.25	0.25
	West	0.00	0.00	0.05	0.95
	South	0.00	0.26	0.00	0.74

	East	0.00	0.84	0.16	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.000	1.000	1.000
	West	1.000	1.000	1.000	1.000
	South	1.000	1.000	1.000	1.000
	East	1.000	1.000	1.000	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	0.0	0.0	0.0
	West	0.0	0.0	0.0	0.0
	South	0.0	0.0	0.0	0.0
	East	0.0	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.00	0.00	0.00	~1	A	0.00	0.00	0.00	0.00	0.00	0.00	0.00
West	0.33	4.53	0.48	1.00	A	321.17	481.75	33.61	4.19	0.37	33.61	4.19
South	0.62	9.42	1.62	1.00	A	523.04	784.56	95.59	7.31	1.06	95.60	7.31
East	0.41	5.37	0.68	1.00	A	379.89	569.84	45.54	4.80	0.51	45.55	4.80

Main Results for each time segment

Main results: (16:00-16:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	0.00	0.00	0.00	0.00	423.20	0.00	976.77	521.09	0.000	0.00	0.00	0.000	A
West	263.50	65.87	262.37	374.50	48.71	0.00	1193.51	899.37	0.221	0.00	0.28	3.861	A
South	429.13	107.28	426.50	61.45	249.63	0.00	1077.23	575.67	0.398	0.00	0.66	5.510	A
East	311.68	77.92	310.21	563.15	112.99	0.00	1156.31	1058.04	0.270	0.00	0.37	4.248	A

Main results: (16:15-16:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	0.00	0.00	0.00	0.00	507.17	0.00	928.17	521.09	0.000	0.00	0.00	0.000	A
West	314.64	78.66	314.34	448.81	58.36	0.00	1187.92	899.37	0.265	0.28	0.36	4.120	A
South	512.42	128.10	511.27	73.63	299.07	0.00	1048.61	575.67	0.489	0.66	0.94	6.684	A
East	372.18	93.04	371.73	674.90	135.44	0.00	1143.31	1058.04	0.326	0.37	0.48	4.662	A

Main results: (16:30-16:45)

Leg	Total	Intersection	Entry	Exit Flow	Circulating	Pedestrian	Capacity	Saturation	V/C	Start	End	Delay	

Leg	Demand (PCE/hr)	Arrivals (PCE)	Flow (PCE/hr)	(PCE/hr)	Flow (PCE/hr)	Demand (Ped/hr)	(PCE/hr)	Capacity (PCE/hr)	Ratio	Queue (PCE)	Queue (PCE)	(s)	LOS
North	0.00	0.00	0.00	0.00	620.60	0.00	862.52	521.09	0.000	0.00	0.00	0.000	A
West	385.36	96.34	384.86	549.16	71.44	0.00	1180.35	899.37	0.326	0.36	0.48	4.522	A
South	627.58	156.90	624.95	90.14	366.17	0.00	1009.78	575.67	0.622	0.94	1.60	9.290	A
East	455.82	113.96	455.04	825.57	165.56	0.00	1125.88	1058.04	0.405	0.48	0.67	5.358	A

Main results: (16:45-17:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	0.00	0.00	0.00	0.00	622.04	0.00	861.69	521.09	0.000	0.00	0.00	0.000	A
West	385.36	96.34	385.35	550.48	71.56	0.00	1180.28	899.37	0.327	0.48	0.48	4.528	A
South	627.58	156.90	627.50	90.28	366.63	0.00	1009.51	575.67	0.622	1.60	1.62	9.418	A
East	455.82	113.96	455.81	827.90	166.23	0.00	1125.49	1058.04	0.405	0.67	0.68	5.375	A

Main results: (17:00-17:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	0.00	0.00	0.00	0.00	509.38	0.00	926.89	521.09	0.000	0.00	0.00	0.000	A
West	314.64	78.66	315.12	450.82	58.55	0.00	1187.81	899.37	0.265	0.48	0.36	4.128	A
South	512.42	128.10	515.02	73.86	299.82	0.00	1048.18	575.67	0.489	1.62	0.97	6.784	A
East	372.18	93.04	372.94	678.40	136.44	0.00	1142.74	1058.04	0.326	0.68	0.49	4.682	A

Main results: (17:15-17:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	0.00	0.00	0.00	0.00	426.14	0.00	975.07	521.09	0.000	0.00	0.00	0.000	A
West	263.50	65.87	263.81	377.13	49.01	0.00	1193.34	899.37	0.221	0.36	0.28	3.875	A
South	429.13	107.28	430.33	61.82	251.00	0.00	1076.43	575.67	0.399	0.97	0.67	5.583	A
East	311.68	77.92	312.14	567.32	114.00	0.00	1155.72	1058.04	0.270	0.49	0.37	4.269	A

Queueing Delay Results for each time segment

Queueing Delay results: (16:00-16:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.00	0.00	0.000	A	A
West	4.13	0.28	3.861	A	A
South	9.48	0.63	5.510	A	A
East	5.36	0.36	4.248	A	A

Queueing Delay results: (16:15-16:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.00	0.00	0.000	A	A
West	5.28	0.35	4.120	A	A
South	13.69	0.91	6.684	A	A
East	7.05	0.47	4.662	A	A

Queueing Delay results: (16:30-16:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.00	0.00	0.000	A	A
West	7.08	0.47	4.522	A	A
South	22.76	1.52	9.290	A	A
East	9.86	0.66	5.358	A	A

Queueing Delay results: (16:45-17:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service

North	0.00	0.00	0.000	A	A
West	7.23	0.48	4.528	A	A
South	24.19	1.61	9.418	A	A
East	10.14	0.68	5.375	A	A

Queueing Delay results: (17:00-17:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.00	0.00	0.000	A	A
West	5.54	0.37	4.128	A	A
South	15.14	1.01	6.784	A	A
East	7.47	0.50	4.682	A	A

Queueing Delay results: (17:15-17:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.00	0.00	0.000	A	A
West	4.34	0.29	3.875	A	A
South	10.33	0.69	5.583	A	A
East	5.68	0.38	4.269	A	A

Queue Variation Results for each time segment

Queue Variation results: (16:00-16:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.00	~1	~1	~1	~1			N/A	N/A
West	0.28	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.66	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.37	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:15-16:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.00	~1	~1	~1	~1			N/A	N/A
West	0.36	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.94	0.00	0.00	1.00	1.00			N/A	N/A
East	0.48	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:30-16:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.00	~1	~1	~1	~1			N/A	N/A
West	0.48	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.60	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.67	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:45-17:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.00	~1	~1	~1	~1			N/A	N/A

West	0.48	0.00	0.00	0.00	1.00			N/A	N/A
South	1.62	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.68	0.00	0.00	0.00	1.00			N/A	N/A

Queue Variation results: (17:00-17:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.00	~1	~1	~1	~1			N/A	N/A
West	0.36	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.97	0.00	0.00	1.00	1.00			N/A	N/A
East	0.49	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:15-17:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.00	~1	~1	~1	~1			N/A	N/A
West	0.28	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.67	0.00	0.00	0.00	1.00			N/A	N/A
East	0.37	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

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The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution

Filename: Columbia Street West & Platinum Drive.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Without Extension
Report generation date: 2019-07-31 6:13:59 PM

Summary of intersection performance

	Sat					
	Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	A1 - Total 2031					
Leg North	0.00	0.00	0.00	A	3.90	A
Leg West	0.31	4.08	0.23	A		
Leg South	0.12	3.68	0.11	A		
Leg East	0.28	3.83	0.22	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D3 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D4 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Total 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Total 2031, Sat " model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 6:13:58 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-24
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

(Default Analysis Set) - Total 2031, Sat

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, Sat	Total 2031	Sat		ONE HOUR	12:00	13:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,South,East				3.90	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	(untitled)	
West	West	(untitled)	
South	South	(untitled)	
East	East	(untitled)	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	3.50	4.50	30.00	20.00	40.00	25.00	
West	3.50	4.50	30.00	20.00	40.00	25.00	
South	3.50	4.50	30.00	20.00	40.00	25.00	

East	3.50	4.50	30.00	20.00	40.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.579	1221.701
West		(calculated)	(calculated)	0.579	1221.701
South		(calculated)	(calculated)	0.579	1221.701
East		(calculated)	(calculated)	0.579	1221.701

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	0.00	100.000
West	ONE HOUR	✓	246.00	100.000
South	ONE HOUR	✓	105.00	100.000
East	ONE HOUR	✓	239.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	0.000	0.000	0.000
	West	0.000	0.000	46.000	200.000
	South	0.000	28.000	0.000	77.000
	East	0.000	132.000	107.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.25	0.25	0.25	0.25
	West	0.00	0.00	0.19	0.81
	South	0.00	0.27	0.00	0.73
	East	0.00	0.55	0.45	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.000	1.000	1.000
	West	1.000	1.000	1.000	1.000
	South	1.000	1.000	1.000	1.000
	East	1.000	1.000	1.000	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	0.0	0.0	0.0
	West	0.0	0.0	0.0	0.0
	South	0.0	0.0	0.0	0.0
	East	0.0	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.00	0.00	0.00	~1	A	0.00	0.00	0.00	0.00	0.00	0.00	0.00
West	0.23	4.08	0.31	~1	A	225.73	338.60	21.71	3.85	0.24	21.71	3.85
South	0.11	3.68	0.12	~1	A	96.35	144.52	8.52	3.54	0.09	8.52	3.54
East	0.22	3.83	0.28	~1	A	219.31	328.97	20.02	3.65	0.22	20.02	3.65

Main Results for each time segment

Main results: (12:00-12:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	0.00	0.00	0.00	0.00	200.24	0.00	1105.81	509.89	0.000	0.00	0.00	0.000	A
West	185.20	46.30	184.46	119.99	80.24	0.00	1175.26	732.11	0.158	0.00	0.19	3.632	A
South	79.05	19.76	78.75	114.74	149.97	0.00	1134.91	729.66	0.070	0.00	0.07	3.408	A
East	179.93	44.98	179.24	207.72	21.00	0.00	1209.55	1035.31	0.149	0.00	0.17	3.492	A

Main results: (12:15-12:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	0.00	0.00	0.00	0.00	239.84	0.00	1082.89	509.89	0.000	0.00	0.00	0.000	A
West	221.15	55.29	220.96	143.73	96.12	0.00	1166.07	732.11	0.190	0.19	0.23	3.808	A
South	94.39	23.60	94.32	137.43	179.64	0.00	1117.73	729.66	0.084	0.07	0.09	3.517	A
East	214.86	53.71	214.69	248.81	25.15	0.00	1207.14	1035.31	0.178	0.17	0.22	3.627	A

Main results: (12:30-12:45)

	Total	Intersection	Entry	Exit Flow	Circulating	Pedestrian	Capacity	Saturation	V/C	Start	End	Delay	

Leg	Demand (PCE/hr)	Arrivals (PCE)	Flow (PCE/hr)	(PCE/hr)	Flow (PCE/hr)	Demand (Ped/hr)	(PCE/hr)	Capacity (PCE/hr)	Ratio	Queue (PCE)	Queue (PCE)	(s)	LOS
North	0.00	0.00	0.00	0.00	293.69	0.00	1051.72	509.89	0.000	0.00	0.00	0.000	A
West	270.85	67.71	270.56	176.00	117.70	0.00	1153.58	732.11	0.235	0.23	0.31	4.076	A
South	115.61	28.90	115.50	168.29	219.97	0.00	1094.39	729.66	0.106	0.09	0.12	3.677	A
East	263.14	65.79	262.89	304.67	30.80	0.00	1203.87	1035.31	0.219	0.22	0.28	3.825	A

Main results: (12:45-13:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	0.00	0.00	0.00	0.00	293.97	0.00	1051.56	509.89	0.000	0.00	0.00	0.000	A
West	270.85	67.71	270.85	176.16	117.81	0.00	1153.52	732.11	0.235	0.31	0.31	4.078	A
South	115.61	28.90	115.61	168.45	220.20	0.00	1094.26	729.66	0.106	0.12	0.12	3.677	A
East	263.14	65.79	263.14	304.98	30.83	0.00	1203.86	1035.31	0.219	0.28	0.28	3.825	A

Main results: (13:00-13:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	0.00	0.00	0.00	0.00	240.30	0.00	1082.62	509.89	0.000	0.00	0.00	0.000	A
West	221.15	55.29	221.43	144.00	96.30	0.00	1165.97	732.11	0.190	0.31	0.24	3.814	A
South	94.39	23.60	94.49	137.71	180.03	0.00	1117.51	729.66	0.084	0.12	0.09	3.521	A
East	214.86	53.71	215.10	249.32	25.20	0.00	1207.12	1035.31	0.178	0.28	0.22	3.631	A

Main results: (13:15-13:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	0.00	0.00	0.00	0.00	201.20	0.00	1105.26	509.89	0.000	0.00	0.00	0.000	A
West	185.20	46.30	185.39	120.57	80.63	0.00	1175.03	732.11	0.158	0.24	0.19	3.637	A
South	79.05	19.76	79.12	115.30	150.72	0.00	1134.47	729.66	0.070	0.09	0.08	3.410	A
East	179.93	44.98	180.10	208.75	21.10	0.00	1209.49	1035.31	0.149	0.22	0.18	3.499	A

Queueing Delay Results for each time segment

Queueing Delay results: (12:00-12:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.00	0.00	0.000	A	A
West	2.74	0.18	3.632	A	A
South	1.10	0.07	3.408	A	A
East	2.56	0.17	3.492	A	A

Queueing Delay results: (12:15-12:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.00	0.00	0.000	A	A
West	3.44	0.23	3.808	A	A
South	1.36	0.09	3.517	A	A
East	3.19	0.21	3.627	A	A

Queueing Delay results: (12:30-12:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.00	0.00	0.000	A	A
West	4.50	0.30	4.076	A	A
South	1.74	0.12	3.677	A	A
East	4.11	0.27	3.825	A	A

Queueing Delay results: (12:45-13:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service

North	0.00	0.00	0.000	A	A
West	4.58	0.31	4.078	A	A
South	1.77	0.12	3.677	A	A
East	4.18	0.28	3.825	A	A

Queueing Delay results: (13:00-13:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.00	0.00	0.000	A	A
West	3.59	0.24	3.814	A	A
South	1.41	0.09	3.521	A	A
East	3.31	0.22	3.631	A	A

Queueing Delay results: (13:15-13:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.00	0.00	0.000	A	A
West	2.86	0.19	3.637	A	A
South	1.14	0.08	3.410	A	A
East	2.67	0.18	3.499	A	A

Queue Variation Results for each time segment

Queue Variation results: (12:00-12:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.00	~1	~1	~1	~1			N/A	N/A
West	0.19	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.07	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.17	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (12:15-12:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.00	~1	~1	~1	~1			N/A	N/A
West	0.23	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.09	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.22	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (12:30-12:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.00	~1	~1	~1	~1			N/A	N/A
West	0.31	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.12	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.28	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (12:45-13:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker

North	0.00	~1	~1	~1	~1			N/A	N/A
West	0.31	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.12	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.28	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (13:00-13:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.00	~1	~1	~1	~1			N/A	N/A
West	0.24	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.09	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.22	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (13:15-13:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.00	~1	~1	~1	~1			N/A	N/A
West	0.19	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.08	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.18	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution

Filename: Erb Street & Waterloo Waste Road 1Platinum Drive.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Without Extension
Report generation date: 2019-07-31 6:14:27 PM

Summary of intersection performance

	AM					
	Queue (PCE)	**Delay (s)**	**V/C Ratio**	**LOS**	**Intersection Delay (s)**	**Intersection LOS**
	Default - Total 2031					
Leg North	0.27	3.51	0.14	A	3.70	A
Leg West	0.89	3.51	0.46	A		
Leg South	0.08	7.09	0.06	A		
Leg East	1.15	3.80	0.53	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - Existing, Sat" model duration: 12:00 PM - 1:30 PM
"D4 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D7 - Total 2031, AM " model duration: 8:00 AM - 9:30 AM
"D8 - Total 2031, PM" model duration: 4:00 PM - 5:30 PM
"D9 - Total 2031, Sat" model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 6:14:26 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-22
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Default - Total 2031, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Default	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, AM	Total 2031	AM		ONE HOUR	08:00	09:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Erbsville Road/Ira-Needles Boulavard & Erb Street	Roundabout	North,West,South,East				3.70	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	(untitled)	
West	West	(untitled)	
South	South	(untitled)	
East	East	(untitled)	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	3.50	4.50	30.00	20.00	55.00	25.00	

East	7.00	8.00	30.00	20.00	55.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.527	1221.701
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	252.00	100.000
West	ONE HOUR	✓	831.00	100.000
South	ONE HOUR	✓	35.00	100.000
East	ONE HOUR	✓	991.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	29.000	0.000	223.000
	West	173.000	0.000	7.000	651.000
	South	1.000	4.000	0.000	30.000
	East	709.000	229.000	53.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.12	0.00	0.88
	West	0.21	0.00	0.01	0.78
	South	0.03	0.11	0.00	0.86

	East	0.72	0.23	0.05	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.000	1.000	1.800
	West	1.040	1.000	1.000	1.030
	South	1.000	1.000	1.000	1.160
	East	1.000	1.040	1.080	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	0.0	0.0	80.0
	West	4.0	0.0	0.0	3.0
	South	0.0	0.0	0.0	16.0
	East	0.0	4.0	8.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.14	3.51	0.27	~1	A	231.24	346.86	19.40	3.36	0.22	19.41	3.36
West	0.46	3.51	0.89	~1	A	762.54	1143.81	58.26	3.06	0.65	58.26	3.06
South	0.06	7.09	0.08	~1	A	32.12	48.17	4.92	6.13	0.05	4.92	6.13
East	0.53	3.80	1.15	1.01	A	909.36	1364.04	73.50	3.23	0.82	73.50	3.23

Main Results for each time segment

Main results: (08:00-08:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	189.72	47.43	189.04	662.79	214.66	0.00	2037.52	1771.96	0.093	0.00	0.17	3.210	A
West	625.62	156.41	623.81	196.64	207.07	0.00	2043.01	980.02	0.306	0.00	0.45	2.614	A
South	26.35	6.59	26.20	45.04	785.84	0.00	807.67	0.00	0.033	0.00	0.04	5.224	A
East	746.08	186.52	743.85	678.43	133.61	0.00	2096.12	2045.21	0.356	0.00	0.56	2.692	A

Main results: (08:15-08:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	226.54	56.64	226.38	793.10	256.88	0.00	2007.00	1771.96	0.113	0.17	0.21	3.331	A
West	747.05	186.76	746.44	235.32	247.93	0.00	2013.47	980.02	0.371	0.45	0.61	2.930	A
South	31.46	7.87	31.41	53.89	940.49	0.00	726.20	0.00	0.043	0.04	0.05	5.875	A
East	890.89	222.72	890.09	812.01	159.88	0.00	2077.12	2045.21	0.429	0.56	0.76	3.071	A

Main results: (08:30-08:45)

Leg	Total	Intersection	Entry	Exit Flow	Circulating	Pedestrian	Capacity	Saturation	V/C	Start	End	Delay	

Leg	Demand (PCE/hr)	Arrivals (PCE)	Flow (PCE/hr)	(PCE/hr)	Flow (PCE/hr)	Demand (Ped/hr)	(PCE/hr)	Capacity (PCE/hr)	Ratio	Queue (PCE)	Queue (PCE)	(s)	LOS
North	277.46	69.36	277.21	970.86	314.44	0.00	1965.38	1771.96	0.141	0.21	0.27	3.514	A
West	914.95	228.74	913.83	288.07	303.58	0.00	1973.23	980.02	0.464	0.61	0.89	3.503	A
South	38.54	9.63	38.44	65.97	1151.44	0.00	615.05	0.00	0.063	0.05	0.08	7.080	A
East	1091.11	272.78	1089.57	994.15	195.73	0.00	2051.20	2045.21	0.532	0.76	1.14	3.785	A

Main results: (08:45-09:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	277.46	69.36	277.45	972.18	314.89	0.00	1965.06	1771.96	0.141	0.27	0.27	3.515	A
West	914.95	228.74	914.93	288.46	303.88	0.00	1973.02	980.02	0.464	0.89	0.89	3.509	A
South	38.54	9.63	38.53	66.06	1152.75	0.00	614.36	0.00	0.063	0.08	0.08	7.089	A
East	1091.11	272.78	1091.09	995.31	195.98	0.00	2051.03	2045.21	0.532	1.14	1.15	3.798	A

Main results: (09:00-09:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	226.54	56.64	226.78	795.12	257.55	0.00	2006.51	1771.96	0.113	0.27	0.21	3.333	A
West	747.05	186.76	748.16	235.92	248.41	0.00	2013.12	980.02	0.371	0.89	0.61	2.938	A
South	31.46	7.87	31.56	54.03	942.54	0.00	725.11	0.00	0.043	0.08	0.05	5.889	A
East	890.89	222.72	892.41	813.84	160.26	0.00	2076.85	2045.21	0.429	1.15	0.77	3.082	A

Main results: (09:15-09:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	189.72	47.43	189.88	665.48	215.55	0.00	2036.88	1771.96	0.093	0.21	0.17	3.212	A
West	625.62	156.41	626.24	197.46	207.97	0.00	2042.36	980.02	0.306	0.61	0.46	2.625	A
South	26.35	6.59	26.40	45.22	788.99	0.00	806.01	0.00	0.033	0.05	0.04	5.238	A
East	746.08	186.52	746.89	681.25	134.14	0.00	2095.73	2045.21	0.356	0.77	0.56	2.704	A

Queueing Delay Results for each time segment

Queueing Delay results: (08:00-08:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.48	0.17	3.210	A	A
West	6.68	0.45	2.614	A	A
South	0.56	0.04	5.224	A	A
East	8.19	0.55	2.692	A	A

Queueing Delay results: (08:15-08:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	3.10	0.21	3.331	A	A
West	8.95	0.60	2.930	A	A
South	0.75	0.05	5.875	A	A
East	11.15	0.74	3.071	A	A

Queueing Delay results: (08:30-08:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	3.99	0.27	3.514	A	A
West	13.01	0.87	3.503	A	A
South	1.10	0.07	7.080	A	A
East	16.70	1.11	3.785	A	A

Queueing Delay results: (08:45-09:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service

North	4.05	0.27	3.515	A	A
West	13.32	0.89	3.509	A	A
South	1.13	0.08	7.089	A	A
East	17.16	1.14	3.798	A	A

Queueing Delay results: (09:00-09:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	3.20	0.21	3.333	A	A
West	9.34	0.62	2.938	A	A
South	0.79	0.05	5.889	A	A
East	11.71	0.78	3.082	A	A

Queueing Delay results: (09:15-09:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.58	0.17	3.212	A	A
West	6.96	0.46	2.625	A	A
South	0.59	0.04	5.238	A	A
East	8.57	0.57	2.704	A	A

Queue Variation Results for each time segment

Queue Variation results: (08:00-08:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.17	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.45	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.04	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.56	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:15-08:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.21	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.61	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.05	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.76	0.00	0.00	0.00	1.01			N/A	N/A

Queue Variation results: (08:30-08:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.27	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.89	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.08	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.14	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:45-09:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.27	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.89	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.08	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.15	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:00-09:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.21	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.61	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.05	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.77	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:15-09:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.17	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.46	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.04	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.56	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Erb Street & Waterloo Waste Road 1Platinum Drive.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Without Extension
Report generation date: 2019-07-31 6:14:50 PM

Summary of intersection performance

	PM					
	Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	Default - Total 2031					
Leg North	3.39	9.57	0.78	A	6.54	A
Leg West	0.51	3.88	0.34	A		
Leg South	0.29	10.74	0.22	B		
Leg East	1.19	3.80	0.54	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - Existing, Sat" model duration: 12:00 PM - 1:30 PM
"D4 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D7 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM
"D8 - Total 2031, PM " model duration: 4:00 PM - 5:30 PM
"D9 - Total 2031, Sat" model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 6:14:49 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-22
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Default - Total 2031, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Default	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, PM	Total 2031	PM		ONE HOUR	16:00	17:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Erbsville Road/Ira-Needles Boulavard & Erb Street	Roundabout	North,West,South,East				6.54	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	(untitled)	
West	West	(untitled)	
South	South	(untitled)	
East	East	(untitled)	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	3.50	4.50	30.00	20.00	55.00	25.00	

East	7.00	8.00	30.00	20.00	55.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.527	1221.701
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	1181.00	100.000
West	ONE HOUR	✓	431.00	100.000
South	ONE HOUR	✓	89.00	100.000
East	ONE HOUR	✓	1026.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	248.000	7.000	926.000
	West	118.000	0.000	7.000	306.000
	South	7.000	6.000	0.000	76.000
	East	382.000	592.000	52.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.21	0.01	0.78
	West	0.27	0.00	0.02	0.71
	South	0.08	0.07	0.00	0.85

	East	0.37	0.58	0.05	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.000	1.000	1.000
	West	1.000	1.000	1.000	1.010
	South	1.000	1.000	1.000	1.020
	East	1.000	1.020	1.030	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	0.0	0.0	0.0
	West	0.0	0.0	0.0	1.0
	South	0.0	0.0	0.0	2.0
	East	0.0	2.0	3.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.78	9.57	3.39	7.00	A	1083.71	1625.56	169.55	6.26	1.88	169.57	6.26
West	0.34	3.88	0.51	1.01	A	395.49	593.24	32.49	3.29	0.36	32.49	3.29
South	0.22	10.74	0.29	~1	B	81.67	122.50	16.63	8.14	0.18	16.63	8.14
East	0.54	3.80	1.19	1.01	A	941.48	1412.21	76.15	3.24	0.85	76.15	3.24

Main Results for each time segment

Main results: (16:00-16:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	889.12	222.28	885.41	380.54	487.88	0.00	1840.00	1320.58	0.483	0.00	0.93	3.758	A
West	324.48	81.12	323.50	634.77	738.51	0.00	1658.80	1368.06	0.196	0.00	0.24	2.714	A
South	67.00	16.75	66.57	49.53	1012.48	0.00	688.26	0.00	0.097	0.00	0.11	5.885	A
East	772.43	193.11	770.12	980.76	98.29	0.00	2121.65	1921.93	0.364	0.00	0.58	2.693	A

Main results: (16:15-16:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1061.69	265.42	1059.50	455.36	583.80	0.00	1770.65	1320.58	0.600	0.93	1.48	5.047	A
West	387.46	96.87	387.10	759.58	883.72	0.00	1553.83	1368.06	0.249	0.24	0.33	3.107	A
South	80.01	20.00	79.80	59.27	1211.55	0.00	583.38	0.00	0.137	0.11	0.16	7.266	A
East	922.35	230.59	921.53	1173.71	117.64	0.00	2107.66	1921.93	0.438	0.58	0.78	3.073	A

Main results: (16:30-16:45)

	Total	Intersection	Entry	Exit Flow	Circulating	Pedestrian	Capacity	Saturation	V/C	Start	End	Delay	

Leg	Demand (PCE/hr)	Arrivals (PCE)	Flow (PCE/hr)	(PCE/hr)	Flow (PCE/hr)	Demand (Ped/hr)	(PCE/hr)	Capacity (PCE/hr)	Ratio	Queue (PCE)	Queue (PCE)	(s)	LOS
North	1300.31	325.08	1292.97	557.39	714.63	0.00	1676.07	1320.58	0.776	1.48	3.31	9.224	A
West	474.54	118.63	473.85	928.97	1078.63	0.00	1412.92	1368.06	0.336	0.33	0.51	3.858	A
South	97.99	24.50	97.49	72.53	1479.94	0.00	441.98	0.00	0.222	0.16	0.29	10.614	B
East	1129.65	282.41	1128.05	1433.46	143.97	0.00	2088.63	1921.93	0.541	0.78	1.18	3.789	A

Main results: (16:45-17:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1300.31	325.08	1300.00	558.20	715.65	0.00	1675.33	1320.58	0.776	3.31	3.39	9.570	A
West	474.54	118.63	474.53	931.39	1084.26	0.00	1408.84	1368.06	0.337	0.51	0.51	3.880	A
South	97.99	24.50	97.97	72.66	1486.13	0.00	438.72	0.00	0.223	0.29	0.29	10.744	B
East	1129.65	282.41	1129.63	1439.87	144.23	0.00	2088.44	1921.93	0.541	1.18	1.19	3.802	A

Main results: (17:00-17:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1061.69	265.42	1069.16	456.60	585.36	0.00	1769.52	1320.58	0.600	3.39	1.52	5.193	A
West	387.46	96.87	388.15	763.05	891.47	0.00	1548.22	1368.06	0.250	0.51	0.34	3.128	A
South	80.01	20.00	80.51	59.47	1220.15	0.00	578.85	0.00	0.138	0.29	0.16	7.356	A
East	922.35	230.59	923.93	1182.63	118.03	0.00	2107.38	1921.93	0.438	1.19	0.79	3.084	A

Main results: (17:15-17:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	889.12	222.28	891.43	382.13	489.90	0.00	1838.54	1320.58	0.484	1.52	0.94	3.809	A
West	324.48	81.12	324.84	637.90	743.42	0.00	1655.25	1368.06	0.196	0.34	0.25	2.725	A
South	67.00	16.75	67.22	49.75	1018.52	0.00	685.08	0.00	0.098	0.16	0.11	5.929	A
East	772.43	193.11	773.27	986.98	98.75	0.00	2121.32	1921.93	0.364	0.79	0.58	2.708	A

Queueing Delay Results for each time segment

Queueing Delay results: (16:00-16:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	13.50	0.90	3.758	A	A
West	3.60	0.24	2.714	A	A
South	1.59	0.11	5.885	A	A
East	8.49	0.57	2.693	A	A

Queueing Delay results: (16:15-16:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	21.42	1.43	5.047	A	A
West	4.92	0.33	3.107	A	A
South	2.34	0.16	7.266	A	A
East	11.55	0.77	3.073	A	A

Queueing Delay results: (16:30-16:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	45.84	3.06	9.224	A	A
West	7.44	0.50	3.858	A	A
South	4.12	0.27	10.614	B	B
East	17.30	1.15	3.789	A	A

Queueing Delay results: (16:45-17:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service

North	50.36	3.36	9.570	A	A
West	7.62	0.51	3.880	A	A
South	4.32	0.29	10.744	B	B
East	17.79	1.19	3.802	A	A

Queueing Delay results: (17:00-17:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	23.89	1.59	5.193	A	A
West	5.15	0.34	3.128	A	A
South	2.55	0.17	7.356	A	A
East	12.14	0.81	3.084	A	A

Queueing Delay results: (17:15-17:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	14.54	0.97	3.809	A	A
West	3.75	0.25	2.725	A	A
South	1.70	0.11	5.929	A	A
East	8.88	0.59	2.708	A	A

Queue Variation Results for each time segment

Queue Variation results: (16:00-16:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.93	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.24	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.11	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.58	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:15-16:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.48	0.00	0.00	3.00	4.00			N/A	N/A
West	0.33	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.16	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.78	0.00	0.00	0.00	1.01			N/A	N/A

Queue Variation results: (16:30-16:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	3.31	0.00	0.00	0.00	7.00			N/A	N/A
West	0.51	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.29	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.18	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:45-17:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker

North	3.39	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.51	0.00	0.00	0.00	1.01			N/A	N/A
South	0.29	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.19	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:00-17:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.52	0.00	0.00	3.00	4.00			N/A	N/A
West	0.34	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.16	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.79	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:15-17:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.94	0.00	0.00	1.00	2.00			N/A	N/A
West	0.25	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.11	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.58	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Erb Street & Waterloo Waste Road 1Platinum Drive.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Without Extension
Report generation date: 2019-07-31 6:15:17 PM

Summary of intersection performance

	Sat					
	Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	Default - Total 2031					
Leg North	1.04	3.84	0.51	A	3.65	A
Leg West	0.35	3.20	0.26	A		
Leg South	0.21	7.32	0.17	A		
Leg East	0.85	3.23	0.46	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - Existing, Sat" model duration: 12:00 PM - 1:30 PM
"D4 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D7 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM
"D8 - Total 2031, PM" model duration: 4:00 PM - 5:30 PM
"D9 - Total 2031, Sat " model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 6:15:16 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-22
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Default - Total 2031, Sat

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Default	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, Sat	Total 2031	Sat		ONE HOUR	12:00	13:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Erbsville Road/Ira-Needles Boulavard & Erb Street	Roundabout	North,West,South,East				3.65	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	(untitled)	
West	West	(untitled)	
South	South	(untitled)	
East	East	(untitled)	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	3.50	4.50	30.00	20.00	55.00	25.00	

East	7.00	8.00	30.00	20.00	55.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.527	1221.701
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	888.00	100.000
West	ONE HOUR	✓	357.00	100.000
South	ONE HOUR	✓	93.00	100.000
East	ONE HOUR	✓	866.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	146.000	2.000	740.000
	West	135.000	0.000	15.000	207.000
	South	11.000	13.000	0.000	69.000
	East	530.000	230.000	106.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.16	0.00	0.83
	West	0.38	0.00	0.04	0.58
	South	0.12	0.14	0.00	0.74

	East	0.61	0.27	0.12	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.000	1.000	1.000
	West	1.000	1.000	1.000	1.000
	South	1.000	1.000	1.000	1.000
	East	1.000	1.000	1.000	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	0.0	0.0	0.0
	West	0.0	0.0	0.0	0.0
	South	0.0	0.0	0.0	0.0
	East	0.0	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.51	3.84	1.04	?	A	814.84	1222.27	66.24	3.25	0.74	66.25	3.25
West	0.26	3.20	0.35	~1	A	327.59	491.38	23.16	2.83	0.26	23.16	2.83
South	0.17	7.32	0.21	~1	A	85.34	128.01	13.03	6.11	0.14	13.03	6.11
East	0.46	3.23	0.85	~1	A	794.66	1191.99	56.58	2.85	0.63	56.58	2.85

Main Results for each time segment

Main results: (12:00-12:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	668.53	167.13	666.54	507.51	262.00	0.00	2003.30	1656.10	0.334	0.00	0.50	2.690	A
West	268.77	67.19	268.04	292.00	636.53	0.00	1732.53	1023.00	0.155	0.00	0.18	2.457	A
South	70.02	17.50	69.63	92.35	812.22	0.00	793.77	0.00	0.088	0.00	0.10	4.969	A
East	651.97	162.99	650.18	762.53	119.33	0.00	2106.44	1913.04	0.310	0.00	0.45	2.468	A

Main results: (12:15-12:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	798.29	199.57	797.57	607.25	313.50	0.00	1966.07	1656.10	0.406	0.50	0.68	3.079	A
West	320.94	80.23	320.70	349.41	761.66	0.00	1642.07	1022.99	0.195	0.18	0.24	2.724	A
South	83.61	20.90	83.46	110.49	971.87	0.00	709.66	0.00	0.118	0.10	0.13	5.747	A
East	778.52	194.63	777.94	912.51	142.81	0.00	2089.47	1913.04	0.373	0.45	0.59	2.743	A

Main results: (12:30-12:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	977.71	244.43	976.29	743.46	383.81	0.00	1915.23	1656.11	0.510	0.68	1.03	3.829	A
West	393.06	98.27	392.64	427.75	932.35	0.00	1518.67	1022.99	0.259	0.24	0.35	3.197	A
South	102.39	25.60	102.10	135.28	1189.72	0.00	594.89	0.00	0.172	0.13	0.21	7.300	A
East	953.48	238.37	952.44	1116.99	174.83	0.00	2066.32	1913.04	0.461	0.59	0.85	3.229	A

Main results: (12:45-13:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	977.71	244.43	977.69	744.28	384.25	0.00	1914.92	1656.11	0.511	1.03	1.04	3.840	A
West	393.06	98.27	393.06	428.29	933.65	0.00	1517.73	1022.99	0.259	0.35	0.35	3.200	A
South	102.39	25.60	102.39	135.42	1191.28	0.00	594.06	0.00	0.172	0.21	0.21	7.321	A
East	953.48	238.37	953.47	1118.62	175.06	0.00	2066.15	1913.04	0.461	0.85	0.85	3.234	A

Main results: (13:00-13:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	798.29	199.57	799.70	608.53	314.18	0.00	1965.57	1656.10	0.406	1.04	0.69	3.093	A
West	320.94	80.23	321.35	350.25	763.63	0.00	1640.64	1022.99	0.196	0.35	0.24	2.731	A
South	83.61	20.90	83.89	110.72	974.27	0.00	708.40	0.00	0.118	0.21	0.13	5.766	A
East	778.52	194.63	779.55	914.99	143.17	0.00	2089.21	1913.04	0.373	0.85	0.60	2.750	A

Main results: (13:15-13:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	668.53	167.13	669.27	509.40	262.99	0.00	2002.58	1656.10	0.334	0.69	0.50	2.701	A
West	268.77	67.19	269.01	293.16	639.11	0.00	1730.67	1023.00	0.155	0.24	0.18	2.462	A
South	70.02	17.50	70.16	92.68	815.43	0.00	792.08	0.00	0.088	0.13	0.10	4.987	A
East	651.97	162.99	652.56	765.76	119.83	0.00	2106.08	1913.04	0.310	0.60	0.45	2.479	A

Queueing Delay Results for each time segment

Queueing Delay results: (12:00-12:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	7.34	0.49	2.690	A	A
West	2.70	0.18	2.457	A	A
South	1.41	0.09	4.969	A	A
East	6.58	0.44	2.468	A	A

Queueing Delay results: (12:15-12:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	10.03	0.67	3.079	A	A
West	3.59	0.24	2.724	A	A
South	1.95	0.13	5.747	A	A
East	8.74	0.58	2.743	A	A

Queueing Delay results: (12:30-12:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	15.14	1.01	3.829	A	A
West	5.13	0.34	3.197	A	A
South	3.01	0.20	7.300	A	A
East	12.52	0.83	3.229	A	A

Queueing Delay results: (12:45-13:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service

North	15.55	1.04	3.840	A	A
West	5.22	0.35	3.200	A	A
South	3.10	0.21	7.321	A	A
East	12.79	0.85	3.234	A	A

Queueing Delay results: (13:00-13:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	10.52	0.70	3.093	A	A
West	3.71	0.25	2.731	A	A
South	2.07	0.14	5.766	A	A
East	9.10	0.61	2.750	A	A

Queueing Delay results: (13:15-13:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	7.67	0.51	2.701	A	A
West	2.80	0.19	2.462	A	A
South	1.49	0.10	4.987	A	A
East	6.84	0.46	2.479	A	A

Queue Variation Results for each time segment

Queue Variation results: (12:00-12:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.50	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.18	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.10	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.45	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (12:15-12:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.68	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.24	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.13	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.59	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (12:30-12:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.03	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.35	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.21	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.85	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (12:45-13:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.04	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.35	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.21	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.85	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (13:00-13:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.69	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.24	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.13	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.60	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (13:15-13:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.50	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.18	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.10	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.45	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Erb Street & Waterloo Waste Road 2Costco Entrance.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Without Extension
Report generation date: 2019-07-31 6:16:31 PM

Summary of intersection performance

	AM					
	Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	Default - Total 2031					
Leg North	0.24	3.18	0.19	A	5.54	A
Leg West	0.54	2.87	0.34	A		
Leg South	0.09	8.95	0.05	A		
Leg East	3.12	6.96	0.75	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - Existing, Sat" model duration: 12:00 PM - 1:30 PM
"D4 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D7 - Total 2031, AM " model duration: 8:00 AM - 9:30 AM
"D8 - Total 2031, PM" model duration: 4:00 PM - 5:30 PM
"D9 - Total 2031, Sat" model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 6:16:31 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-22
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Default - Total 2031, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Default	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, AM	Total 2031	AM		ONE HOUR	08:00	09:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Erbsville Road/Ira-Needles Boulavard & Erb Street	Roundabout	North,West,South,East				5.54	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	(untitled)	
West	West	(untitled)	
South	South	(untitled)	
East	East	(untitled)	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	3.50	4.50	30.00	20.00	55.00	25.00	

East	7.00	8.00	30.00	20.00	55.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.527	1221.701
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	245.00	100.000
West	ONE HOUR	✓	616.00	100.000
South	ONE HOUR	✓	32.00	100.000
East	ONE HOUR	✓	1485.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	15.000	0.000	230.000
	West	18.000	0.000	5.000	593.000
	South	2.000	5.000	0.000	25.000
	East	495.000	959.000	31.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.06	0.00	0.94
	West	0.03	0.00	0.01	0.96
	South	0.06	0.16	0.00	0.78
	East	0.33	0.65	0.02	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.000	1.000	1.000
	West	1.000	1.000	1.800	1.040
	South	1.000	1.600	1.000	1.880
	East	1.000	1.050	1.770	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	0.0	0.0	0.0
	West	0.0	0.0	80.0	4.0
	South	0.0	60.0	0.0	88.0
	East	0.0	5.0	77.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.19	3.18	0.24	~1	A	224.82	337.22	15.82	2.82	0.18	15.82	2.82
West	0.34	2.87	0.54	1.04	A	565.25	847.88	36.96	2.62	0.41	36.96	2.62
South	0.05	8.95	0.09	~1	A	29.36	44.05	5.91	8.05	0.07	5.91	8.05
East	0.75	6.96	3.12	5.21	A	1362.66	2043.99	172.62	5.07	1.92	172.64	5.07

Main Results for each time segment

Main results: (08:00-08:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	184.45	46.11	183.95	386.22	746.16	0.00	1653.28	1149.94	0.112	0.00	0.13	2.450	A
West	463.76	115.94	462.54	734.17	195.93	0.00	2051.06	1379.61	0.226	0.00	0.30	2.361	A
South	24.09	6.02	23.90	27.00	631.47	0.00	889.00	0.00	0.027	0.00	0.05	7.226	A
East	1117.99	279.50	1113.63	636.63	18.74	0.00	2179.16	2163.57	0.513	0.00	1.09	3.504	A

Main results: (08:15-08:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	220.25	55.06	220.09	462.24	893.03	0.00	1547.10	1149.94	0.142	0.13	0.17	2.712	A
West	553.77	138.44	553.42	878.68	234.44	0.00	2023.22	1379.61	0.274	0.30	0.39	2.553	A
South	28.77	7.19	28.71	32.32	755.54	0.00	823.64	0.00	0.035	0.05	0.06	7.866	A
East	1334.98	333.75	1332.81	761.80	22.45	0.00	2176.48	2163.57	0.613	1.09	1.63	4.432	A

Main results: (08:30-08:45)

	Total	Intersection	Entry	Exit Flow	Circulating	Pedestrian	Capacity	Saturation	V/C	Start	End	Delay	

Leg	Demand (PCE/hr)	Arrivals (PCE)	Flow (PCE/hr)	(PCE/hr)	Flow (PCE/hr)	Demand (Ped/hr)	(PCE/hr)	Capacity (PCE/hr)	Ratio	Queue (PCE)	Queue (PCE)	(s)	LOS
North	269.75	67.44	269.46	565.08	1091.65	0.00	1403.50	1149.94	0.192	0.17	0.24	3.174	A
West	678.23	169.56	677.64	1074.14	286.98	0.00	1985.24	1379.61	0.342	0.39	0.54	2.868	A
South	35.23	8.81	35.14	39.51	925.11	0.00	734.30	0.00	0.048	0.06	0.09	8.942	A
East	1635.02	408.75	1629.25	932.75	27.49	0.00	2172.84	2163.57	0.752	1.63	3.07	6.826	A

Main results: (08:45-09:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	269.75	67.44	269.75	566.97	1095.40	0.00	1400.79	1149.94	0.193	0.24	0.24	3.182	A
West	678.23	169.56	678.22	1077.78	287.36	0.00	1984.96	1379.61	0.342	0.54	0.54	2.871	A
South	35.23	8.81	35.23	39.63	925.95	0.00	733.86	0.00	0.048	0.09	0.09	8.950	A
East	1635.02	408.75	1634.84	933.66	27.52	0.00	2172.81	2163.57	0.752	3.07	3.12	6.962	A

Main results: (09:00-09:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	220.25	55.06	220.53	464.92	898.35	0.00	1543.25	1149.94	0.143	0.24	0.17	2.723	A
West	553.77	138.44	554.35	883.87	235.02	0.00	2022.80	1379.61	0.274	0.54	0.39	2.555	A
South	28.77	7.19	28.86	32.49	756.88	0.00	822.93	0.00	0.035	0.09	0.06	7.875	A
East	1334.98	333.75	1340.77	763.23	22.51	0.00	2176.44	2163.57	0.613	3.12	1.67	4.516	A

Main results: (09:15-09:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	184.45	46.11	184.61	388.49	750.61	0.00	1650.06	1149.94	0.112	0.17	0.13	2.456	A
West	463.76	115.94	464.11	738.53	196.70	0.00	2050.51	1379.61	0.226	0.39	0.31	2.365	A
South	24.09	6.02	24.15	27.15	633.65	0.00	887.85	0.00	0.027	0.06	0.05	7.242	A
East	1117.99	279.50	1120.25	638.96	18.84	0.00	2179.09	2163.57	0.513	1.67	1.11	3.547	A

Queueing Delay Results for each time segment

Queueing Delay results: (08:00-08:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	1.85	0.12	2.450	A	A
West	4.48	0.30	2.361	A	A
South	0.70	0.05	7.226	A	A
East	15.85	1.06	3.504	A	A

Queueing Delay results: (08:15-08:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.45	0.16	2.712	A	A
West	5.80	0.39	2.553	A	A
South	0.91	0.06	7.866	A	A
East	23.74	1.58	4.432	A	A

Queueing Delay results: (08:30-08:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	3.50	0.23	3.174	A	A
West	7.95	0.53	2.868	A	A
South	1.27	0.08	8.942	A	A
East	43.44	2.90	6.826	A	A

Queueing Delay results: (08:45-09:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	3.56	0.24	3.182	A	A
West	8.09	0.54	2.871	A	A
South	1.30	0.09	8.950	A	A
East	46.52	3.10	6.962	A	A

Queueing Delay results: (09:00-09:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.54	0.17	2.723	A	A
West	6.00	0.40	2.555	A	A
South	0.98	0.07	7.875	A	A
East	26.06	1.74	4.516	A	A

Queueing Delay results: (09:15-09:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	1.91	0.13	2.456	A	A
West	4.64	0.31	2.365	A	A
South	0.75	0.05	7.242	A	A
East	17.01	1.13	3.547	A	A

Queue Variation Results for each time segment

Queue Variation results: (08:00-08:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.13	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.30	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.05	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.09	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:15-08:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.17	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.39	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.63	0.00	0.00	3.12	5.21			N/A	N/A

Queue Variation results: (08:30-08:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.24	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.54	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.09	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	3.07	0.00	0.00	0.00	3.12			N/A	N/A

Queue Variation results: (08:45-09:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.24	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.54	0.00	0.00	0.00	1.04			N/A	N/A
South	0.09	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	3.12	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:00-09:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.17	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.39	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.67	0.00	0.00	3.12	4.17			N/A	N/A

Queue Variation results: (09:15-09:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.13	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.31	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.05	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.11	0.00	0.00	2.08	3.12			N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Erb Street & Waterloo Waste Road 2Costco Entrance.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Without Extension
Report generation date: 2019-07-31 6:17:33 PM

Summary of intersection performance

	PM					
	Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	Default - Total 2031					
Leg North	0.37	3.59	0.27	A	8.06	A
Leg West	2.93	7.44	0.75	A		
Leg South	0.20	20.01	0.13	C		
Leg East	4.46	9.26	0.82	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - Existing, Sat" model duration: 12:00 PM - 1:30 PM
"D4 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D7 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM
"D8 - Total 2031, PM " model duration: 4:00 PM - 5:30 PM
"D9 - Total 2031, Sat" model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 6:17:32 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-22
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Default - Total 2031, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Default	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, PM	Total 2031	PM		ONE HOUR	16:00	17:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Erbsville Road/Ira-Needles Boulavard & Erb Street	Roundabout	North,West,South,East				8.06	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	(untitled)	
West	West	(untitled)	
South	South	(untitled)	
East	East	(untitled)	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	3.50	4.50	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.527	1221.701
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	339.00	100.000
West	ONE HOUR	✓	1308.00	100.000
South	ONE HOUR	✓	34.00	100.000
East	ONE HOUR	✓	1610.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	29.000	0.000	310.000
	West	30.000	0.000	2.000	1276.000
	South	1.000	4.000	0.000	29.000
	East	588.000	994.000	28.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.09	0.00	0.91
	West	0.02	0.00	0.00	0.98
	South	0.03	0.12	0.00	0.85
	East	0.00	0.00	0.00	0.00

	East	0.37	0.62	0.02	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.000	1.000	1.000
	West	1.000	1.000	1.500	1.000
	South	1.000	1.250	1.000	1.410
	East	1.000	1.010	1.680	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	0.0	0.0	0.0
	West	0.0	0.0	50.0	0.0
	South	0.0	25.0	0.0	41.0
	East	0.0	1.0	68.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.27	3.59	0.37	~1	A	311.07	466.61	24.03	3.09	0.27	24.03	3.09
West	0.75	7.44	2.93	4.00	A	1200.24	1800.37	157.68	5.26	1.75	157.70	5.26
South	0.13	20.01	0.20	~1	C	31.20	46.80	10.77	13.81	0.12	10.77	13.81
East	0.82	9.26	4.46	11.15	A	1477.36	2216.05	225.61	6.11	2.51	225.63	6.11

Main Results for each time segment

Main results: (16:00-16:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	255.22	63.80	254.48	464.07	769.18	0.00	1636.63	1196.90	0.156	0.00	0.18	2.603	A
West	984.73	246.18	980.91	769.96	253.70	0.00	2009.30	1374.15	0.490	0.00	0.95	3.489	A
South	25.60	6.40	25.35	22.49	1212.12	0.00	583.08	0.00	0.044	0.00	0.06	8.857	A
East	1212.09	303.02	1207.03	1211.25	26.23	0.00	2173.75	2169.92	0.558	0.00	1.27	3.753	A

Main results: (16:15-16:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	304.75	76.19	304.50	555.35	920.48	0.00	1527.25	1196.90	0.200	0.18	0.25	2.944	A
West	1175.87	293.97	1173.85	921.41	303.57	0.00	1973.24	1374.15	0.596	0.95	1.46	4.495	A
South	30.57	7.64	30.43	26.92	1450.51	0.00	457.49	0.00	0.067	0.06	0.10	11.568	B
East	1447.36	361.84	1444.43	1449.53	31.40	0.00	2170.01	2169.92	0.667	1.27	2.00	5.008	A

Main results: (16:30-16:45)

	Total	Intersection	Entry	Exit Flow	Circulating	Pedestrian	Capacity	Saturation	V/C	Start	End	Delay	

Leg	Demand (PCE/hr)	Arrivals (PCE)	Flow (PCE/hr)	(PCE/hr)	Flow (PCE/hr)	Demand (Ped/hr)	(PCE/hr)	Capacity (PCE/hr)	Ratio	Queue (PCE)	Queue (PCE)	(s)	LOS
North	373.25	93.31	372.76	677.96	1123.63	0.00	1380.38	1196.90	0.270	0.25	0.37	3.570	A
West	1440.13	360.03	1434.42	1124.86	371.54	0.00	1924.10	1374.15	0.748	1.46	2.89	7.269	A
South	37.43	9.36	37.02	32.86	1773.10	0.00	287.52	0.00	0.130	0.10	0.20	19.696	C
East	1772.64	443.16	1763.25	1771.78	38.34	0.00	2164.99	2169.92	0.819	2.00	4.35	8.869	A

Main results: (16:45-17:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	373.25	93.31	373.24	681.37	1129.36	0.00	1376.24	1196.90	0.271	0.37	0.37	3.588	A
West	1440.13	360.03	1439.95	1130.47	372.13	0.00	1923.68	1374.15	0.749	2.89	2.93	7.439	A
South	37.43	9.36	37.42	33.02	1779.06	0.00	284.39	0.00	0.132	0.20	0.20	20.007	C
East	1772.64	443.16	1772.20	1777.95	38.53	0.00	2164.86	2169.92	0.819	4.35	4.46	9.262	A

Main results: (17:00-17:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	304.75	76.19	305.23	560.11	928.48	0.00	1521.47	1196.90	0.200	0.37	0.25	2.962	A
West	1175.87	293.97	1181.61	929.25	304.46	0.00	1972.60	1374.15	0.596	2.93	1.49	4.585	A
South	30.57	7.64	30.98	27.14	1458.93	0.00	453.05	0.00	0.067	0.20	0.10	11.719	B
East	1447.36	361.84	1456.93	1458.25	31.66	0.00	2169.82	2169.92	0.667	4.46	2.06	5.183	A

Main results: (17:15-17:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	255.22	63.80	255.48	467.20	774.41	0.00	1632.85	1196.90	0.156	0.25	0.19	2.615	A
West	984.73	246.18	986.83	775.13	254.76	0.00	2008.53	1374.15	0.490	1.49	0.97	3.531	A
South	25.60	6.40	25.74	22.64	1218.95	0.00	579.49	0.00	0.044	0.10	0.06	8.926	A
East	1212.09	303.02	1215.19	1218.27	26.42	0.00	2173.61	2169.92	0.558	2.06	1.29	3.817	A

Queueing Delay Results for each time segment

Queueing Delay results: (16:00-16:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.72	0.18	2.603	A	A
West	13.91	0.93	3.489	A	A
South	0.90	0.06	8.857	A	A
East	18.36	1.22	3.753	A	A

Queueing Delay results: (16:15-16:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	3.68	0.25	2.944	A	A
West	21.21	1.41	4.495	A	A
South	1.41	0.09	11.568	B	B
East	28.85	1.92	5.008	A	A

Queueing Delay results: (16:30-16:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	5.43	0.36	3.570	A	A
West	40.67	2.71	7.269	A	A
South	2.84	0.19	19.696	C	B
East	59.75	3.98	8.869	A	A

Queueing Delay results: (16:45-17:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service

North	5.55	0.37	3.588	A	A
West	43.71	2.91	7.439	A	A
South	3.05	0.20	20.007	C	C
East	66.20	4.41	9.262	A	A

Queueing Delay results: (17:00-17:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	3.83	0.26	2.962	A	A
West	23.28	1.55	4.585	A	A
South	1.58	0.11	11.719	B	B
East	32.55	2.17	5.183	A	A

Queueing Delay results: (17:15-17:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.82	0.19	2.615	A	A
West	14.90	0.99	3.531	A	A
South	0.99	0.07	8.926	A	A
East	19.91	1.33	3.817	A	A

Queue Variation Results for each time segment

Queue Variation results: (16:00-16:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.18	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.95	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.27	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:15-16:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.25	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	1.46	0.00	0.00	3.00	4.00			N/A	N/A
South	0.10	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	2.00	0.00	0.00	4.05	6.08			N/A	N/A

Queue Variation results: (16:30-16:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.37	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	2.89	0.00	0.00	0.00	4.00			N/A	N/A
South	0.20	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	4.35	0.00	0.00	2.03	11.15			N/A	N/A

Queue Variation results: (16:45-17:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.37	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or		N/A	N/A

						very big.			
West	2.93	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.20	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	4.46	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:00-17:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.25	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	1.49	0.00	0.00	3.00	4.00			N/A	N/A
South	0.10	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	2.06	0.00	0.00	4.05	6.08			N/A	N/A

Queue Variation results: (17:15-17:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.19	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.97	0.00	0.00	1.00	2.00			N/A	N/A
South	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.29	0.00	0.00	2.03	4.05			N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Erb Street & Waterloo Waste Road 2Costco Entrance.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Without Extension
Report generation date: 2019-07-31 6:17:52 PM

Summary of intersection performance

	Sat					
	Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	Default - Total 2031					
Leg North	1.02	4.77	0.51	A	7.65	A
Leg West	2.28	7.21	0.70	A		
Leg South	0.09	23.16	0.06	C		
Leg East	4.37	9.08	0.82	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - Existing, Sat" model duration: 12:00 PM - 1:30 PM
"D4 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D7 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM
"D8 - Total 2031, PM" model duration: 4:00 PM - 5:30 PM
"D9 - Total 2031, Sat " model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 6:17:52 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-22
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Default - Total 2031, Sat

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Default	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, Sat	Total 2031	Sat		ONE HOUR	12:00	13:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Erbsville Road/Ira-Needles Boulavard & Erb Street	Roundabout	North,West,South,East				7.65	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	(untitled)	
West	West	(untitled)	
South	South	(untitled)	
East	East	(untitled)	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	3.50	4.50	30.00	20.00	55.00	25.00	

East	7.00	8.00	30.00	20.00	55.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.527	1221.701
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	706.00	100.000
West	ONE HOUR	✓	1048.00	100.000
South	ONE HOUR	✓	13.00	100.000
East	ONE HOUR	✓	1609.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	43.000	1.000	662.000
	West	24.000	0.000	1.000	1023.000
	South	3.000	5.000	0.000	5.000
	East	784.000	816.000	9.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.06	0.00	0.94
	West	0.02	0.00	0.00	0.98
	South	0.23	0.38	0.00	0.38

	East	0.49	0.51	0.01	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.000	1.000	1.000
	West	1.000	1.000	1.000	1.010
	South	1.000	1.400	1.000	1.800
	East	1.000	1.000	1.670	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	0.0	0.0	0.0
	West	0.0	0.0	0.0	1.0
	South	0.0	40.0	0.0	80.0
	East	0.0	0.0	67.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.51	4.77	1.02	?	A	647.84	971.76	62.01	3.83	0.69	62.01	3.83
West	0.70	7.21	2.28	3.03	A	961.66	1442.49	124.20	5.17	1.38	124.21	5.17
South	0.06	23.16	0.09	~1	C	11.93	17.89	4.59	15.39	0.05	4.59	15.39
East	0.82	9.08	4.37	11.02	A	1476.45	2214.67	221.77	6.01	2.46	221.79	6.01

Main Results for each time segment

Main results: (12:00-12:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	531.51	132.88	529.77	608.04	622.27	0.00	1742.84	1387.53	0.305	0.00	0.44	2.964	A
West	788.99	197.25	785.94	647.79	504.25	0.00	1828.16	1241.91	0.432	0.00	0.76	3.478	A
South	9.79	2.45	9.69	8.25	1281.94	0.00	546.30	0.00	0.018	0.00	0.03	9.328	A
East	1211.34	302.83	1206.35	1267.67	23.96	0.00	2175.39	2172.15	0.557	0.00	1.25	3.706	A

Main results: (12:15-12:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	634.68	158.67	633.95	727.62	744.66	0.00	1654.36	1387.53	0.384	0.44	0.62	3.526	A
West	942.13	235.53	940.55	775.19	603.42	0.00	1756.47	1241.91	0.536	0.76	1.16	4.448	A
South	11.69	2.92	11.63	9.87	1534.10	0.00	413.45	0.00	0.028	0.03	0.04	12.456	B
East	1446.46	361.61	1443.58	1517.03	28.69	0.00	2171.97	2172.15	0.666	1.25	1.97	4.933	A

Main results: (12:30-12:45)

	Total	Intersection	Entry	Exit Flow	Circulating	Pedestrian	Capacity	Saturation	V/C	Start	End	Delay	

Leg	Demand (PCE/hr)	Arrivals (PCE)	Flow (PCE/hr)	(PCE/hr)	Flow (PCE/hr)	Demand (Ped/hr)	(PCE/hr)	Capacity (PCE/hr)	Ratio	Queue (PCE)	Queue (PCE)	(s)	LOS
North	777.32	194.33	775.74	888.31	909.06	0.00	1535.50	1387.53	0.506	0.62	1.01	4.729	A
West	1153.87	288.47	1149.49	946.45	738.35	0.00	1658.92	1241.91	0.696	1.16	2.25	7.075	A
South	14.31	3.58	14.12	12.05	1875.79	0.00	233.42	0.00	0.061	0.04	0.09	22.804	C
East	1771.54	442.89	1762.35	1854.89	35.01	0.00	2167.40	2172.15	0.817	1.97	4.26	8.713	A

Main results: (12:45-13:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	777.32	194.33	777.29	892.72	913.63	0.00	1532.20	1387.53	0.507	1.01	1.02	4.768	A
West	1153.87	288.47	1153.74	951.06	739.85	0.00	1657.84	1241.91	0.696	2.25	2.28	7.206	A
South	14.31	3.58	14.30	12.11	1881.49	0.00	230.42	0.00	0.062	0.09	0.09	23.160	C
East	1771.54	442.89	1771.12	1860.57	35.22	0.00	2167.24	2172.15	0.817	4.26	4.37	9.082	A

Main results: (13:00-13:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	634.68	158.67	636.26	733.78	751.02	0.00	1649.76	1387.53	0.385	1.02	0.63	3.556	A
West	942.13	235.53	946.52	781.63	605.65	0.00	1754.86	1241.91	0.537	2.28	1.18	4.522	A
South	11.69	2.92	11.88	9.95	1542.22	0.00	409.17	0.00	0.029	0.09	0.04	12.607	B
East	1446.46	361.61	1455.81	1525.12	28.99	0.00	2171.75	2172.15	0.666	4.37	2.03	5.105	A

Main results: (13:15-13:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	531.51	132.88	532.26	612.10	626.45	0.00	1739.82	1387.53	0.306	0.63	0.44	2.982	A
West	788.99	197.25	790.63	652.08	506.64	0.00	1826.44	1241.91	0.432	1.18	0.77	3.516	A
South	9.79	2.45	9.85	8.30	1288.96	0.00	542.60	0.00	0.018	0.04	0.03	9.396	A
East	1211.34	302.83	1214.38	1274.65	24.17	0.00	2175.24	2172.15	0.557	2.03	1.27	3.765	A

Queueing Delay Results for each time segment

Queueing Delay results: (12:00-12:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	6.42	0.43	2.964	A	A
West	11.12	0.74	3.478	A	A
South	0.36	0.02	9.328	A	A
East	18.11	1.21	3.706	A	A

Queueing Delay results: (12:15-12:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	9.11	0.61	3.526	A	A
West	16.87	1.12	4.448	A	A
South	0.58	0.04	12.456	B	B
East	28.42	1.89	4.933	A	A

Queueing Delay results: (12:30-12:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	14.79	0.99	4.729	A	A
West	31.95	2.13	7.075	A	A
South	1.25	0.08	22.804	C	C
East	58.69	3.91	8.713	A	A

Queueing Delay results: (12:45-13:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service

North	15.30	1.02	4.768	A	A
West	34.04	2.27	7.206	A	A
South	1.35	0.09	23.160	C	C
East	64.91	4.33	9.082	A	A

Queueing Delay results: (13:00-13:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	9.65	0.64	3.556	A	A
West	18.36	1.22	4.522	A	A
South	0.65	0.04	12.607	B	B
East	32.02	2.13	5.105	A	A

Queueing Delay results: (13:15-13:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	6.74	0.45	2.982	A	A
West	11.86	0.79	3.516	A	A
South	0.40	0.03	9.396	A	A
East	19.62	1.31	3.765	A	A

Queue Variation Results for each time segment

Queue Variation results: (12:00-12:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.44	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.76	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.03	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.25	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (12:15-12:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.62	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	1.16	0.00	0.00	2.02	3.03			N/A	N/A
South	0.04	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.97	0.00	0.00	4.01	6.01			N/A	N/A

Queue Variation results: (12:30-12:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.01	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	2.25	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.09	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	4.26	0.00	0.00	1.00	11.02			N/A	N/A

Queue Variation results: (12:45-13:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker

North	1.02	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	2.28	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.09	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	4.37	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (13:00-13:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.63	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	1.18	0.00	0.00	1.01	2.02			N/A	N/A
South	0.04	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	2.03	0.00	0.00	4.01	6.01			N/A	N/A

Queue Variation results: (13:15-13:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.44	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.77	0.00	0.00	1.01	1.01			N/A	N/A
South	0.03	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.27	0.00	0.00	2.00	4.01			N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Erbsville Road & Keatsway Drive.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Without Extension
Report generation date: 2019-07-31 6:08:52 PM

Summary of intersection performance

	AM						
	Queue (PCE)	**95% Queue (PCE)**	**Delay (s)**	**V/C Ratio**	**LOS**	**Intersection Delay (s)**	**Intersection LOS**
	A1 - Total 2031						
Leg North	1.05	?	3.70	0.50	A	4.12	A
Leg West	0.24	~1	3.37	0.19	A		
Leg South	1.59	2.09	4.73	0.61	A		
Leg East	0.24	~1	3.61	0.18	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D3 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D4 - Total 2031, AM " model duration: 8:00 AM - 9:30 AM
"D5 - Total 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Total 2031, Sat" model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 6:08:52 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-07-24
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

(Default Analysis Set) - Total 2031, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, AM	Total 2031	AM		ONE HOUR	08:00	09:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,South,East				4.12	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Erbsville Road	
West	West	Keats Way	
South	South	Erbsville Road	
East	East	Keats Way	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	7.00	8.00	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.723	2192.710
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	930.00	100.000
West	ONE HOUR	✓	237.00	100.000
South	ONE HOUR	✓	1109.00	100.000
East	ONE HOUR	✓	217.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	20.000	864.000	46.000
	West	84.000	0.000	59.000	94.000
	South	1002.000	30.000	0.000	77.000
	East	59.000	34.000	124.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.02	0.93	0.05
	West	0.35	0.00	0.25	0.40
	South	0.90	0.03	0.00	0.07

	East	0.27	0.16	0.57	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.000	1.050	1.020
	West	1.030	1.000	1.050	1.040
	South	1.040	1.110	1.000	1.060
	East	1.120	1.140	1.030	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	0.0	5.0	2.0
	West	3.0	0.0	5.0	4.0
	South	4.0	11.0	0.0	6.0
	East	12.0	14.0	3.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.50	3.70	1.05	?	A	853.38	1280.08	68.10	3.19	0.76	68.11	3.19
West	0.19	3.37	0.24	~1	A	217.48	326.21	16.15	2.97	0.18	16.15	2.97
South	0.61	4.73	1.59	2.09	A	1017.64	1526.46	97.74	3.84	1.09	97.75	3.84
East	0.18	3.61	0.24	~1	A	199.12	298.68	15.71	3.16	0.17	15.71	3.16

Main Results for each time segment

Main results: (08:00-08:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	700.15	175.04	698.05	859.17	141.10	0.00	2090.70	1721.92	0.335	0.00	0.52	2.704	A
West	178.43	44.61	177.92	63.04	776.12	0.00	1631.62	632.58	0.109	0.00	0.13	2.573	A
South	834.91	208.73	832.11	785.88	168.15	0.00	2071.14	1787.66	0.403	0.00	0.70	3.025	A
East	163.37	40.84	162.88	162.87	837.40	0.00	1587.32	827.96	0.103	0.00	0.12	2.703	A

Main results: (08:15-08:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	836.05	209.01	835.33	1028.21	168.86	0.00	2070.63	1721.92	0.404	0.52	0.71	3.050	A
West	213.06	53.26	212.89	75.44	928.75	0.00	1521.27	632.58	0.140	0.13	0.17	2.858	A
South	996.97	249.24	995.84	940.43	201.21	0.00	2047.24	1787.66	0.487	0.70	0.98	3.569	A
East	195.08	48.77	194.91	194.90	1002.15	0.00	1468.20	827.96	0.133	0.12	0.16	3.023	A

Main results: (08:30-08:45)

	Total	Intersection	Entry	Exit Flow	Circulating	Pedestrian	Capacity	Saturation	V/C	Start	End	Delay	

Leg	Demand (PCE/hr)	Arrivals (PCE)	Flow (PCE/hr)	(PCE/hr)	Flow (PCE/hr)	Demand (Ped/hr)	(PCE/hr)	Capacity (PCE/hr)	Ratio	Queue (PCE)	Queue (PCE)	(s)	LOS
North	1023.95	255.99	1022.60	1258.31	206.71	0.00	2043.27	1721.92	0.501	0.71	1.04	3.689	A
West	260.94	65.24	260.64	92.34	1136.96	0.00	1370.75	632.58	0.190	0.17	0.24	3.369	A
South	1221.03	305.26	1218.63	1151.27	246.34	0.00	2014.62	1787.66	0.606	0.98	1.58	4.703	A
East	238.92	59.73	238.62	238.57	1226.39	0.00	1306.09	827.96	0.183	0.16	0.24	3.607	A

Main results: (08:45-09:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1023.95	255.99	1023.93	1260.63	206.99	0.00	2043.07	1721.92	0.501	1.04	1.05	3.698	A
West	260.94	65.24	260.94	92.48	1138.44	0.00	1369.68	632.58	0.191	0.24	0.24	3.372	A
South	1221.03	305.26	1220.99	1152.75	246.63	0.00	2014.41	1787.66	0.606	1.58	1.59	4.732	A
East	238.92	59.73	238.92	238.92	1228.70	0.00	1304.42	827.96	0.183	0.24	0.24	3.612	A

Main results: (09:00-09:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	836.05	209.01	837.39	1031.67	169.29	0.00	2070.32	1721.92	0.404	1.05	0.71	3.063	A
West	213.06	53.26	213.35	75.65	931.02	0.00	1519.63	632.58	0.140	0.24	0.17	2.865	A
South	996.97	249.24	999.36	942.72	201.66	0.00	2046.92	1787.66	0.487	1.59	1.00	3.594	A
East	195.08	48.77	195.38	195.43	1005.59	0.00	1465.72	827.96	0.133	0.24	0.16	3.033	A

Main results: (09:15-09:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	700.15	175.04	700.89	863.17	141.69	0.00	2090.28	1721.92	0.335	0.71	0.53	2.714	A
West	178.43	44.61	178.59	63.31	779.26	0.00	1629.34	632.58	0.110	0.17	0.13	2.577	A
South	834.91	208.73	836.07	789.06	168.80	0.00	2070.68	1787.66	0.403	1.00	0.71	3.046	A
East	163.37	40.84	163.53	163.55	841.32	0.00	1584.48	827.96	0.103	0.16	0.12	2.711	A

Queueing Delay Results for each time segment

Queueing Delay results: (08:00-08:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	7.72	0.51	2.704	A	A
West	1.88	0.13	2.573	A	A
South	10.27	0.68	3.025	A	A
East	1.81	0.12	2.703	A	A

Queueing Delay results: (08:15-08:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	10.41	0.69	3.050	A	A
West	2.50	0.17	2.858	A	A
South	14.43	0.96	3.569	A	A
East	2.42	0.16	3.023	A	A

Queueing Delay results: (08:30-08:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	15.30	1.02	3.689	A	A
West	3.59	0.24	3.369	A	A
South	23.00	1.53	4.703	A	A
East	3.52	0.23	3.607	A	A

Queueing Delay results: (08:45-09:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service

North	15.69	1.05	3.698	A	A
West	3.65	0.24	3.372	A	A
South	23.86	1.59	4.732	A	A
East	3.58	0.24	3.612	A	A

Queueing Delay results: (09:00-09:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	10.91	0.73	3.063	A	A
West	2.59	0.17	2.865	A	A
South	15.35	1.02	3.594	A	A
East	2.51	0.17	3.033	A	A

Queueing Delay results: (09:15-09:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	8.07	0.54	2.714	A	A
West	1.94	0.13	2.577	A	A
South	10.83	0.72	3.046	A	A
East	1.87	0.12	2.711	A	A

Queue Variation Results for each time segment

Queue Variation results: (08:00-08:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.52	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.13	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.70	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.12	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:15-08:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.71	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.17	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.98	0.00	0.00	1.04	2.09			N/A	N/A
East	0.16	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:30-08:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.04	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.24	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.58	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.24	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:45-09:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.05	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.24	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.59	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.24	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:00-09:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.71	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.17	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.00	0.00	0.00	0.00	1.04			N/A	N/A
East	0.16	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:15-09:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.53	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.13	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.71	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.12	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Erbsville Road & Keatsway Drive.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Without Extension
Report generation date: 2019-07-31 6:11:07 PM

Summary of intersection performance

	PM						
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	A1 - Total 2031						
Leg North	2.84	4.07	7.13	0.74	A	5.90	A
Leg West	0.29	~1	4.48	0.23	A		
Leg South	1.97	3.04	5.34	0.66	A		
Leg East	0.33	~1	3.71	0.25	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D3 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D4 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Total 2031, PM " model duration: 4:00 PM - 5:30 PM
"D6 - Total 2031, Sat" model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 6:11:06 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-07-24
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

(Default Analysis Set) - Total 2031, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, PM	Total 2031	PM		ONE HOUR	16:00	17:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,South,East				5.90	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Erbsville Road	
West	West	Keats Way	
South	South	Erbsville Road	
East	East	Keats Way	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	7.00	8.00	30.00	20.00	55.00	25.00	

East	7.00	8.00	30.00	20.00	55.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.723	2192.710
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	1322.00	100.000
West	ONE HOUR	✓	213.00	100.000
South	ONE HOUR	✓	1213.00	100.000
East	ONE HOUR	✓	296.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	24.000	1235.000	63.000
	West	64.000	0.000	56.000	93.000
	South	1000.000	38.000	0.000	175.000
	East	53.000	89.000	154.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.02	0.93	0.05
	West	0.30	0.00	0.26	0.44
	South	0.82	0.03	0.00	0.14
	East	0.18	0.30	0.52	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.000	1.020	1.000
	West	1.000	1.000	1.000	1.000
	South	1.010	1.000	1.000	1.030
	East	1.000	1.000	1.040	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	0.0	2.0	0.0
	West	0.0	0.0	0.0	0.0
	South	1.0	0.0	0.0	3.0
	East	0.0	0.0	4.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.74	7.13	2.84	4.07	A	1213.09	1819.64	155.55	5.13	1.73	155.56	5.13
West	0.23	4.48	0.29	~1	A	195.45	293.18	17.92	3.67	0.20	17.92	3.67
South	0.66	5.34	1.97	3.04	A	1113.07	1669.61	115.96	4.17	1.29	115.97	4.17
East	0.25	3.71	0.33	~1	A	271.61	407.42	21.64	3.19	0.24	21.64	3.19

Main Results for each time segment

Main results: (16:00-16:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	995.27	248.82	991.42	838.05	210.91	0.00	2040.23	1589.23	0.488	0.00	0.96	3.483	A
West	160.36	40.09	159.84	113.31	1089.02	0.00	1405.41	707.46	0.114	0.00	0.13	2.888	A
South	913.21	228.30	910.04	1083.79	165.07	0.00	2073.38	1760.97	0.440	0.00	0.79	3.126	A
East	222.84	55.71	222.18	248.33	826.78	0.00	1594.99	949.61	0.140	0.00	0.17	2.674	A

Main results: (16:15-16:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1188.45	297.11	1186.48	1002.91	252.38	0.00	2010.25	1589.27	0.591	0.96	1.46	4.441	A
West	191.48	47.87	191.28	135.60	1303.26	0.00	1250.52	707.46	0.153	0.13	0.18	3.398	A
South	1090.46	272.62	1089.07	1297.01	197.53	0.00	2049.91	1760.97	0.532	0.79	1.14	3.789	A
East	266.10	66.52	265.87	297.18	989.42	0.00	1477.41	949.61	0.180	0.17	0.22	3.031	A

Main results: (16:30-16:45)

	Total	Intersection	Entry	Exit Flow	Circulating	Pedestrian	Capacity	Saturation	V/C	Start	End	Delay	

Leg	Demand (PCE/hr)	Arrivals (PCE)	Flow (PCE/hr)	(PCE/hr)	Flow (PCE/hr)	Demand (Ped/hr)	(PCE/hr)	Capacity (PCE/hr)	Ratio	Queue (PCE)	Queue (PCE)	(s)	LOS
North	1455.55	363.89	1450.16	1226.97	308.92	0.00	1969.37	1589.23	0.739	1.46	2.80	6.991	A
West	234.52	58.63	234.08	165.92	1593.16	0.00	1040.94	707.46	0.225	0.18	0.29	4.460	A
South	1335.54	333.88	1332.31	1585.59	241.65	0.00	2018.01	1760.97	0.662	1.14	1.95	5.290	A
East	325.90	81.48	325.46	363.52	1210.43	0.00	1317.63	949.61	0.247	0.22	0.33	3.700	A

Main results: (16:45-17:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1455.55	363.89	1455.39	1229.78	309.38	0.00	1969.04	1589.23	0.739	2.80	2.84	7.132	A
West	234.52	58.63	234.51	166.25	1598.52	0.00	1037.06	707.46	0.226	0.29	0.29	4.485	A
South	1335.54	333.88	1335.47	1590.82	242.21	0.00	2017.60	1760.97	0.662	1.95	1.97	5.343	A
East	325.90	81.48	325.90	364.42	1213.26	0.00	1315.58	949.61	0.248	0.33	0.33	3.710	A

Main results: (17:00-17:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1188.45	297.11	1193.86	1007.02	253.07	0.00	2009.75	1589.27	0.591	2.84	1.49	4.525	A
West	191.48	47.87	191.92	136.08	1310.86	0.00	1245.02	707.46	0.154	0.29	0.18	3.421	A
South	1090.46	272.62	1093.68	1304.42	198.35	0.00	2049.31	1760.97	0.532	1.97	1.16	3.826	A
East	266.10	66.52	266.54	298.47	993.56	0.00	1474.42	949.61	0.180	0.33	0.23	3.044	A

Main results: (17:15-17:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	995.27	248.82	997.32	842.23	211.79	0.00	2039.60	1589.23	0.488	1.49	0.98	3.524	A
West	160.36	40.09	160.57	113.83	1095.28	0.00	1400.88	707.46	0.114	0.18	0.13	2.904	A
South	913.21	228.30	914.65	1089.97	165.88	0.00	2072.79	1760.97	0.441	1.16	0.80	3.150	A
East	222.84	55.71	223.08	249.59	830.94	0.00	1591.98	949.61	0.140	0.23	0.17	2.683	A

Queueing Delay Results for each time segment

Queueing Delay results: (16:00-16:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	14.04	0.94	3.483	A	A
West	1.89	0.13	2.888	A	A
South	11.59	0.77	3.126	A	A
East	2.44	0.16	2.674	A	A

Queueing Delay results: (16:15-16:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	21.20	1.41	4.441	A	A
West	2.66	0.18	3.398	A	A
South	16.71	1.11	3.789	A	A
East	3.30	0.22	3.031	A	A

Queueing Delay results: (16:30-16:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	39.64	2.64	6.991	A	A
West	4.25	0.28	4.460	A	A
South	28.07	1.87	5.290	A	A
East	4.92	0.33	3.700	A	A

Queueing Delay results: (16:45-17:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service

North	42.43	2.83	7.132	A	A
West	4.36	0.29	4.485	A	A
South	29.38	1.96	5.343	A	A
East	5.02	0.33	3.710	A	A

Queueing Delay results: (17:00-17:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	23.21	1.55	4.525	A	A
West	2.79	0.19	3.421	A	A
South	17.93	1.20	3.826	A	A
East	3.44	0.23	3.044	A	A

Queueing Delay results: (17:15-17:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	15.03	1.00	3.524	A	A
West	1.97	0.13	2.904	A	A
South	12.28	0.82	3.150	A	A
East	2.53	0.17	2.683	A	A

Queue Variation Results for each time segment

Queue Variation results: (16:00-16:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.96	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.13	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.79	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.17	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:15-16:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.46	0.00	0.00	3.06	4.07			N/A	N/A
West	0.18	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.14	0.00	0.00	2.03	3.04			N/A	N/A
East	0.22	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:30-16:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	2.80	0.00	0.00	0.00	3.06			N/A	N/A
West	0.29	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.95	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.33	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:45-17:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker

North	2.84	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.29	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.97	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.33	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:00-17:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.49	0.00	0.00	2.04	3.06			N/A	N/A
West	0.18	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.16	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.23	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:15-17:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.98	0.00	0.00	1.02	2.04			N/A	N/A
West	0.13	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.80	0.00	0.00	1.01	1.01			N/A	N/A
East	0.17	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Erbsville Road & Keatsway Drive.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Without Extension
Report generation date: 2019-07-31 6:11:27 PM

Summary of intersection performance

	Sat						
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	A1 - Total 2031						
Leg North	1.20	1.01	3.97	0.54	A	3.80	A
Leg West	0.10	~1	3.06	0.09	A		
Leg South	1.26	1.02	3.89	0.55	A		
Leg East	0.22	~1	3.08	0.18	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D3 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D4 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Total 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Total 2031, Sat " model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 6:11:27 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-07-24
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

(Default Analysis Set) - Total 2031, Sat

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, Sat	Total 2031	Sat		ONE HOUR	12:00	13:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,South,East				3.80	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Erbsville Road	
West	West	Keats Way	
South	South	Erbsville Road	
East	East	Keats Way	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	7.00	8.00	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.723	2192.710
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	991.00	100.000
West	ONE HOUR	✓	105.00	100.000
South	ONE HOUR	✓	1063.00	100.000
East	ONE HOUR	✓	234.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	16.000	934.000	41.000
	West	29.000	0.000	43.000	33.000
	South	865.000	40.000	0.000	158.000
	East	41.000	34.000	159.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.02	0.94	0.04
	West	0.28	0.00	0.41	0.31
	South	0.81	0.04	0.00	0.15

	East	0.18	0.15	0.68	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.000	1.010	1.000
	West	1.000	1.000	1.000	1.000
	South	1.010	1.000	1.000	1.050
	East	1.030	1.000	1.020	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	0.0	1.0	0.0
	West	0.0	0.0	0.0	0.0
	South	1.0	0.0	0.0	5.0
	East	3.0	0.0	2.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.54	3.97	1.20	1.01	A	909.36	1364.04	75.90	3.34	0.84	75.90	3.34
West	0.09	3.06	0.10	~1	A	96.35	144.52	6.59	2.73	0.07	6.59	2.73
South	0.55	3.89	1.26	1.02	A	975.43	1463.14	80.26	3.29	0.89	80.26	3.29
East	0.18	3.08	0.22	~1	A	214.72	322.08	14.78	2.75	0.16	14.78	2.75

Main Results for each time segment

Main results: (12:00-12:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	746.08	186.52	743.81	701.81	174.93	0.00	2066.24	1598.27	0.361	0.00	0.57	2.743	A
West	79.05	19.76	78.84	67.56	851.18	0.00	1577.35	608.43	0.050	0.00	0.05	2.402	A
South	800.28	200.07	797.86	852.69	77.33	0.00	2136.81	1885.18	0.375	0.00	0.61	2.725	A
East	176.17	44.04	175.69	174.14	701.05	0.00	1685.89	910.91	0.105	0.00	0.12	2.428	A

Main results: (12:15-12:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	890.89	222.72	890.05	839.79	209.31	0.00	2041.39	1598.27	0.436	0.57	0.78	3.155	A
West	94.39	23.60	94.33	80.84	1018.52	0.00	1456.37	608.43	0.065	0.05	0.07	2.642	A
South	955.62	238.90	954.74	1020.33	92.52	0.00	2125.82	1885.18	0.450	0.61	0.82	3.120	A
East	210.36	52.59	210.21	208.38	838.88	0.00	1586.24	910.91	0.133	0.12	0.16	2.665	A

Main results: (12:30-12:45)

Leg	Total	Intersection	Entry	Exit Flow	Circulating	Pedestrian	Capacity	Saturation	V/C	Start	End	Delay	

Leg	Demand (PCE/hr)	Arrivals (PCE)	Flow (PCE/hr)	(PCE/hr)	Flow (PCE/hr)	Demand (Ped/hr)	(PCE/hr)	Capacity (PCE/hr)	Ratio	Queue (PCE)	Queue (PCE)	(s)	LOS
North	1091.11	272.78	1089.46	1027.99	256.26	0.00	2007.45	1598.27	0.544	0.78	1.19	3.951	A
West	115.61	28.90	115.49	98.96	1246.76	0.00	1291.37	608.43	0.090	0.07	0.10	3.061	A
South	1170.38	292.60	1168.67	1248.98	113.27	0.00	2110.82	1885.18	0.554	0.82	1.25	3.872	A
East	257.64	64.41	257.38	255.08	1026.86	0.00	1450.34	910.91	0.178	0.16	0.22	3.074	A

Main results: (12:45-13:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1091.11	272.78	1091.09	1029.43	256.53	0.00	2007.25	1598.27	0.544	1.19	1.20	3.966	A
West	115.61	28.90	115.61	99.09	1248.53	0.00	1290.08	608.43	0.090	0.10	0.10	3.064	A
South	1170.38	292.60	1170.36	1250.74	113.40	0.00	2110.73	1885.18	0.554	1.25	1.26	3.886	A
East	257.64	64.41	257.64	255.43	1028.33	0.00	1449.28	910.91	0.178	0.22	0.22	3.077	A

Main results: (13:00-13:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	890.89	222.72	892.53	842.00	209.73	0.00	2041.08	1598.27	0.436	1.20	0.79	3.167	A
West	94.39	23.60	94.51	81.04	1021.23	0.00	1454.41	608.43	0.065	0.10	0.07	2.649	A
South	955.62	238.90	957.31	1023.00	92.73	0.00	2125.67	1885.18	0.450	1.26	0.83	3.132	A
East	210.36	52.59	210.61	208.92	841.12	0.00	1584.62	910.91	0.133	0.22	0.16	2.671	A

Main results: (13:15-13:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	746.08	186.52	746.93	704.69	175.57	0.00	2065.78	1598.27	0.361	0.79	0.57	2.758	A
West	79.05	19.76	79.12	67.83	854.67	0.00	1574.82	608.43	0.050	0.07	0.05	2.408	A
South	800.28	200.07	801.18	856.17	77.62	0.00	2136.60	1885.18	0.375	0.83	0.61	2.738	A
East	176.17	44.04	176.32	174.85	703.94	0.00	1683.79	910.91	0.105	0.16	0.12	2.434	A

Queueing Delay Results for each time segment

Queueing Delay results: (12:00-12:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	8.35	0.56	2.743	A	A
West	0.78	0.05	2.402	A	A
South	8.89	0.59	2.725	A	A
East	1.75	0.12	2.428	A	A

Queueing Delay results: (12:15-12:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	11.45	0.76	3.155	A	A
West	1.03	0.07	2.642	A	A
South	12.14	0.81	3.120	A	A
East	2.30	0.15	2.665	A	A

Queueing Delay results: (12:30-12:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	17.40	1.16	3.951	A	A
West	1.45	0.10	3.061	A	A
South	18.30	1.22	3.872	A	A
East	3.24	0.22	3.074	A	A

Queueing Delay results: (12:45-13:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service

North	17.91	1.19	3.966	A	A
West	1.47	0.10	3.064	A	A
South	18.83	1.26	3.886	A	A
East	3.29	0.22	3.077	A	A

Queueing Delay results: (13:00-13:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	12.05	0.80	3.167	A	A
West	1.06	0.07	2.649	A	A
South	12.78	0.85	3.132	A	A
East	2.38	0.16	2.671	A	A

Queueing Delay results: (13:15-13:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	8.74	0.58	2.758	A	A
West	0.80	0.05	2.408	A	A
South	9.31	0.62	2.738	A	A
East	1.81	0.12	2.434	A	A

Queue Variation Results for each time segment

Queue Variation results: (12:00-12:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.57	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.05	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.61	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.12	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (12:15-12:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.78	0.00	0.00	0.00	1.01			N/A	N/A
West	0.07	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.82	0.00	0.00	1.02	1.02			N/A	N/A
East	0.16	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (12:30-12:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.19	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.10	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.25	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.22	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (12:45-13:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.20	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.10	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.26	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.22	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (13:00-13:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.79	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.07	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.83	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.16	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (13:15-13:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.57	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.05	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.61	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.12	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Erbsville Road-Ira-Needles Boulavard & Erb Street.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Without Extension
Report generation date: 2019-07-31 6:18:19 PM

Summary of intersection performance

There are warnings associated with this model run - see the 'Data Errors and Warnings' tables.

	AM						
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	Default - Total 2031						
Leg North	24.53	88.04	67.95	1.00	F	833.29	F
Leg West	507.45	?	2330.00	2.16	F		
Leg South	129.98	202.44	312.33	1.16	F		
Leg East	219.67	?	1226.22	1.46	F		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - Existing, Sat" model duration: 12:00 PM - 1:30 PM
"D4 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D7 - Total 2031, AM " model duration: 8:00 AM - 9:30 AM
"D8 - Total 2031, PM" model duration: 4:00 PM - 5:30 PM
"D9 - Total 2031, Sat" model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 6:18:18 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-22
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Default - Total 2031, AM

Data Errors and Warnings

Severity	Area	Item	Description
Last Run	Last Run	Leg North - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment(s).
Last Run	Last Run	Leg South - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment(s).
Last Run	Last Run	Leg East - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment(s).
Warning	Pedestrian Crossing	Leg West - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Default	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, AM	Total 2031	AM		ONE HOUR	08:00	09:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Erbsville Road/Ira-Needles Boulavard & Erb Street	Roundabout	North,West,South,East				833.29	F

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	(untitled)	
West	West	(untitled)	
South	South	(untitled)	
East	East	(untitled)	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	7.00	8.00	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Bypass

Leg	Leg Has Bypass	Bypass Utilisation (%)
North	✓	100
West		
South	✓	100
East		

Pedestrian Crossings

Leg	Crossing Type
North	Unsignalled Pedestrian Crossing
West	Unsignalled Pedestrian Crossing
South	Unsignalled Pedestrian Crossing
East	Unsignalled Pedestrian Crossing

Unsignalled Pedestrian Crossing Crossings

Leg	Space between crossing and intersection entry (PCE)	Vehicles queueing on exit (PCE)	Central Refuge	Crossing Data Type	Crossing length (m)	Crossing time (s)	Crossing length (entry side) (m)	Crossing time (entry side) (s)	Crossing length (exit side) (m)	Crossing time (exit side) (s)
North	1.00	1.00	✓	Distance			9.00	6.43	9.00	6.43
West	1.00	1.00	✓	Distance			9.00	6.43	9.50	6.79
South	1.00	1.00	✓	Distance			8.50	6.07	8.25	5.89
East	1.00	1.00	✓	Distance			8.50	6.07	7.50	5.36

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.723	2192.710
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	1378.00	100.000
West	ONE HOUR	✓	1085.00	100.000
South	ONE HOUR	✓	1755.00	100.000
East	ONE HOUR	✓	878.00	100.000

Pedestrian Flows

General Flows Data

Leg	Profile Type	Average Pedestrian Flow (Ped/hr)
North	ONE HOUR	5.00
West	ONE HOUR	4.00
South	ONE HOUR	6.00
East	ONE HOUR	8.00

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	187.000	944.000	247.000
	West	329.000	0.000	394.000	362.000
	South	848.000	674.000	0.000	233.000
	East	118.000	385.000	375.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.14	0.69	0.18
	West	0.30	0.00	0.36	0.33
	South	0.48	0.38	0.00	0.13
	East	0.13	0.44	0.43	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.040	1.040	1.020
	West	1.040	1.000	1.110	1.020
	South	1.030	1.100	1.000	1.030
	East	1.060	1.070	1.040	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	4.0	4.0	2.0
	West	4.0	0.0	11.0	2.0
	South	3.0	10.0	0.0	3.0
	East	6.0	7.0	4.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	1.00	67.95	24.53	88.04	F	1264.48	1639.32	747.83	27.37	8.31	747.93	27.37
West	2.16	2330.00	507.45	?	F	995.61	1493.42	22894.35	919.81	254.38	32816.58	1318.44
South	1.16	312.33	129.98	202.44	F	1610.42	2094.92	5473.92	156.78	60.82	5534.87	158.52
East	1.46	1226.22	219.67	?	F	805.67	1208.50	9709.35	482.05	107.88	11964.85	594.03

Main Results for each time segment

Main results: (08:00-08:15)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1037.43	896.65	224.16	140.78	0.00	889.78	943.10	1059.15	3.76	1426.94	1313.77	0.628	0.00	1.72	6.857	A
West	816.84	816.84	204.21	0.00	140.78	747.96	783.43	1165.50	0.00	793.88	536.62	1.029	0.00	17.22	56.820	F
South	1321.26	1145.84	286.46	175.41	0.00	1129.90	1252.58	660.88	4.52	1430.42	1448.72	0.801	0.00	3.98	12.126	B
East	661.00	661.00	165.25	0.00	175.41	645.55	434.08	1356.70	6.02	821.92	663.30	0.804	0.00	3.86	20.089	C

Main results: (08:15-08:30)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1238.79	1070.68	267.67	168.11	0.00	1061.92	1038.85	1185.77	4.49	1335.40	1313.91	0.802	1.72	3.91	13.227	B
West	975.39	975.39	243.85	0.00	168.11	670.14	892.18	1355.52	0.00	671.35	536.03	1.453	17.22	93.53	328.557	F
South	1577.71	1368.25	342.06	209.46	0.00	1334.01	1378.64	647.02	5.39	1432.89	1448.54	0.955	3.98	12.54	31.013	D
East	789.30	789.30	197.33	0.00	209.46	687.40	443.82	1537.22	7.19	703.58	663.15	1.122	3.86	29.34	104.270	F

Main results: (08:30-08:45)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1517.21	1311.32	327.83	205.89	0.00	1256.60	1061.34	1209.57	5.51	1318.16	1314.10	0.995	3.91	17.58	41.694	E
West	1194.61	1194.61	298.65	0.00	205.89	566.54	926.70	1539.48	0.00	566.59	535.23	2.108	93.53	250.55	1102.863	F
South	1932.29	1675.75	418.94	256.54	0.00	1436.83	1484.60	621.41	6.61	1444.33	1448.28	1.160	12.54	72.27	116.216	F
East	966.70	966.70	241.67	0.00	256.54	662.30	449.62	1608.62	8.81	662.96	662.94	1.458	29.34	105.44	378.380	F

Main results: (08:45-09:00)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1517.21	1311.32	327.83	205.89	0.00	1283.51	1061.35	1212.13	5.51	1316.31	1314.10	0.996	17.58	24.53	67.949	F
West	1194.61	1194.61	298.65	0.00	205.89	552.19	929.76	1565.88	0.00	552.21	535.23	2.163	250.55	411.16	2165.260	F
South	1932.29	1675.75	418.94	256.54	0.00	1444.93	1500.21	617.86	6.61	1446.01	1448.28	1.159	72.27	129.98	259.044	F
East	966.70	966.70	241.67	0.00	256.54	661.11	450.42	1612.37	8.81	661.22	662.94	1.462	105.44	181.84	793.134	F

Main results: (09:00-09:15)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1238.79	1070.68	267.67	168.11	0.00	1149.63	1072.27	1199.70	4.49	1325.33	1313.91	0.808	24.53	4.80	28.080	D
West	975.39	975.39	243.85	0.00	168.11	628.53	918.86	1430.46	0.00	628.54	536.03	1.552	411.16	497.87	2280.860	F
South	1577.71	1368.25	342.06	209.46	0.00	1423.86	1420.29	638.71	5.39	1435.47	1448.54	0.953	129.98	116.08	312.333	F
East	789.30	789.30	197.33	0.00	209.46	657.53	448.12	1614.44	7.19	657.64	663.15	1.200	181.84	214.78	1098.408	F

Main results: (09:15-09:30)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1037.43	896.65	224.16	140.78	0.00	907.32	1100.16	1173.50	3.76	1344.30	1313.77	0.667	4.80	2.13	8.731	A
West	816.84	816.84	204.21	0.00	140.78	778.51	899.54	1181.28	0.00	778.58	536.61	1.049	497.87	507.45	2329.999	F
South	1321.26	1145.84	286.46	175.41	0.00	1396.16	1275.82	683.98	4.52	1408.90	1448.72	0.813	116.08	53.50	220.804	F
East	661.00	661.00	165.25	0.00	175.41	641.44	447.91	1632.22	6.02	641.83	663.31	1.030	214.78	219.67	1226.222	F

Queueing Delay Results for each time segment

Queueing Delay results: (08:00-08:15)

Leg	Queueing Total Delay (PCE-	Queueing Rate Of Delay (PCE-	Average Delay Per Arriving Vehicle	Unsignalised Level Of	Signalised Level Of

	min)	min/min)	(s)	Service	Service
North	24.29	1.62	6.857	A	A
West	161.46	10.76	56.820	F	E
South	52.91	3.53	12.126	B	B
East	49.18	3.28	20.089	C	C

Queueing Delay results: (08:15-08:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	52.78	3.52	13.227	B	B
West	831.76	55.45	328.557	F	F
South	144.10	9.61	31.013	D	C
East	261.26	17.42	104.270	F	F

Queueing Delay results: (08:30-08:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	183.59	12.24	41.694	E	D
West	2580.68	172.05	1102.863	F	F
South	642.39	42.83	116.216	F	F
East	1011.31	67.42	378.380	F	F

Queueing Delay results: (08:45-09:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	319.05	21.27	67.949	F	E
West	4962.82	330.85	2165.260	F	F
South	1517.27	101.15	259.044	F	F
East	2154.59	143.64	793.134	F	F

Queueing Delay results: (09:00-09:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	133.71	8.91	28.080	D	C
West	6817.70	454.51	2280.860	F	F
South	1845.43	123.03	312.333	F	F
East	2974.62	198.31	1098.408	F	F

Queueing Delay results: (09:15-09:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	34.41	2.29	8.731	A	A
West	7539.93	502.66	2329.999	F	F
South	1271.82	84.79	220.804	F	F
East	3258.38	217.23	1226.222	F	F

Queue Variation Results for each time segment

Queue Variation results: (08:00-08:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.72	0.00	0.00	2.07	3.11			N/A	N/A
West	17.22	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
South	3.98	0.00	0.00	9.54	13.78			N/A	N/A
East	3.86	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A

Queue Variation results: (08:15-08:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	3.91	0.00	0.00	9.32	13.47			N/A	N/A
West	93.53	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
South	12.54	0.00	6.36	29.68	41.33			N/A	N/A
East	29.34	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A

Queue Variation results: (08:30-08:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	17.58	0.00	9.32	42.47	58.00			N/A	N/A
West	250.55	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
South	72.27	31.80	67.83	109.17	122.94			N/A	N/A
East	105.44	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A

Queue Variation results: (08:45-09:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	24.53	0.00	11.39	63.18	88.04			N/A	N/A
West	411.16	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
South	129.98	69.95	125.06	183.36	>199			N/A	N/A
East	181.84	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A

Queue Variation results: (09:00-09:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	4.80	0.00	0.00	10.36	17.61			N/A	N/A
West	497.87	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
South	116.08	51.93	109.17	174.88	197.14			N/A	N/A
East	214.78	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A

Queue Variation results: (09:15-09:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	2.13	0.00	0.00	1.04	6.21			N/A	N/A
West	507.45	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
South	53.50	20.14	48.75	83.73	96.45			N/A	N/A
East	219.67	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Erbsville Road-Ira-Needles Boulavard & Erb Street.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Without Extension
Report generation date: 2019-07-31 6:18:49 PM

Summary of intersection performance

There are warnings associated with this model run - see the 'Data Errors and Warnings' tables.

	PM						
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	Default - Total 2031						
Leg North	335.63	?	1277.13	1.48	F	2621.70	F
Leg West	1439.12	?	6283.01	2.68	F		
Leg South	126.06	199.20	257.07	1.14	F		
Leg East	436.87	?	2737.91	1.94	F		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - Existing, Sat" model duration: 12:00 PM - 1:30 PM
"D4 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D7 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM
"D8 - Total 2031, PM " model duration: 4:00 PM - 5:30 PM
"D9 - Total 2031, Sat" model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 6:18:48 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-22
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Default - Total 2031, PM

Data Errors and Warnings

Severity	Area	Item	Description
Last Run	Last Run	Leg North - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment(s).
Last Run	Last Run	Leg West - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment(s).
Last Run	Last Run	Leg South - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment(s).
Last Run	Last Run	Leg East - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment(s).

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Default	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, PM	Total 2031	PM		ONE HOUR	16:00	17:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Erbsville Road/Ira-Needles Boulavard & Erb Street	Roundabout	North,West,South,East				2621.70	F

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	(untitled)	
West	West	(untitled)	
South	South	(untitled)	
East	East	(untitled)	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	7.00	8.00	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Bypass

Leg	Leg Has Bypass	Bypass Utilisation (%)
North	✓	100
West		
South	✓	100
East		

Pedestrian Crossings

Leg	Crossing Type
North	Unsignalled Pedestrian Crossing
West	Unsignalled Pedestrian Crossing
South	Unsignalled Pedestrian Crossing
East	Unsignalled Pedestrian Crossing

Unsignalled Pedestrian Crossing Crossings

Leg	Space between crossing and intersection entry (PCE)	Vehicles queueing on exit (PCE)	Central Refuge	Crossing Data Type	Crossing length (m)	Crossing time (s)	Crossing length (entry side) (m)	Crossing time (entry side) (s)	Crossing length (exit side) (m)	Crossing time (exit side) (s)
North	1.00	1.00	✓	Distance			9.00	6.43	9.00	6.43
West	1.00	1.00	✓	Distance			9.00	6.43	9.50	6.79
South	1.00	1.00	✓	Distance			8.50	6.07	8.25	5.89
East	1.00	1.00	✓	Distance			8.50	6.07	7.50	5.36

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.723	2192.710
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	1678.00	100.000
West	ONE HOUR	✓	1892.00	100.000
South	ONE HOUR	✓	2022.00	100.000
East	ONE HOUR	✓	949.00	100.000

Pedestrian Flows

General Flows Data

Leg	Profile Type	Average Pedestrian Flow (Ped/hr)
North	ONE HOUR	8.00
West	ONE HOUR	15.00
South	ONE HOUR	16.00
East	ONE HOUR	14.00

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	412.000	1124.000	142.000
	West	423.000	0.000	967.000	502.000
	South	1014.000	654.000	0.000	354.000
	East	152.000	558.000	239.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.25	0.67	0.08
	West	0.22	0.00	0.51	0.27
	South	0.50	0.32	0.00	0.18
	East	0.16	0.59	0.25	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.020	1.030	1.000
	West	1.000	1.000	1.040	1.000
	South	1.010	1.040	1.000	1.060
	East	1.010	1.020	1.030	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	2.0	3.0	0.0
	West	0.0	0.0	4.0	0.0
	South	1.0	4.0	0.0	6.0
	East	1.0	2.0	3.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	1.48	1277.13	335.63	?	F	1539.76	1742.56	15558.13	535.70	172.87	19124.83	658.51
West	2.68	6283.01	1439.12	?	F	1736.13	2604.20	64821.24	1493.46	720.24	144582.28	3331.14
South	1.14	257.07	126.06	199.20	F	1855.42	2295.88	4822.89	126.04	53.59	4828.17	126.18
East	1.94	2737.91	436.87	?	F	870.82	1306.23	18047.38	828.98	200.53	28481.32	1308.25

Main Results for each time segment

Main results: (16:00-16:15)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1263.29	953.11	238.28	310.18	0.00	906.45	1038.20	1059.15	6.02	986.23	947.73	0.966	0.00	11.66	35.774	E
West	1424.40	1424.40	356.10	0.00	310.18	777.97	887.59	1078.01	11.29	782.88	779.82	1.819	0.00	161.61	381.711	F
South	1522.27	1255.76	313.94	266.51	0.00	1242.21	1373.96	482.02	12.05	1616.90	1610.21	0.777	0.00	3.39	9.500	A
East	714.46	714.46	178.61	0.00	266.51	681.21	308.09	1416.14	10.54	764.87	539.89	0.934	0.00	8.31	35.704	E

Main results: (16:15-16:30)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1508.49	1138.11	284.53	370.38	0.00	939.53	1167.01	1095.57	7.19	944.57	946.43	1.205	11.66	61.31	152.146	F
West	1700.87	1700.87	425.22	0.00	370.38	770.57	940.33	1094.77	13.48	770.59	778.97	2.207	161.61	394.18	1297.277	F
South	1817.74	1499.50	374.87	318.24	0.00	1473.89	1383.22	482.11	14.38	1614.90	1609.94	0.929	3.39	9.79	22.738	C
East	853.13	853.13	213.28	0.00	318.24	616.41	309.84	1646.17	12.59	619.19	539.55	1.378	8.31	67.49	244.589	F

Main results: (16:30-16:45)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1847.51	1393.89	348.47	453.62	0.00	944.26	1233.44	1084.61	8.81	944.53	944.64	1.476	61.31	173.72	455.524	F
West	2083.13	2083.13	520.78	0.00	453.62	777.10	947.45	1081.42	16.52	777.11	777.76	2.681	394.18	720.69	2587.894	F
South	2226.26	1836.50	459.13	389.76	0.00	1599.68	1372.68	485.84	17.62	1609.87	1609.51	1.141	9.79	68.99	98.015	F
East	1044.87	1044.87	261.22	0.00	389.76	544.63	312.10	1773.42	15.41	544.72	539.11	1.918	67.49	192.55	873.228	F

Main results: (16:45-17:00)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1847.51	1393.89	348.47	453.62	0.00	944.57	1238.00	1083.91	8.81	944.63	944.64	1.476	173.72	286.05	881.194	F
West	2083.13	2083.13	520.78	0.00	453.62	777.70	947.96	1080.52	16.52	777.71	777.76	2.679	720.69	1047.05	4092.591	F
South	2226.26	1836.50	459.13	389.76	0.00	1608.23	1372.06	486.17	17.62	1609.55	1609.51	1.141	68.99	126.06	224.607	F
East	1044.87	1044.87	261.22	0.00	389.76	539.80	312.29	1782.10	15.41	539.82	539.11	1.936	192.55	318.82	1713.721	F

Main results: (17:00-17:15)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1508.49	1138.11	284.53	370.38	0.00	946.14	1232.64	1085.47	7.19	946.20	946.44	1.203	286.05	334.04	1184.592	F
West	1700.87	1700.87	425.22	0.00	370.38	777.97	947.79	1083.82	13.48	777.98	778.97	2.186	1047.05	1277.77	5378.247	F
South	1817.74	1499.50	374.87	318.24	0.00	1597.50	1375.31	486.48	14.38	1610.45	1609.94	0.931	126.06	101.56	257.072	F
East	853.13	853.13	213.28	0.00	318.24	546.67	312.54	1771.44	12.59	546.68	539.55	1.561	318.82	395.44	2354.261	F

Main results: (17:15-17:30)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1263.29	953.11	238.28	310.18	0.00	946.75	1231.49	1086.10	6.02	947.49	947.73	1.006	334.04	335.63	1277.130	F
West	1424.40	1424.40	356.10	0.00	310.18	778.98	947.91	1084.94	11.29	778.98	779.82	1.829	1277.77	1439.12	6283.008	F
South	1522.27	1255.76	313.94	266.51	0.00	1594.70	1376.89	487.04	12.05	1610.74	1610.21	0.780	101.56	16.83	137.567	F
East	714.46	714.46	178.61	0.00	266.51	548.73	312.88	1768.86	10.54	548.75	539.89	1.302	395.44	436.87	2737.913	F

Queueing Delay Results for each time segment

Queueing Delay results: (16:00-16:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	122.47	8.16	35.774	E	D
West	1220.46	81.36	381.711	F	F
South	46.05	3.07	9.500	A	A
East	91.12	6.07	35.704	E	D

Queueing Delay results: (16:15-16:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	551.38	36.76	152.146	F	F
West	4168.43	277.90	1297.277	F	F
South	118.50	7.90	22.738	C	C
East	571.37	38.09	244.589	F	F

Queueing Delay results: (16:30-16:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	1762.86	117.52	455.524	F	F
West	8361.53	557.44	2587.894	F	F
South	599.91	39.99	98.015	F	F
East	1950.40	130.03	873.228	F	F

Queueing Delay results: (16:45-17:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	3448.25	229.88	881.194	F	F
West	13258.01	883.87	4092.591	F	F
South	1463.37	97.56	224.607	F	F
East	3835.30	255.69	1713.721	F	F

Queueing Delay results: (17:00-17:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	4650.65	310.04	1184.592	F	F
West	17436.11	1162.41	5378.247	F	F
South	1707.17	113.81	257.072	F	F
East	5356.92	357.13	2354.261	F	F

Queueing Delay results: (17:15-17:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	5022.52	334.83	1277.130	F	F
West	20376.70	1358.45	6283.008	F	F
South	887.89	59.19	137.567	F	F
East	6242.27	416.15	2737.913	F	F

Queue Variation Results for each time segment

Queue Variation results: (16:00-16:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	11.66	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
West	161.61	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
South	3.39	0.00	1.02	7.15	10.22			N/A	N/A
East	8.31	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A

Queue Variation results: (16:15-16:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	61.31	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
West	394.18	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
South	9.79	0.00	4.09	23.50	33.71			N/A	N/A
East	67.49	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A

Queue Variation results: (16:30-16:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	173.72	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
West	720.69	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A

South	68.99	29.62	64.36	105.22	119.52			N/A	N/A
East	192.55	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A

Queue Variation results: (16:45-17:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	286.05	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
West	1047.05	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
South	126.06	65.38	120.54	179.79	>199			N/A	N/A
East	318.82	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A

Queue Variation results: (17:00-17:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	334.04	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
West	1277.77	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
South	101.56	54.14	97.05	143.02	158.34			N/A	N/A
East	395.44	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A

Queue Variation results: (17:15-17:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	335.63	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
West	1439.12	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
South	16.83	0.00	9.19	39.84	53.12			N/A	N/A
East	436.87	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Erbsville Road-Ira-Needles Boulavard & Erb Street.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Without Extension
Report generation date: 2019-07-31 6:19:18 PM

Summary of intersection performance

There are warnings associated with this model run - see the 'Data Errors and Warnings' tables.

	Sat						
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	Default - Total 2031						
Leg North	438.73	?	2312.17	1.82	F	1868.56	F
Leg West	1076.05	?	4160.54	2.15	F		
Leg South	120.01	193.00	237.81	1.13	F		
Leg East	76.52	130.41	289.13	1.16	F		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - Existing, Sat" model duration: 12:00 PM - 1:30 PM
"D4 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D7 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM
"D8 - Total 2031, PM" model duration: 4:00 PM - 5:30 PM
"D9 - Total 2031, Sat " model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 6:19:17 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-22
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Default - Total 2031, Sat

Data Errors and Warnings

Severity	Area	Item	Description
Last Run	Last Run	Leg West - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment(s).
Last Run	Last Run	Leg South - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment(s).
Last Run	Last Run	Leg East - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment(s).
Warning	Pedestrian Crossing	Leg North - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Default	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, Sat	Total 2031	Sat		ONE HOUR	12:00	13:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Erbsville Road/Ira-Needles Boulavard & Erb Street	Roundabout	North,West,South,East				1868.56	F

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	(untitled)	
West	West	(untitled)	
South	South	(untitled)	
East	East	(untitled)	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	7.00	8.00	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Bypass

Leg	Leg Has Bypass	Bypass Utilisation (%)
North	✓	100
West		
South	✓	100
East		

Pedestrian Crossings

Leg	Crossing Type
North	Unsignalled Pedestrian Crossing
West	Unsignalled Pedestrian Crossing
South	Unsignalled Pedestrian Crossing
East	Unsignalled Pedestrian Crossing

Unsignalled Pedestrian Crossing Crossings

Leg	Space between crossing and intersection entry (PCE)	Vehicles queueing on exit (PCE)	Central Refuge	Crossing Data Type	Crossing length (m)	Crossing time (s)	Crossing length (entry side) (m)	Crossing time (entry side) (s)	Crossing length (exit side) (m)	Crossing time (exit side) (s)
North	1.00	1.00	✓	Distance			9.00	6.43	9.00	6.43
West	1.00	1.00	✓	Distance			9.00	6.43	9.50	6.79
South	1.00	1.00	✓	Distance			8.50	6.07	8.25	5.89
East	1.00	1.00	✓	Distance			8.50	6.07	7.50	5.36

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.723	2192.710
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	1390.00	100.000
West	ONE HOUR	✓	1735.00	100.000
South	ONE HOUR	✓	1913.00	100.000
East	ONE HOUR	✓	933.00	100.000

Pedestrian Flows

General Flows Data

Leg	Profile Type	Average Pedestrian Flow (Ped/hr)
North	ONE HOUR	4.00
West	ONE HOUR	26.00
South	ONE HOUR	10.00
East	ONE HOUR	9.00

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	325.000	938.000	127.000
	West	352.000	0.000	954.000	429.000
	South	875.000	798.000	0.000	240.000
	East	170.000	500.000	263.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.23	0.67	0.09
	West	0.20	0.00	0.55	0.25
	South	0.46	0.42	0.00	0.13
	East	0.18	0.54	0.28	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.000	1.010	1.000
	West	1.000	1.000	1.000	1.000
	South	1.010	1.000	1.000	1.020
	East	1.000	1.010	1.020	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	0.0	1.0	0.0
	West	0.0	0.0	0.0	0.0
	South	1.0	0.0	0.0	2.0
	East	0.0	1.0	2.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	1.82	2312.17	438.73	?	F	1275.49	1465.89	18218.99	745.72	202.43	27011.75	1105.61
West	2.15	4160.54	1076.05	?	F	1592.07	2388.10	49074.22	1232.97	545.27	88251.20	2217.27
South	1.13	237.81	120.01	193.00	F	1755.40	2302.76	4445.20	115.82	49.39	4445.72	115.84
East	1.16	289.13	76.52	130.41	F	856.14	1284.21	3014.95	140.86	33.50	3027.37	141.44

Main Results for each time segment

Main results: (12:00-12:15)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1046.46	801.79	200.45	244.68	0.00	776.82	949.38	1164.09	0.00	902.38	650.34	0.889	0.00	6.24	25.337	D
West	1306.20	1306.20	326.55	0.00	244.68	840.71	967.77	973.14	19.57	847.94	890.77	1.540	0.00	116.37	254.529	F
South	1440.21	1259.52	314.88	180.68	0.00	1246.46	1342.77	471.08	7.53	1630.07	1627.03	0.773	0.00	3.27	9.147	A
East	702.41	702.41	175.60	0.00	180.68	696.44	300.51	1417.02	6.78	1168.20	885.77	0.601	0.00	1.49	7.622	A

Main results: (12:15-12:30)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1249.58	957.41	239.35	292.17	0.00	727.73	1097.76	1381.75	0.00	732.25	647.61	1.308	6.24	63.66	191.617	F
West	1559.73	1559.73	389.93	0.00	292.17	851.84	1148.92	960.56	23.37	851.89	891.33	1.831	116.37	293.35	852.315	F
South	1719.75	1503.99	376.00	215.76	0.00	1480.73	1342.16	470.23	8.99	1632.09	1626.73	0.922	3.27	9.08	21.189	C
East	838.75	838.75	209.69	0.00	215.76	825.95	297.41	1653.56	8.09	997.21	885.89	0.841	1.49	4.69	19.932	C

Main results: (12:30-12:45)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1530.42	1172.59	293.15	357.83	0.00	649.75	1185.93	1491.59	0.00	649.87	643.80	1.804	63.66	194.37	726.485	F
West	1910.27	1910.27	477.57	0.00	357.83	889.11	1243.05	898.29	28.63	889.12	892.09	2.148	293.35	548.63	1709.749	F
South	2106.25	1842.01	460.50	264.24	0.00	1615.44	1309.69	477.71	11.01	1626.71	1626.29	1.132	9.08	65.72	92.685	F
East	1027.25	1027.25	256.81	0.00	264.24	881.69	297.33	1795.83	9.91	894.34	886.07	1.149	4.69	41.08	107.071	F

Main results: (12:45-13:00)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1530.42	1172.59	293.15	357.83	0.00	644.57	1192.08	1499.20	0.00	644.59	643.80	1.819	194.37	326.37	1461.507	F
West	1910.27	1910.27	477.57	0.00	357.83	891.70	1249.59	894.18	28.63	891.71	892.09	2.142	548.63	803.28	2742.571	F
South	2106.25	1842.01	460.50	264.24	0.00	1624.87	1307.63	478.26	11.01	1626.34	1626.29	1.133	65.72	120.01	212.075	F
East	1027.25	1027.25	256.81	0.00	264.24	885.50	297.35	1805.78	9.91	887.15	886.07	1.158	41.08	76.52	248.809	F

Main results: (13:00-13:15)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1249.58	957.41	239.35	292.17	0.00	653.10	1185.30	1492.71	0.00	653.11	647.61	1.466	326.37	402.45	2009.340	F
West	1559.73	1559.73	389.93	0.00	292.17	888.17	1243.51	902.29	23.37	888.17	891.33	1.756	803.28	971.17	3605.313	F
South	1719.75	1503.99	376.00	215.76	0.00	1613.78	1312.78	477.69	8.99	1627.29	1626.73	0.924	120.01	92.56	237.813	F
East	838.75	838.75	209.69	0.00	215.76	884.03	297.49	1793.97	8.09	895.71	885.89	0.936	76.52	65.20	289.127	F

Main results: (13:15-13:30)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1046.46	801.79	200.45	244.68	0.00	656.70	1182.60	1491.82	0.00	656.72	650.34	1.221	402.45	438.73	2312.170	F
West	1306.20	1306.20	326.55	0.00	244.68	886.66	1242.06	906.46	19.57	886.66	890.77	1.473	971.17	1076.05	4160.539	F
South	1440.21	1259.52	314.88	180.68	0.00	1608.51	1315.68	477.43	7.53	1627.88	1627.03	0.774	92.56	5.31	113.876	F
East	702.41	702.41	175.60	0.00	180.68	886.02	297.55	1788.40	6.78	899.75	885.77	0.781	65.20	19.30	176.526	F

Queueing Delay Results for each time segment

Queueing Delay results: (12:00-12:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	73.95	4.93	25.337	D	C
West	884.64	58.98	254.529	F	F
South	44.56	2.97	9.147	A	A
East	21.09	1.41	7.622	A	A

Queueing Delay results: (12:15-12:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	529.09	35.27	191.617	F	F
West	3072.91	204.86	852.315	F	F
South	111.42	7.43	21.189	C	C
East	60.23	4.02	19.932	C	B

Queueing Delay results: (12:30-12:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	1935.31	129.02	726.485	F	F
West	6314.85	420.99	1709.749	F	F
South	570.97	38.06	92.685	F	F
East	354.43	23.63	107.071	F	F

Queueing Delay results: (12:45-13:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	3905.59	260.37	1461.507	F	F
West	10139.34	675.96	2742.571	F	F
South	1393.47	92.90	212.075	F	F
East	882.58	58.84	248.809	F	F

Queueing Delay results: (13:00-13:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	5466.21	364.41	2009.340	F	F
West	13308.33	887.22	3605.313	F	F
South	1594.26	106.28	237.813	F	F
East	1062.89	70.86	289.127	F	F

Queueing Delay results: (13:15-13:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	6308.84	420.59	2312.170	F	F
West	15354.14	1023.61	4160.539	F	F
South	730.52	48.70	113.876	F	F
East	633.72	42.25	176.526	F	F

Queue Variation Results for each time segment

Queue Variation results: (12:00-12:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	6.24	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
West	116.37	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
South	3.27	0.00	1.01	6.03	9.05			N/A	N/A
East	1.49	0.00	0.00	3.03	4.04			N/A	N/A

Queue Variation results: (12:15-12:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	63.66	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
West	293.35	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
South	9.08	0.00	4.02	22.11	31.16			N/A	N/A
East	4.69	0.00	0.00	11.12	17.19			N/A	N/A

Queue Variation results: (12:30-12:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	194.37	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
West	548.63	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
South	65.72	27.14	61.32	101.53	115.60			N/A	N/A

East	41.08	14.15	37.41	66.72	76.83			N/A	N/A

Queue Variation results: (12:45-13:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	326.37	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
West	803.28	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
South	120.01	60.31	114.59	172.90	193.00			N/A	N/A
East	76.52	34.37	71.78	115.25	130.41			N/A	N/A

Queue Variation results: (13:00-13:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	402.45	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
West	971.17	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
South	92.56	53.28	89.46	125.65	137.71			N/A	N/A
East	65.20	26.28	60.66	102.11	116.26			N/A	N/A

Queue Variation results: (13:15-13:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	438.73	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
West	1076.05	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
South	5.31	0.00	0.00	8.04	20.10			N/A	N/A
East	19.30	2.02	15.16	37.41	46.50			N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Ira-Needles Boulavard & The BoardwalkThorndale Drive.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Without Extension
Report generation date: 2019-07-31 6:20:24 PM

Summary of intersection performance

	AM					
	Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	Default - Total 2031					
Leg North	6.06	14.15	0.86	B	209.46	F
Leg West	0.29	3.78	0.21	A		
Leg South	76.34	117.59	1.06	F		
Leg East	116.35	2147.98	2.53	F		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - Existing, Sat" model duration: 12:00 PM - 1:30 PM
"D4 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D7 - Total 2031, AM " model duration: 8:00 AM - 9:30 AM
"D8 - Total 2031, PM" model duration: 4:00 PM - 5:30 PM
"D9 - Total 2031, Sat" model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 6:20:24 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-22
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Default - Total 2031, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Pedestrian Crossing	Leg North - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg West - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg South - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Default	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, AM	Total 2031	AM		ONE HOUR	08:00	09:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Ira Needles Boulevard & The BoardwalkThorndale Drive	Roundabout	North,West,South,East				209.46	F

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Ira Needles Boulevard	
West	West	The Boardwalk	
South	South	Ira Needles Boulevard	
East	East	Thorndale Drive	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	7.00	8.00	30.00	20.00	55.00	25.00	
East	3.50	4.50	30.00	20.00	55.00	25.00	

Pedestrian Crossings

Leg	Crossing Type
North	Unsignalled Pedestrian Crossing
West	Unsignalled Pedestrian Crossing
South	Unsignalled Pedestrian Crossing
East	Unsignalled Pedestrian Crossing

Unsignalled Pedestrian Crossing Crossings

Leg	Space between crossing and intersection entry (PCE)	Vehicles queueing on exit (PCE)	Central Refuge	Crossing Data Type	Crossing length (m)	Crossing time (s)	Crossing length (entry side) (m)	Crossing time (entry side) (s)	Crossing length (exit side) (m)	Crossing time (exit side) (s)
North	1.00	1.00	✓	Distance			8.00	5.71	8.00	5.71
West	1.00	1.00	✓	Distance			7.50	5.36	6.50	4.64
South	1.00	1.00	✓	Distance			7.75	5.54	8.00	5.71
East	1.00	1.00	✓	Distance			5.50	3.93	5.25	3.75

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.723	2192.710
East		(calculated)	(calculated)	0.527	1221.701

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	1452.00	100.000

West	ONE HOUR	✓	253.00	100.000
South	ONE HOUR	✓	1896.00	100.000
East	ONE HOUR	✓	263.00	100.000

Pedestrian Flows

General Flows Data

Leg	Profile Type	Average Pedestrian Flow (Ped/hr)
North	ONE HOUR	3.00
West	ONE HOUR	2.00
South	ONE HOUR	2.00
East	ONE HOUR	5.00

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	400.000	1011.000	41.000
	West	199.000	0.000	33.000	21.000
	South	1450.000	373.000	0.000	73.000
	East	102.000	68.000	93.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.28	0.70	0.03
	West	0.79	0.00	0.13	0.08
	South	0.76	0.20	0.00	0.04
	East	0.39	0.26	0.35	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.040	1.060	1.110
	West	1.130	1.000	1.000	1.000
	South	1.040	1.000	1.000	1.020
	East	1.010	1.000	1.010	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	4.0	6.0	11.0
	West	13.0	0.0	0.0	0.0
	South	4.0	0.0	0.0	2.0
	East	1.0	0.0	1.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.86	14.15	6.06	21.12	B	1332.38	1998.57	288.82	8.67	3.21	288.86	8.67
West	0.21	3.78	0.29	~1	A	232.16	348.24	19.36	3.33	0.22	19.36	3.34
South	1.06	117.59	76.34	157.76	F	1739.80	2609.70	2076.53	47.74	23.07	2076.62	47.74
East	2.53	2147.98	116.35	152.12	F	241.33	362.00	4340.21	719.37	48.22	4651.99	771.05

Main Results for each time segment

Main results: (08:00-08:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1093.14	273.29	1087.52	1309.25	398.09	0.00	1904.91	1977.49	0.574	0.00	1.40	4.619	A
West	190.47	47.62	189.87	628.87	856.74	0.00	1573.33	1147.82	0.121	0.00	0.15	2.859	A
South	1427.41	356.85	1418.00	850.80	195.81	0.00	2039.68	1402.43	0.700	0.00	2.35	5.886	A
East	198.00	49.50	194.59	101.06	1512.75	3.76	424.69	35.60	0.466	0.00	0.85	15.544	C

Main results: (08:15-08:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1305.32	326.33	1301.13	1559.31	469.09	0.00	1853.58	1977.49	0.704	1.40	2.45	6.828	A
West	227.44	56.86	227.23	748.89	1021.33	0.00	1454.34	1147.82	0.156	0.15	0.20	3.225	A
South	1704.47	426.12	1692.45	1014.23	234.33	0.00	2007.79	1402.40	0.849	2.35	5.36	11.354	B
East	236.43	59.11	222.39	120.76	1806.02	4.49	270.18	35.62	0.875	0.85	4.36	63.576	F

Main results: (08:30-08:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1598.68	399.67	1585.20	1746.32	457.62	0.00	1861.87	1977.49	0.859	2.45	5.82	13.131	B
West	278.56	69.64	278.21	849.67	1193.15	0.00	1330.13	1147.81	0.209	0.20	0.29	3.763	A
South	2087.53	521.88	1933.30	1184.67	286.68	0.00	1965.12	1402.35	1.062	5.36	43.91	55.148	F
East	289.57	72.39	126.25	142.29	2077.70	5.51	127.05	35.65	2.279	4.36	45.19	784.046	F

Main results: (08:45-09:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1598.68	399.67	1597.73	1760.78	455.21	0.00	1863.62	1977.49	0.858	5.82	6.06	14.154	B
West	278.56	69.64	278.55	854.90	1198.05	0.00	1326.59	1147.81	0.210	0.29	0.29	3.775	A
South	2087.53	521.88	1957.85	1189.26	287.33	0.00	1964.32	1402.35	1.063	43.91	76.34	117.588	F
East	289.57	72.39	114.42	143.62	2101.57	5.51	114.47	35.65	2.530	45.19	88.98	2147.982	F

Main results: (09:00-09:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1305.32	326.33	1319.30	1738.61	466.19	0.00	1855.67	1977.49	0.703	6.06	2.57	7.263	A
West	227.44	56.86	227.80	784.75	1000.74	0.00	1469.22	1147.82	0.155	0.29	0.20	3.188	A
South	1704.47	426.12	1974.72	993.20	235.34	0.00	2004.33	1402.40	0.850	76.34	8.77	81.814	F
East	236.43	59.11	126.93	132.19	2077.86	4.49	126.96	35.62	1.862	88.98	116.35	1539.138	F

Main results: (09:15-09:30)

Leg	Total Demand	Intersection Arrivals (PCE)	Entry Flow	Exit Flow (PCE/hr)	Circulating Flow	Pedestrian Demand	Capacity (PCE/hr)	Saturation Capacity	V/C Ratio	Start Queue	End Queue	Delay (s)	LOS

	(PCE/hr)		(PCE/hr)		(PCE/hr)	(Ped/hr)		(PCE/hr)		(PCE)	(PCE)		
North	1093.14	273.29	1096.85	1417.32	532.68	0.00	1807.61	1977.49	0.605	2.57	1.64	5.374	A
West	190.47	47.62	190.65	692.23	937.31	0.00	1515.08	1147.82	0.126	0.20	0.16	2.990	A
South	1427.41	356.85	1452.65	931.21	196.75	0.00	2038.66	1402.43	0.700	8.77	2.46	6.598	A
East	198.00	49.50	403.33	102.73	1546.67	3.76	406.82	35.60	0.487	116.35	65.02	812.502	F

Queueing Delay Results for each time segment

Queueing Delay results: (08:00-08:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	20.25	1.35	4.619	A	A
West	2.23	0.15	2.859	A	A
South	33.24	2.22	5.886	A	A
East	11.78	0.79	15.544	C	B

Queueing Delay results: (08:15-08:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	34.93	2.33	6.828	A	A
West	3.00	0.20	3.225	A	A
South	71.93	4.80	11.354	B	B
East	49.24	3.28	63.576	F	E

Queueing Delay results: (08:30-08:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	77.14	5.14	13.131	B	B
West	4.28	0.29	3.763	A	A
South	393.47	26.23	55.148	F	E
East	372.56	24.84	784.046	F	F

Queueing Delay results: (08:45-09:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	89.47	5.96	14.154	B	B
West	4.36	0.29	3.775	A	A
South	903.67	60.24	117.588	F	F
East	1006.30	67.09	2147.982	F	F

Queueing Delay results: (09:00-09:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	41.49	2.77	7.263	A	A
West	3.08	0.21	3.188	A	A
South	632.68	42.18	81.814	F	F
East	1540.00	102.67	1539.138	F	F

Queueing Delay results: (09:15-09:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	25.53	1.70	5.374	A	A
West	2.41	0.16	2.990	A	A
South	41.54	2.77	6.598	A	A
East	1360.32	90.69	812.502	F	F

Queue Variation Results for each time segment

Queue Variation results: (08:00-08:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.40	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.15	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	2.35	0.00	1.03	4.12	5.16			N/A	N/A
East	0.85	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:15-08:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	2.45	0.00	0.00	5.28	8.45			N/A	N/A
West	0.20	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	5.36	0.00	0.00	12.37	19.59			N/A	N/A
East	4.36	0.00	0.00	8.06	16.12			N/A	N/A

Queue Variation results: (08:30-08:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	5.82	0.00	0.00	7.39	21.12			N/A	N/A
West	0.29	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	43.91	8.25	37.12	80.43	96.92			N/A	N/A
East	45.19	21.16	42.31	65.48	73.54			N/A	N/A

Queue Variation results: (08:45-09:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	6.06	0.00	0.00	1.06	13.72			N/A	N/A
West	0.29	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	76.34	20.62	67.02	133.01	157.76			N/A	N/A
East	88.98	59.44	86.64	112.83	121.90			N/A	N/A

Queue Variation results: (09:00-09:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	2.57	0.00	0.00	5.28	8.45			N/A	N/A
West	0.20	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	8.77	0.00	1.03	22.68	34.03			N/A	N/A
East	116.35	82.61	113.84	143.05	152.12			N/A	N/A

Queue Variation results: (09:15-09:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.64	0.00	0.00	2.11	5.28			N/A	N/A
West	0.16	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	2.46	0.00	0.00	0.00	5.16			N/A	N/A
East	65.02	33.24	61.45	92.68	102.75			N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Ira-Needles Boulavard & The BoardwalkThorndale Drive.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Without Extension
Report generation date: 2019-07-31 6:21:02 PM

Summary of intersection performance

	PM					
	Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	Default - Total 2031					
Leg North	536.52	935.55	1.38	F	765.49	F
Leg West	300.75	1312.56	1.47	F		
Leg South	11.84	30.50	0.94	D		
Leg East	39.85	550.86	1.47	F		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - Existing, Sat" model duration: 12:00 PM - 1:30 PM
"D4 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D7 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM
"D8 - Total 2031, PM " model duration: 4:00 PM - 5:30 PM
"D9 - Total 2031, Sat" model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 6:21:01 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-22
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Default - Total 2031, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Pedestrian Crossing	Leg North - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg West - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg South - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Default	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, PM	Total 2031	PM		ONE HOUR	16:00	17:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Ira Needles Boulevard & The BoardwalkThorndale Drive	Roundabout	North,West,South,East				765.49	F

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Ira Needles Boulevard	
West	West	The Boardwalk	
South	South	Ira Needles Boulevard	
East	East	Thorndale Drive	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	7.00	8.00	30.00	20.00	55.00	25.00	
East	3.50	4.50	30.00	20.00	55.00	25.00	

Pedestrian Crossings

Leg	Crossing Type
North	Unsignalled Pedestrian Crossing
West	Unsignalled Pedestrian Crossing
South	Unsignalled Pedestrian Crossing
East	Unsignalled Pedestrian Crossing

Unsignalled Pedestrian Crossing Crossings

Leg	Space between crossing and intersection entry (PCE)	Vehicles queueing on exit (PCE)	Central Refuge	Crossing Data Type	Crossing length (m)	Crossing time (s)	Crossing length (entry side) (m)	Crossing time (entry side) (s)	Crossing length (exit side) (m)	Crossing time (exit side) (s)
North	1.00	1.00	✓	Distance			8.00	5.71	8.00	5.71
West	1.00	1.00	✓	Distance			7.50	5.36	6.50	4.64
South	1.00	1.00	✓	Distance			7.75	5.54	8.00	5.71
East	1.00	1.00	✓	Distance			5.50	3.93	5.25	3.75

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.723	2192.710
East		(calculated)	(calculated)	0.527	1221.701

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	2534.00	100.000
West	ONE HOUR	✓	1121.00	100.000
South	ONE HOUR	✓	1355.00	100.000
East	ONE HOUR	✓	225.00	100.000

Pedestrian Flows

General Flows Data

Leg	Profile Type	Average Pedestrian Flow (Ped/hr)
North	ONE HOUR	3.00
West	ONE HOUR	4.00
South	ONE HOUR	3.00
East	ONE HOUR	6.00

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	258.000	2151.000	125.000
	West	811.000	0.000	238.000	72.000
	South	1134.000	135.000	0.000	86.000
	East	97.500	46.000	81.500	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.10	0.85	0.05
	West	0.72	0.00	0.21	0.06
	South	0.84	0.10	0.00	0.06
	East	0.43	0.20	0.36	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.020	1.040	1.010
	West	1.050	1.000	1.000	1.000
	South	1.030	1.000	1.000	1.000
	East	1.000	1.030	1.000	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	2.0	4.0	1.0
	West	5.0	0.0	0.0	0.0
	South	3.0	0.0	0.0	0.0
	East	0.0	3.0	0.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	1.38	935.55	536.52	207.28	F	2325.24	3487.86	24254.15	417.23	269.49	28122.05	483.77
West	1.47	1312.56	300.75	?	F	1028.65	1542.97	13618.65	529.57	151.32	16926.10	658.19
South	0.94	30.50	11.84	47.15	D	1243.37	1865.06	446.86	14.38	4.97	446.92	14.38
East	1.47	550.86	39.85	63.38	F	206.46	309.70	1164.58	225.62	12.94	1164.62	225.63

Main Results for each time segment

Main results: (16:00-16:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1907.73	476.93	1866.01	1510.67	195.39	0.00	2051.45	2030.84	0.930	0.00	10.43	17.380	C
West	843.95	210.99	816.08	325.02	1736.39	0.00	937.39	843.73	0.900	0.00	6.97	26.546	D
South	1020.12	255.03	1013.33	1817.60	734.87	0.00	1625.88	1589.95	0.627	0.00	1.70	5.959	A
East	169.39	42.35	166.64	208.78	1539.42	4.52	410.64	115.59	0.413	0.00	0.69	14.685	B

Main results: (16:15-16:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	2278.01	569.50	2012.22	1698.99	233.03	0.00	2024.24	2030.83	1.125	10.43	76.88	86.448	F
West	1007.76	251.94	827.06	366.17	1879.08	0.00	834.23	843.73	1.208	6.97	52.14	142.151	F
South	1218.12	304.53	1212.60	1955.41	750.73	0.00	1608.30	1589.87	0.757	1.70	3.07	9.196	A
East	202.27	50.57	198.03	229.34	1733.99	5.39	308.13	115.63	0.656	0.69	1.75	31.806	D

Main results: (16:30-16:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	2789.99	697.50	2015.37	1906.30	244.82	0.00	2015.72	2030.81	1.384	76.88	270.53	314.601	F
West	1234.24	308.56	837.94	386.69	1873.50	0.00	838.27	843.73	1.472	52.14	151.22	445.265	F
South	1491.88	372.97	1462.93	1951.98	759.45	0.00	1596.61	1589.77	0.934	3.07	10.31	23.668	C
East	247.73	61.93	174.82	246.09	1976.29	6.61	180.47	115.68	1.373	1.75	19.97	262.604	F

Main results: (16:45-17:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	2789.99	697.50	2016.71	1923.35	243.36	0.00	2016.77	2030.81	1.383	270.53	463.85	662.642	F
West	1234.24	308.56	839.05	387.76	1872.32	0.00	839.12	843.73	1.471	151.22	250.02	873.079	F
South	1491.88	372.97	1485.76	1950.97	760.39	0.00	1595.42	1589.77	0.935	10.31	11.84	30.503	D
East	247.73	61.93	168.24	247.67	1998.48	6.61	168.78	115.68	1.468	19.97	39.85	550.864	F

Main results: (17:00-17:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	2278.01	569.50	1987.36	1769.11	283.96	0.00	1987.42	2030.83	1.146	463.85	536.52	901.946	F
West	1007.76	251.94	828.60	384.53	1886.78	0.00	828.66	843.73	1.216	250.02	294.81	1192.512	F
South	1218.12	304.53	1252.12	1964.67	750.71	0.00	1607.87	1589.87	0.758	11.84	3.34	11.282	B
East	202.27	50.57	280.95	230.72	1772.11	5.39	288.05	115.63	0.702	39.85	20.18	375.643	F

Main results: (17:15-17:30)

Leg	Total Demand	Intersection Arrivals (PCE)	Entry Flow	Exit Flow (PCE/hr)	Circulating Flow	Pedestrian Demand	Capacity (PCE/hr)	Saturation Capacity	V/C Ratio	Start Queue	End Queue	Delay (s)	LOS

	(PCE/hr)		(PCE/hr)		(PCE/hr)	(Ped/hr)		(PCE/hr)		(PCE)	(PCE)		
North	1907.73	476.93	2013.69	1559.35	242.25	0.00	2017.58	2030.84	0.946	536.52	510.03	935.554	F
West	843.95	210.99	820.16	357.79	1898.15	0.00	820.44	843.73	1.029	294.81	300.75	1312.562	F
South	1020.12	255.03	1026.34	1972.94	745.36	0.00	1615.95	1589.95	0.631	3.34	1.79	6.324	A
East	169.39	42.35	247.05	217.15	1554.56	4.52	402.66	115.59	0.421	20.18	0.76	37.271	E

Queueing Delay Results for each time segment

Queueing Delay results: (16:00-16:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	122.97	8.20	17.380	C	B
West	81.34	5.42	26.546	D	C
South	24.14	1.61	5.959	A	A
East	9.57	0.64	14.685	B	B

Queueing Delay results: (16:15-16:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	665.62	44.37	86.448	F	F
West	449.81	29.99	142.151	F	F
South	43.00	2.87	9.196	A	A
East	23.03	1.54	31.806	D	C

Queueing Delay results: (16:30-16:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2605.83	173.72	314.601	F	F
West	1525.38	101.69	445.265	F	F
South	122.54	8.17	23.668	C	C
East	168.15	11.21	262.604	F	F

Queueing Delay results: (16:45-17:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	5507.90	367.19	662.642	F	F
West	3009.26	200.62	873.079	F	F
South	167.89	11.19	30.503	D	C
East	448.86	29.92	550.864	F	F

Queueing Delay results: (17:00-17:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	7502.76	500.18	901.946	F	F
West	4086.17	272.41	1192.512	F	F
South	61.17	4.08	11.282	B	B
East	450.16	30.01	375.643	F	F

Queueing Delay results: (17:15-17:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	7849.06	523.27	935.554	F	F
West	4466.69	297.78	1312.562	F	F
South	28.12	1.87	6.324	A	A
East	64.81	4.32	37.271	E	D

Queue Variation Results for each time segment

Queue Variation results: (16:00-16:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker

North	10.43	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	6.97	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
South	1.70	0.00	1.02	2.05	2.05			N/A	N/A
East	0.69	0.00	0.00	1.01	1.01			N/A	N/A

Queue Variation results: (16:15-16:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	76.88	0.00	35.24	>199	>199			N/A	N/A
West	52.14	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
South	3.07	0.00	0.00	7.17	10.25			N/A	N/A
East	1.75	0.00	0.00	3.02	6.04			N/A	N/A

Queue Variation results: (16:30-16:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	270.53	115.04	>199	>199	>199			N/A	N/A
West	151.22	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
South	10.31	0.00	0.00	25.62	41.00			N/A	N/A
East	19.97	7.04	17.10	31.19	36.22			N/A	N/A

Queue Variation results: (16:45-17:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	463.85	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	250.02	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
South	11.84	0.00	0.00	24.60	47.15			N/A	N/A
East	39.85	19.11	37.22	57.34	63.38			N/A	N/A

Queue Variation results: (17:00-17:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	536.52	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	294.81	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
South	3.34	0.00	0.00	7.17	12.30			N/A	N/A
East	20.18	6.04	18.11	32.19	37.22			N/A	N/A

Queue Variation results: (17:15-17:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	510.03	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	300.75	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
South	1.79	0.00	0.00	1.02	5.12			N/A	N/A
East	0.76	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Ira-Needles Boulavard & The BoardwalkThorndale Drive.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Without Extension
Report generation date: 2019-07-31 6:21:28 PM

Summary of intersection performance

	Sat					
	Queue (PCE)	**Delay (s)**	**V/C Ratio**	**LOS**	**Intersection Delay (s)**	**Intersection LOS**
	Default - Total 2031					
Leg North	168.73	299.40	1.16	F	310.97	F
Leg West	3.94	17.14	0.80	C		
Leg South	65.32	120.25	1.06	F		
Leg East	79.81	3643.04	3.71	F		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - Existing, Sat" model duration: 12:00 PM - 1:30 PM
"D4 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D7 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM
"D8 - Total 2031, PM" model duration: 4:00 PM - 5:30 PM
"D9 - Total 2031, Sat " model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 6:21:27 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-22
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Default - Total 2031, Sat

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Pedestrian Crossing	Leg North - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg West - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg South - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg East - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Default	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, Sat	Total 2031	Sat		ONE HOUR	12:00	13:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Ira Needles Boulevard & The BoardwalkThorndale Drive	Roundabout	North,West,South,East				310.97	F

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Ira Needles Boulevard	
West	West	The Boardwalk	
South	South	Ira Needles Boulevard	
East	East	Thorndale Drive	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	7.00	8.00	30.00	20.00	55.00	25.00	
East	3.50	4.50	30.00	20.00	55.00	25.00	

Pedestrian Crossings

Leg	Crossing Type
North	Unsignalled Pedestrian Crossing
West	Unsignalled Pedestrian Crossing
South	Unsignalled Pedestrian Crossing
East	Unsignalled Pedestrian Crossing

Unsignalled Pedestrian Crossing Crossings

Leg	Space between crossing and intersection entry (PCE)	Vehicles queueing on exit (PCE)	Central Refuge	Crossing Data Type	Crossing length (m)	Crossing time (s)	Crossing length (entry side) (m)	Crossing time (entry side) (s)	Crossing length (exit side) (m)	Crossing time (exit side) (s)
North	1.00	1.00	✓	Distance			8.00	5.71	8.00	5.71
West	1.00	1.00	✓	Distance			7.50	5.36	6.50	4.64
South	1.00	1.00	✓	Distance			7.75	5.54	8.00	5.71
East	1.00	1.00	✓	Distance			5.50	3.93	5.25	3.75

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.723	2192.710
East		(calculated)	(calculated)	0.527	1221.701

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	2061.00	100.000
West	ONE HOUR	✓	780.00	100.000
South	ONE HOUR	✓	1591.00	100.000
East	ONE HOUR	✓	167.00	100.000

Pedestrian Flows

General Flows Data

Leg	Profile Type	Average Pedestrian Flow (Ped/hr)
North	ONE HOUR	2.00
West	ONE HOUR	3.00
South	ONE HOUR	0.00
East	ONE HOUR	0.00

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	444.000	1562.000	55.000
	West	586.000	0.000	141.000	53.000
	South	1254.000	279.000	0.000	58.000
	East	64.000	54.000	49.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.22	0.76	0.03
	West	0.75	0.00	0.18	0.07
	South	0.79	0.18	0.00	0.04
	East	0.38	0.32	0.29	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.000	1.010	1.000
	West	1.020	1.000	1.000	1.000
	South	1.010	1.000	1.000	1.000
	East	1.000	1.000	1.000	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	0.0	1.0	0.0
	West	2.0	0.0	0.0	0.0
	South	1.0	0.0	0.0	0.0
	East	0.0	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	1.16	299.40	168.73	201.51	F	1891.21	2836.81	6998.04	148.01	77.76	7081.67	149.78
West	0.80	17.14	3.94	12.18	C	715.74	1073.61	194.64	10.88	2.16	194.69	10.88
South	1.06	120.25	65.32	138.08	F	1459.93	2189.89	1696.28	46.48	18.85	1696.34	46.48
East	3.71	3643.04	79.81	111.00	F	153.24	229.86	2854.64	745.13	31.72	2884.58	752.95

Main Results for each time segment

Main results: (12:00-12:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1551.63	387.91	1537.82	1424.17	285.08	0.00	1986.61	1987.05	0.781	0.00	3.45	7.858	A
West	587.22	146.81	583.89	580.04	1242.86	0.00	1294.18	1059.88	0.454	0.00	0.83	5.121	A
South	1197.79	299.45	1190.14	1307.37	519.38	0.00	1817.23	1526.65	0.659	0.00	1.91	5.719	A
East	125.73	31.43	123.84	124.10	1585.41	0.00	386.41	27.17	0.325	0.00	0.47	13.617	B

Main results: (12:15-12:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1852.80	463.20	1816.04	1699.78	338.53	0.00	1947.97	1987.05	0.951	3.45	12.64	22.879	C
West	701.20	175.30	698.09	687.23	1467.34	0.00	1131.90	1059.88	0.619	0.83	1.61	8.362	A
South	1430.28	357.57	1420.70	1545.07	620.36	0.00	1744.22	1526.65	0.820	1.91	4.31	10.901	B
East	150.13	37.53	144.94	147.69	1893.37	0.00	224.16	27.17	0.670	0.47	1.77	43.018	E

Main results: (12:30-12:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	2269.20	567.30	1952.16	1938.97	322.35	0.00	1959.67	1987.05	1.158	12.64	91.90	104.125	F
West	858.80	214.70	850.22	724.65	1549.86	0.00	1072.24	1059.88	0.801	1.61	3.76	15.870	C
South	1751.72	437.93	1619.39	1651.46	748.62	0.00	1651.49	1526.65	1.061	4.31	37.39	56.432	F
East	183.87	45.97	62.21	168.90	2199.11	0.00	63.08	27.17	2.915	1.77	32.19	1065.822	F

Main results: (12:45-13:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	2269.20	567.30	1961.89	1956.23	318.11	0.00	1962.73	1987.05	1.156	91.90	168.73	244.659	F
West	858.80	214.70	858.06	726.24	1553.76	0.00	1069.42	1059.88	0.803	3.76	3.94	17.140	C
South	1751.72	437.93	1640.00	1656.51	755.30	0.00	1646.66	1526.65	1.064	37.39	65.32	120.250	F
East	183.87	45.97	49.48	170.45	2224.86	0.00	49.51	27.17	3.714	32.19	65.78	3643.043	F

Main results: (13:00-13:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1852.80	463.20	1927.77	1883.75	350.55	0.00	1939.28	1987.05	0.955	168.73	149.99	299.401	F
West	701.20	175.30	709.22	738.25	1540.06	0.00	1079.32	1059.88	0.650	3.94	1.94	10.075	B
South	1430.28	357.57	1668.25	1616.82	632.46	0.00	1735.47	1526.65	0.824	65.32	5.83	71.595	F

East	150.13	37.53	94.04	160.45	2140.26	0.00	94.08	27.17	1.596	65.78	79.81	1389.013	F

Main results: (13:15-13:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1551.63	387.91	1862.40	1540.18	439.58	0.00	1874.91	1987.05	0.828	149.99	72.29	216.357	F
West	587.22	146.81	589.82	732.87	1569.11	0.00	1058.32	1059.88	0.555	1.94	1.29	7.843	A
South	1197.79	299.45	1213.03	1626.03	532.90	0.00	1807.45	1526.65	0.663	5.83	2.02	6.256	A
East	125.73	31.43	367.83	134.00	1611.93	0.00	372.44	27.17	0.338	79.81	19.28	491.814	F

Queueing Delay Results for each time segment

Queueing Delay results: (12:00-12:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	47.42	3.16	7.858	A	A
West	12.07	0.80	5.121	A	A
South	27.19	1.81	5.719	A	A
East	6.63	0.44	13.617	B	B

Queueing Delay results: (12:15-12:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	146.86	9.79	22.879	C	C
West	22.96	1.53	8.362	A	A
South	58.53	3.90	10.901	B	B
East	22.44	1.50	43.018	E	D

Queueing Delay results: (12:30-12:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	791.18	52.75	104.125	F	F
West	50.24	3.35	15.870	C	B
South	336.44	22.43	56.432	F	E
East	255.75	17.05	1065.822	F	F

Queueing Delay results: (12:45-13:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	1955.05	130.34	244.659	F	F
West	58.06	3.87	17.140	C	B
South	772.16	51.48	120.250	F	F
East	734.78	48.99	3643.043	F	F

Queueing Delay results: (13:00-13:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2390.40	159.36	299.401	F	F
West	31.14	2.08	10.075	B	B
South	469.20	31.28	71.595	F	E
East	1091.92	72.79	1389.013	F	F

Queueing Delay results: (13:15-13:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	1667.12	111.14	216.357	F	F
West	20.18	1.35	7.843	A	A
South	32.76	2.18	6.256	A	A
East	743.13	49.54	491.814	F	F

Queue Variation Results for each time segment

Queue Variation results: (12:00-12:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	3.45	0.00	0.00	8.06	12.09			N/A	N/A
West	0.83	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.91	0.00	0.00	3.02	4.03			N/A	N/A
East	0.47	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (12:15-12:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	12.64	0.00	5.04	32.24	45.34			N/A	N/A
West	1.61	0.00	0.00	3.04	5.07			N/A	N/A
South	4.31	0.00	0.00	10.08	16.13			N/A	N/A
East	1.77	0.00	0.00	0.00	2.00			N/A	N/A

Queue Variation results: (12:30-12:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	91.90	44.33	86.65	135.01	151.13			N/A	N/A
West	3.76	0.00	0.00	4.06	12.18			N/A	N/A
South	37.39	6.05	31.24	69.54	84.66			N/A	N/A
East	32.19	12.00	29.00	50.00	58.00			N/A	N/A

Queue Variation results: (12:45-13:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	168.73	97.73	163.22	>199	>199			N/A	N/A
West	3.94	0.00	0.00	0.00	8.12			N/A	N/A
South	65.32	16.13	56.44	115.91	138.08			N/A	N/A
East	65.78	40.00	63.00	87.00	94.00			N/A	N/A

Queue Variation results: (13:00-13:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	149.99	74.56	143.07	>199	>199			N/A	N/A
West	1.94	0.00	0.00	4.06	6.09			N/A	N/A
South	5.83	0.00	0.00	13.10	22.17			N/A	N/A
East	79.81	52.00	77.00	103.00	111.00			N/A	N/A

Queue Variation results: (13:15-13:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	72.29	33.25	68.51	106.80	119.90			N/A	N/A
West	1.29	0.00	0.00	2.03	4.06			N/A	N/A
South	2.02	0.00	0.00	0.00	4.03			N/A	N/A
East	19.28	0.00	13.00	42.00	55.00			N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Ira-Needles Boulavard & University Avenue West.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Without Extension
Report generation date: 2019-07-31 9:33:27 PM

Summary of intersection performance

There are warnings associated with this model run - see the 'Data Errors and Warnings' tables.

	AM					
	Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	Default - Total 2031					
Leg North	2.60	7.58	0.72	A	1394.99	F
Leg West	0.35	10.15	0.22	B		
Leg South	1135.66	2466.50	1.83	F		
Leg East	1.36	6.37	0.57	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - Existing, Sat" model duration: 12:00 PM - 1:30 PM
"D4 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D7 - Total 2031, AM " model duration: 8:00 AM - 9:30 AM
"D8 - Total 2031, PM" model duration: 4:00 PM - 5:30 PM
"D9 - Total 2031, Sat" model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 9:33:27 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-22
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Default - Total 2031, AM

Data Errors and Warnings

Severity	Area	Item	Description
Last Run	Last Run	Leg South - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment(s).
Last Run	Last Run	Leg East - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment(s).
Warning	Pedestrian Crossing	Leg North - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg West - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Default	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, AM	Total 2031	AM		ONE HOUR	08:00	09:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Ira-Needles Boulavard & University Avenue West	Roundabout	North,West,South,East				1394.99	F

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Ira Needles Boulevard	
West	West	University Avenue West	
South	South	Ira Needles Boulevard	
East	East	University Avenue West	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00

East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	7.00	8.00	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Pedestrian Crossings

Leg	Crossing Type
North	Unsignalled Pedestrian Crossing
West	Unsignalled Pedestrian Crossing
South	Unsignalled Pedestrian Crossing
East	Unsignalled Pedestrian Crossing

Unsignalled Pedestrian Crossing Crossings

Leg	Space between crossing and intersection entry (PCE)	Vehicles queueing on exit (PCE)	Central Refuge	Crossing Data Type	Crossing length (m)	Crossing time (s)	Crossing length (entry side) (m)	Crossing time (entry side) (s)	Crossing length (exit side) (m)	Crossing time (exit side) (s)
North	1.00	1.00	✓	Distance			7.50	5.36	7.50	5.36
West	1.00	1.00	✓	Distance			7.50	5.36	7.50	5.36
South	1.00	1.00	✓	Distance			7.50	5.36	7.50	5.36
East	1.00	1.00	✓	Distance			7.50	5.36	7.50	5.36

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.723	2192.710
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	1135.00	100.000
West	ONE HOUR	✓	113.00	100.000
South	ONE HOUR	✓	2528.00	100.000
East	ONE HOUR	✓	704.00	100.000

Pedestrian Flows

General Flows Data

Leg	Profile Type	Average Pedestrian Flow (Ped/hr)
North	ONE HOUR	3.00
West	ONE HOUR	2.00
South	ONE HOUR	7.00
East	ONE HOUR	7.00

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	36.000	923.000	176.000
	West	25.000	0.000	41.000	47.000
	South	1652.000	189.000	0.000	687.000
	East	240.000	126.000	338.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.03	0.81	0.16
	West	0.22	0.00	0.36	0.42
	South	0.65	0.07	0.00	0.27
	East	0.34	0.18	0.48	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.040	1.040	1.020
	West	1.470	1.000	1.330	1.090
	South	1.040	1.150	1.000	1.020
	East	1.070	1.070	1.040	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	4.0	4.0	2.0
	West	47.0	0.0	33.0	9.0
	South	4.0	15.0	0.0	2.0
	East	7.0	7.0	4.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.72	7.58	2.60	3.11	A	1041.50	1562.24	142.05	5.46	1.58	142.07	5.46
West	0.22	10.15	0.35	~1	B	103.69	155.54	19.56	7.55	0.22	19.56	7.55
South	1.83	2466.50	1135.66	?	F	2319.74	3479.61	51281.37	884.26	569.79	75389.29	1299.96
East	0.57	6.37	1.36	1.06	A	646.00	969.00	88.63	5.49	0.98	88.64	5.49

Main Results for each time segment

Main results: (08:00-08:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	854.49	213.62	850.97	1236.37	466.27	0.00	1855.62	1447.25	0.460	0.00	0.88	3.704	A
West	85.07	21.27	84.58	240.11	1077.14	0.00	942.63	279.49	0.090	0.00	0.12	5.210	A
South	1903.21	475.80	1588.27	975.87	185.85	5.27	1609.28	1412.42	1.183	0.00	78.74	95.868	F
East	530.01	132.50	527.28	598.76	1175.36	5.27	1342.92	1404.31	0.395	0.00	0.68	4.644	A

Main results: (08:15-08:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1020.34	255.09	1018.54	1263.84	533.88	0.00	1806.74	1447.15	0.565	0.88	1.33	4.725	A
West	101.58	25.40	101.33	262.79	1289.63	0.00	771.10	278.98	0.132	0.12	0.19	6.678	A
South	2272.62	568.16	1570.05	1168.45	222.50	6.29	1570.31	1412.14	1.447	78.74	254.38	391.099	F
East	632.88	158.22	631.92	626.76	1165.80	6.29	1349.80	1404.51	0.469	0.68	0.92	5.286	A

Main results: (08:30-08:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1249.66	312.41	1244.74	1285.92	623.56	0.00	1741.91	1447.03	0.717	1.33	2.56	7.433	A
West	124.42	31.10	123.79	291.72	1576.58	0.00	568.45	278.29	0.219	0.19	0.34	10.044	B
South	2783.38	695.84	1522.41	1428.48	271.89	7.71	1522.44	1411.71	1.828	254.38	569.62	976.327	F
East	775.12	193.78	773.40	658.23	1136.08	7.71	1371.23	1404.79	0.565	0.92	1.35	6.337	A

Main results: (08:45-09:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1249.66	312.41	1249.51	1285.94	624.59	0.00	1741.16	1447.03	0.718	2.56	2.60	7.584	A
West	124.42	31.10	124.40	292.10	1582.00	0.00	564.95	278.29	0.220	0.34	0.35	10.152	B
South	2783.38	695.84	1521.37	1433.38	273.02	7.71	1521.38	1411.71	1.830	569.62	885.12	1724.263	F
East	775.12	193.78	775.08	658.94	1135.45	7.71	1371.68	1404.79	0.565	1.35	1.36	6.368	A

Main results: (09:00-09:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1020.34	255.09	1025.28	1264.08	535.52	0.00	1805.56	1447.15	0.565	2.60	1.36	4.814	A
West	101.58	25.40	102.21	263.37	1297.42	0.00	765.18	278.98	0.133	0.35	0.19	6.754	A
South	2272.62	568.16	1568.74	1175.52	224.11	6.29	1568.75	1412.14	1.449	885.12	1061.09	2205.857	F
East	632.88	158.22	634.56	627.81	1165.04	6.29	1350.35	1404.51	0.469	1.36	0.94	5.319	A

Main results: (09:15-09:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	854.49	213.62	856.36	1248.68	469.94	0.00	1852.96	1447.23	0.461	1.36	0.89	3.751	A
West	85.07	21.27	85.34	242.18	1084.13	0.00	936.67	279.48	0.091	0.19	0.12	5.254	A
South	1903.21	475.80	1604.93	982.30	187.17	5.27	1604.94	1412.44	1.186	1061.09	1135.66	2466.501	F
East	530.01	132.50	530.97	604.44	1187.66	5.27	1334.02	1404.30	0.397	0.94	0.70	4.736	A

Queueing Delay Results for each time segment

Queueing Delay results: (08:00-08:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	12.80	0.85	3.704	A	A
West	1.79	0.12	5.210	A	A
South	620.03	41.34	95.868	F	F
East	9.92	0.66	4.644	A	A

Queueing Delay results: (08:15-08:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	19.36	1.29	4.725	A	A
West	2.74	0.18	6.678	A	A
South	2498.54	166.57	391.099	F	F
East	13.48	0.90	5.286	A	A

Queueing Delay results: (08:30-08:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	36.20	2.41	7.433	A	A
West	4.96	0.33	10.044	B	B
South	6180.00	412.00	976.327	F	F
East	19.57	1.30	6.337	A	A

Queueing Delay results: (08:45-09:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	38.74	2.58	7.584	A	A
West	5.19	0.35	10.152	B	B
South	10910.56	727.37	1724.263	F	F
East	20.35	1.36	6.368	A	A

Queueing Delay results: (09:00-09:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	21.22	1.41	4.814	A	A
West	2.96	0.20	6.754	A	A
South	14596.59	973.11	2205.857	F	F
East	14.54	0.97	5.319	A	A

Queueing Delay results: (09:15-09:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	13.74	0.92	3.751	A	A
West	1.91	0.13	5.254	A	A
South	16475.64	1098.38	2466.501	F	F
East	10.77	0.72	4.736	A	A

Queue Variation Results for each time segment

Queue Variation results: (08:00-08:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker

North	0.88	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.12	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	78.74	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
East	0.68	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:15-08:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.33	0.00	0.00	2.07	3.11			N/A	N/A
West	0.19	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	254.38	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
East	0.92	0.00	0.00	1.06	1.06			N/A	N/A

Queue Variation results: (08:30-08:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	2.56	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.34	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	569.62	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
East	1.35	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:45-09:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	2.60	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.35	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	885.12	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
East	1.36	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:00-09:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.36	0.00	0.00	2.07	3.11			N/A	N/A
West	0.19	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1061.09	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
East	0.94	0.00	0.00	0.00	1.06			N/A	N/A

Queue Variation results: (09:15-09:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.89	0.00	0.00	1.04	2.07			N/A	N/A
West	0.12	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1135.66	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A

East	0.70	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Ira-Needles Boulavard & University Avenue West.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Without Extension
Report generation date: 2019-07-31 9:34:04 PM

Summary of intersection performance

There are warnings associated with this model run - see the 'Data Errors and Warnings' tables.

	PM					
	Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	Default - Total 2031					
Leg North	1398.54	3578.67	2.06	F	1981.71	F
Leg West	29.23	223.92	1.09	F		
Leg South	431.42	1050.67	1.42	F		
Leg East	73.76	290.26	1.15	F		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - Existing, Sat" model duration: 12:00 PM - 1:30 PM
"D4 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D7 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM
"D8 - Total 2031, PM " model duration: 4:00 PM - 5:30 PM
"D9 - Total 2031, Sat" model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 9:34:03 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-22
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Default - Total 2031, PM

Data Errors and Warnings

Severity	Area	Item	Description
Last Run	Last Run	Leg North - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment(s).
Last Run	Last Run	Leg West - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment(s).
Last Run	Last Run	Leg South - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment(s).
Last Run	Last Run	Leg East - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment(s).

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Default	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, PM	Total 2031	PM		ONE HOUR	16:00	17:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Ira-Needles Boulavard & University Avenue West	Roundabout	North,West,South,East				1981.71	F

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Ira Needles Boulevard	
West	West	University Avenue West	
South	South	Ira Needles Boulevard	
East	East	University Avenue West	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	7.00	8.00	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Pedestrian Crossings

Leg	Crossing Type
North	Unsignalled Pedestrian Crossing
West	Unsignalled Pedestrian Crossing
South	Unsignalled Pedestrian Crossing
East	Unsignalled Pedestrian Crossing

Unsignalled Pedestrian Crossing Crossings

Leg	Space between crossing and intersection entry (PCE)	Vehicles queueing on exit (PCE)	Central Refuge	Crossing Data Type	Crossing length (m)	Crossing time (s)	Crossing length (entry side) (m)	Crossing time (entry side) (s)	Crossing length (exit side) (m)	Crossing time (exit side) (s)
North	1.00	1.00	✓	Distance			7.50	5.36	7.50	5.36
West	1.00	1.00	✓	Distance			7.50	5.36	7.50	5.36
South	1.00	1.00	✓	Distance			7.50	5.36	7.50	5.36
East	1.00	1.00	✓	Distance			7.50	5.36	7.50	5.36

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.723	2192.710
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	2500.00	100.000
West	ONE HOUR	✓	420.00	100.000
South	ONE HOUR	✓	1871.00	100.000
East	ONE HOUR	✓	894.00	100.000

Pedestrian Flows

General Flows Data

Leg	Profile Type	Average Pedestrian Flow (Ped/hr)
North	ONE HOUR	11.00
West	ONE HOUR	8.00
South	ONE HOUR	6.00
East	ONE HOUR	6.00

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	82.000	2085.000	333.000
	West	38.000	0.000	226.000	156.000
	South	1161.000	231.000	0.000	479.000
	East	222.000	209.000	463.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.03	0.83	0.13
	West	0.09	0.00	0.54	0.37
	South	0.62	0.12	0.00	0.26
	East	0.25	0.23	0.52	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.010	1.030	1.010
	West	1.090	1.000	1.060	1.030
	South	1.020	1.080	1.000	1.000
	East	1.010	1.020	1.010	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	1.0	3.0	1.0
	West	9.0	0.0	6.0	3.0
	South	2.0	8.0	0.0	0.0
	East	1.0	2.0	1.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	2.06	3578.67	1398.54	?	F	2294.04	3441.07	61757.84	1076.84	686.20	105551.78	1840.45
West	1.09	223.92	29.23	65.18	F	385.40	578.10	1165.59	120.97	12.95	1166.54	121.07
South	1.42	1050.67	431.42	204.36	F	1716.86	2575.29	19736.39	459.82	219.29	23345.52	543.91
East	1.15	290.26	73.76	126.54	F	820.35	1230.53	3020.78	147.29	33.56	3034.18	147.95

Main Results for each time segment

Main results: (16:00-16:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1882.13	470.53	1444.17	1039.93	667.16	8.28	1457.71	1332.49	1.291	0.00	109.49	143.475	F
West	316.20	79.05	306.47	371.05	1740.29	6.02	438.99	423.32	0.720	0.00	2.43	26.909	D
South	1408.59	352.15	1365.80	1712.84	333.93	4.52	1496.25	1445.96	0.941	0.00	10.70	23.391	C
East	673.05	168.26	663.23	655.86	1043.86	4.52	936.79	861.01	0.718	0.00	2.45	12.902	B

Main results: (16:15-16:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	2247.45	561.86	1376.41	1130.05	766.29	9.89	1376.51	1332.53	1.633	109.49	327.25	583.201	F
West	377.57	94.39	366.39	407.28	1735.43	7.19	431.24	422.99	0.876	2.43	5.23	50.808	F
South	1681.99	420.50	1455.40	1749.24	352.58	5.39	1464.18	1445.61	1.149	10.70	67.35	106.533	F
East	803.69	200.92	780.39	692.03	1115.95	5.39	866.63	860.25	0.927	2.45	8.28	35.312	E

Main results: (16:30-16:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	2752.55	688.14	1337.44	1147.33	817.53	12.11	1337.45	1332.58	2.058	327.25	681.03	1362.400	F
West	462.43	115.61	410.50	421.40	1733.57	8.81	424.48	422.57	1.089	5.23	18.21	125.499	F
South	2060.01	515.00	1449.13	1776.31	367.76	6.61	1449.45	1445.11	1.421	67.35	220.07	362.737	F
East	984.31	246.08	849.58	701.61	1115.27	6.61	858.73	859.19	1.146	8.28	41.96	120.591	F

Main results: (16:45-17:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	2752.55	688.14	1333.54	1148.37	822.88	12.11	1333.54	1332.58	2.064	681.03	1035.78	2314.712	F
West	462.43	115.61	418.36	422.72	1733.69	8.81	423.22	422.57	1.093	18.21	29.23	223.370	F
South	2060.01	515.00	1446.65	1781.18	370.87	6.61	1446.71	1445.11	1.424	220.07	373.41	741.692	F
East	984.31	246.08	857.11	703.38	1114.14	6.61	858.83	859.19	1.146	41.96	73.76	253.353	F

Main results: (17:00-17:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	2247.45	561.86	1338.71	1147.48	816.62	9.89	1338.72	1332.53	1.679	1035.78	1262.96	3092.141	F
West	377.57	94.39	410.26	421.23	1734.11	7.19	425.02	422.99	0.888	29.23	21.05	223.915	F
South	1681.99	420.50	1449.95	1776.55	367.82	5.39	1450.01	1445.61	1.160	373.41	431.42	1001.979	F
East	803.69	200.92	848.24	701.91	1115.86	5.39	859.88	860.25	0.935	73.76	62.62	290.256	F

Main results: (17:15-17:30)

Leg	Total Demand	Intersection Arrivals (PCE)	Entry Flow	Exit Flow (PCE/hr)	Circulating Flow	Pedestrian Demand	Capacity (PCE/hr)	Saturation Capacity	V/C Ratio	Start Queue	End Queue	Delay (s)	LOS

	(PCE/hr)		(PCE/hr)		(PCE/hr)	(Ped/hr)		(PCE/hr)		(PCE)	(PCE)		
North	1882.13	470.53	1339.84	1149.12	815.25	8.28	1339.85	1332.49	1.405	1262.96	1398.54	3578.668	F
West	316.20	79.05	385.69	421.47	1733.62	6.02	429.15	423.31	0.737	21.05	3.68	104.849	F
South	1408.59	352.15	1457.38	1762.69	356.62	4.52	1460.83	1445.96	0.964	431.42	419.22	1050.665	F
East	673.05	168.26	845.20	694.83	1119.17	4.52	858.86	861.02	0.784	62.62	19.59	179.983	F

Queueing Delay Results for each time segment

Queueing Delay results: (16:00-16:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	842.24	56.15	143.475	F	F
West	31.02	2.07	26.909	D	C
South	120.70	8.05	23.391	C	C
East	33.17	2.21	12.902	B	B

Queueing Delay results: (16:15-16:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	3275.61	218.37	583.201	F	F
West	64.27	4.28	50.808	F	D
South	592.82	39.52	106.533	F	F
East	96.35	6.42	35.312	E	D

Queueing Delay results: (16:30-16:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	7562.08	504.14	1362.400	F	F
West	182.19	12.15	125.499	F	F
South	2155.82	143.72	362.737	F	F
East	383.41	25.56	120.591	F	F

Queueing Delay results: (16:45-17:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	12876.06	858.40	2314.712	F	F
West	356.83	23.79	223.370	F	F
South	4451.08	296.74	741.692	F	F
East	868.44	57.90	253.353	F	F

Queueing Delay results: (17:00-17:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	17240.59	1149.37	3092.141	F	F
West	377.12	25.14	223.915	F	F
South	6036.20	402.41	1001.979	F	F
East	1022.86	68.19	290.256	F	F

Queueing Delay results: (17:15-17:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	19961.26	1330.75	3578.668	F	F
West	154.16	10.28	104.849	F	F
South	6379.78	425.32	1050.665	F	F
East	616.55	41.10	179.983	F	F

Queue Variation Results for each time segment

Queue Variation results: (16:00-16:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker

North	109.49	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
West	2.43	0.00	1.05	3.15	4.21			N/A	N/A
South	10.70	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	2.45	0.00	0.00	5.06	7.09			N/A	N/A

Queue Variation results: (16:15-16:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	327.25	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
West	5.23	0.00	2.10	11.56	14.72			N/A	N/A
South	67.35	0.00	11.24	185.96	>199			N/A	N/A
East	8.28	0.00	4.05	19.23	26.32			N/A	N/A

Queue Variation results: (16:30-16:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	681.03	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
West	18.21	2.10	14.72	33.64	41.00			N/A	N/A
South	220.07	53.13	192.09	>199	>199			N/A	N/A
East	41.96	14.17	37.46	67.83	77.95			N/A	N/A

Queue Variation results: (16:45-17:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1035.78	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
West	29.23	5.26	24.18	53.61	65.18			N/A	N/A
South	373.41	178.81	>199	>199	>199			N/A	N/A
East	73.76	32.39	68.84	112.37	126.54			N/A	N/A

Queue Variation results: (17:00-17:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1262.96	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
West	21.05	1.05	15.77	43.10	53.61			N/A	N/A
South	431.42	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	62.62	22.27	56.69	101.23	116.42			N/A	N/A

Queue Variation results: (17:15-17:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1398.54	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
West	3.68	0.00	0.00	6.31	13.67			N/A	N/A
South	419.22	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	19.59	1.01	14.17	40.49	50.62			N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Ira-Needles Boulavard & University Avenue West.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Without Extension
Report generation date: 2019-07-31 9:37:28 PM

Summary of intersection performance

There are warnings associated with this model run - see the 'Data Errors and Warnings' tables.

	Sat					
	Queue (PCE)	**Delay (s)**	**V/C Ratio**	**LOS**	**Intersection Delay (s)**	**Intersection LOS**
	Default - Total 2031					
Leg North	57.29	103.29	1.05	F	283.75	F
Leg West	1.04	8.06	0.51	A		
Leg South	177.31	319.24	1.18	F		
Leg East	120.09	801.85	1.35	F		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - Existing, Sat" model duration: 12:00 PM - 1:30 PM
"D4 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D7 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM
"D8 - Total 2031, PM" model duration: 4:00 PM - 5:30 PM
"D9 - Total 2031, Sat " model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 9:37:28 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-22
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Default - Total 2031, Sat

Data Errors and Warnings

Severity	Area	Item	Description
Last Run	Last Run	Leg North - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment(s).
Warning	Pedestrian Crossing	Leg West - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg South - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg East - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Default	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, Sat	Total 2031	Sat		ONE HOUR	12:00	13:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Ira-Needles Boulavard & University Avenue West	Roundabout	North,West,South,East				283.75	F

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Ira Needles Boulevard	
West	West	University Avenue West	
South	South	Ira Needles Boulevard	
East	East	University Avenue West	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	7.00	8.00	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Pedestrian Crossings

Leg	Crossing Type
North	Unsignalled Pedestrian Crossing
West	Unsignalled Pedestrian Crossing
South	Unsignalled Pedestrian Crossing
East	Unsignalled Pedestrian Crossing

Unsignalled Pedestrian Crossing Crossings

Leg	Space between crossing and intersection entry (PCE)	Vehicles queueing on exit (PCE)	Central Refuge	Crossing Data Type	Crossing length (m)	Crossing time (s)	Crossing length (entry side) (m)	Crossing time (entry side) (s)	Crossing length (exit side) (m)	Crossing time (exit side) (s)
North	1.00	1.00	✓	Distance			7.50	5.36	7.50	5.36
West	1.00	1.00	✓	Distance			7.50	5.36	7.50	5.36
South	1.00	1.00	✓	Distance			7.50	5.36	7.50	5.36
East	1.00	1.00	✓	Distance			7.50	5.36	7.50	5.36

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.723	2192.710
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	1660.00	100.000
West	ONE HOUR	✓	429.00	100.000
South	ONE HOUR	✓	1963.00	100.000
East	ONE HOUR	✓	672.00	100.000

Pedestrian Flows

General Flows Data

Leg	Profile Type	Average Pedestrian Flow (Ped/hr)
North	ONE HOUR	6.00
West	ONE HOUR	1.00
South	ONE HOUR	3.00
East	ONE HOUR	0.00

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	132.000	1302.000	226.000
	West	105.000	0.000	188.000	136.000
	South	1284.000	289.000	0.000	390.000
	East	247.000	238.000	187.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.08	0.78	0.14
	West	0.24	0.00	0.44	0.32
	South	0.65	0.15	0.00	0.20
	East	0.37	0.35	0.28	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.010	1.010	1.010
	West	1.010	1.000	1.020	1.020
	South	1.010	1.020	1.000	1.010
	East	1.010	1.010	1.020	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	1.0	1.0	1.0
	West	1.0	0.0	2.0	2.0
	South	1.0	2.0	0.0	1.0
	East	1.0	1.0	2.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	1.05	103.29	57.29	133.32	F	1523.25	2284.87	1609.25	42.26	17.88	1609.37	42.26
West	0.51	8.06	1.04	2.04	A	393.66	590.49	59.30	6.03	0.66	59.31	6.03
South	1.18	319.24	177.31	202.29	F	1801.28	2701.92	6956.19	154.47	77.29	6984.16	155.09
East	1.35	801.85	120.09	202.55	F	616.64	924.96	5371.28	348.42	59.68	6114.06	396.61

Main Results for each time segment

Main results: (12:00-12:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1249.74	312.43	1240.90	1220.50	531.12	4.52	1808.64	1758.07	0.691	0.00	2.21	6.311	A
West	322.97	80.74	321.59	491.03	1281.00	0.00	1266.61	908.88	0.255	0.00	0.35	3.871	A
South	1477.85	369.46	1465.36	1252.99	349.60	0.00	1939.97	1650.55	0.762	0.00	3.12	7.488	A
East	505.92	126.48	498.69	562.02	1252.94	0.00	778.04	566.18	0.650	0.00	1.81	12.745	B

Main results: (12:15-12:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1492.31	373.08	1479.72	1437.29	613.45	5.39	1749.09	1758.26	0.853	2.21	5.35	12.929	B
West	385.66	96.42	384.85	573.60	1519.56	0.00	1094.14	908.85	0.352	0.35	0.55	5.159	A
South	1764.70	441.17	1735.28	1486.76	417.65	0.00	1890.77	1650.54	0.933	3.12	10.48	20.383	C
East	604.11	151.03	566.02	668.22	1484.72	0.00	610.36	565.67	0.990	1.81	11.33	58.510	F

Main results: (12:30-12:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1827.69	456.92	1710.93	1511.48	616.35	6.61	1746.93	1758.53	1.046	5.35	34.55	51.950	F
West	472.34	118.08	470.52	599.49	1727.79	0.00	943.60	908.82	0.501	0.55	1.00	7.713	A
South	2161.30	540.33	1825.92	1701.05	497.26	0.00	1833.22	1650.53	1.179	10.48	94.32	111.168	F
East	739.89	184.97	549.51	744.86	1578.32	0.00	551.85	564.98	1.341	11.33	58.92	246.174	F

Main results: (12:45-13:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1827.69	456.92	1736.72	1514.15	616.91	6.61	1746.53	1758.53	1.046	34.55	57.29	103.291	F
West	472.34	118.08	472.17	602.07	1751.56	0.00	926.42	908.82	0.510	1.00	1.04	8.060	A
South	2161.30	540.33	1829.35	1722.03	501.70	0.00	1830.01	1650.53	1.181	94.32	177.31	271.061	F
East	739.89	184.97	549.59	749.58	1581.47	0.00	549.91	564.98	1.345	58.92	106.50	553.146	F

Main results: (13:00-13:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1492.31	373.08	1689.95	1512.49	621.30	5.39	1743.41	1758.26	0.856	57.29	7.88	69.143	F
West	385.66	96.42	387.06	602.71	1708.55	0.00	957.51	908.85	0.403	1.04	0.69	6.438	A
South	1764.70	441.17	1858.57	1648.09	447.52	0.00	1869.18	1650.54	0.944	177.31	153.84	319.240	F
East	604.11	151.03	549.74	722.04	1584.06	0.00	550.15	565.67	1.098	106.50	120.09	762.664	F

Main results: (13:15-13:30)

Leg	Total Demand	Intersection Arrivals (PCE)	Entry Flow	Exit Flow (PCE/hr)	Circulating Flow	Pedestrian Demand	Capacity (PCE/hr)	Saturation Capacity	V/C Ratio	Start Queue	End Queue	Delay (s)	LOS

	(PCE/hr)		(PCE/hr)		(PCE/hr)	(Ped/hr)		(PCE/hr)		(PCE)	(PCE)		
North	1249.74	312.43	1270.80	1531.21	616.64	4.52	1746.82	1758.07	0.715	7.88	2.61	7.959	A
West	322.97	80.74	324.31	570.96	1316.49	0.00	1240.95	908.88	0.260	0.69	0.36	4.001	A
South	1477.85	369.46	1923.27	1285.60	355.20	0.00	1935.92	1650.55	0.763	153.84	42.49	186.034	F
East	505.92	126.48	527.31	657.93	1620.54	0.00	531.76	566.18	0.951	120.09	114.74	801.852	F

Queueing Delay Results for each time segment

Queueing Delay results: (12:00-12:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	31.14	2.08	6.311	A	A
West	5.07	0.34	3.871	A	A
South	43.20	2.88	7.488	A	A
East	24.76	1.65	12.745	B	B

Queueing Delay results: (12:15-12:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	71.08	4.74	12.929	B	B
West	8.03	0.54	5.159	A	A
South	125.92	8.39	20.383	C	C
East	116.16	7.74	58.510	F	E

Queueing Delay results: (12:30-12:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	321.99	21.47	51.950	F	D
West	14.43	0.96	7.713	A	A
South	793.48	52.90	111.168	F	F
East	528.88	35.26	246.174	F	F

Queueing Delay results: (12:45-13:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	691.06	46.07	103.291	F	F
West	15.48	1.03	8.060	A	A
South	2037.49	135.83	271.061	F	F
East	1240.78	82.72	553.146	F	F

Queueing Delay results: (13:00-13:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	450.18	30.01	69.143	F	E
West	10.75	0.72	6.438	A	A
South	2483.64	165.58	319.240	F	F
East	1699.45	113.30	762.664	F	F

Queueing Delay results: (13:15-13:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	43.80	2.92	7.959	A	A
West	5.53	0.37	4.001	A	A
South	1472.45	98.16	186.034	F	F
East	1761.26	117.42	801.852	F	F

Queue Variation Results for each time segment

Queue Variation results: (12:00-12:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	2.21	0.00	1.01	4.04	5.05			N/A	N/A
West	0.35	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	3.12	0.00	0.00	7.08	10.11			N/A	N/A
East	1.81	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (12:15-12:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	5.35	0.00	0.00	13.13	20.20			N/A	N/A
West	0.55	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	10.48	0.00	4.05	26.30	37.42			N/A	N/A
East	11.33	0.00	0.00	8.10	34.43			N/A	N/A

Queue Variation results: (12:30-12:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	34.55	4.04	27.27	67.67	83.83			N/A	N/A
West	1.00	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	94.32	48.55	90.02	134.52	149.70			N/A	N/A
East	58.92	2.03	40.51	133.68	174.19			N/A	N/A

Queue Variation results: (12:45-13:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	57.29	10.10	47.47	110.09	133.32			N/A	N/A
West	1.04	0.00	0.00	0.00	2.04			N/A	N/A
South	177.31	108.23	171.95	>199	>199			N/A	N/A
East	106.50	29.37	94.19	186.35	>199			N/A	N/A

Queue Variation results: (13:00-13:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	7.88	0.00	0.00	19.19	30.30			N/A	N/A
West	0.69	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	153.84	93.05	149.70	>199	>199			N/A	N/A
East	120.09	37.47	108.37	>199	>199			N/A	N/A

Queue Variation results: (13:15-13:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	2.61	0.00	0.00	1.01	7.07			N/A	N/A
West	0.36	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	42.49	13.15	38.44	69.79	81.93			N/A	N/A
East	114.74	31.40	102.29	>199	>199			N/A	N/A

Appendix H

2031 Total Traffic Operations Reports – Preferred Corridor



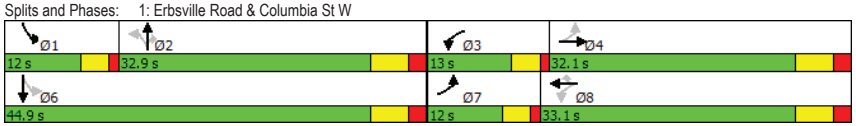
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	189	443	64	385	225	115	116	428	642	275	485	182
Future Volume (vph)	189	443	64	385	225	115	116	428	642	275	485	182
Ideal Flow (vphpl)	1775	1650	1650	1775	1900	1750	1775	1900	1750	1775	1650	1650
Storage Length (m)	0.0		0.0	0.0		75.0	0.0		170.0	0.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	0.0			7.5			80.0			0.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00				0.97	1.00				0.99	
Frt		0.981				0.850			0.850		0.959	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1637	1561	0	1653	1727	1390	1561	1810	1473	1621	1476	0
Flt Permitted	0.530			0.148			0.214			0.197		
Satd. Flow (perm)	909	1561	0	258	1727	1352	351	1810	1473	336	1476	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8				133			334		28	
Link Speed (k/h)		50			60			60			60	
Link Distance (m)		118.8			135.9			921.3			152.9	
Travel Time (s)		8.6			8.2			55.3			9.2	
Confl. Peds. (#/hr)	3		1	1		3	4					4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	7%	2%	10%	7%	8%	5%	1%	4%	5%	10%
Adj. Flow (vph)	189	443	64	385	225	115	116	428	642	275	485	182
Shared Lane Traffic (%)												
Lane Group Flow (vph)	189	507	0	385	225	115	116	428	642	275	667	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	7	4		3	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	22.8		5.0	22.8	22.8	26.4	26.4	26.4	5.0	26.4	
Minimum Split (s)	9.0	28.8		9.0	28.8	28.8	32.4	32.4	32.4	9.0	32.4	
Total Split (s)	12.0	32.1		13.0	33.1	33.1	32.9	32.9	32.9	12.0	44.9	
Total Split (%)	13.3%	35.7%		14.4%	36.8%	36.8%	36.6%	36.6%	36.6%	13.3%	49.9%	
Maximum Green (s)	8.0	26.1		9.0	27.1	27.1	26.9	26.9	26.9	8.0	38.9	
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	
All-Red Time (s)	1.0	2.0		1.0	2.0	2.0	2.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	-2.0		0.0	-2.0	-2.0	0.0	-2.0	-2.0	0.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	6.0	4.0	4.0	4.0	4.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Max		None	Max	Max	Max	Max	Max	None	Max	
Walk Time (s)		7.0			7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0		11.0	
Pedestrian Calls (#/hr)		0			0	0	0	0	0		0	
Act Effct Green (s)	36.1	28.1		38.1	29.1	29.1	26.9	28.9	28.9	40.9	40.9	
Actuated g/C Ratio	0.40	0.31		0.42	0.32	0.32	0.30	0.32	0.32	0.45	0.45	
v/c Ratio	0.44	1.03		1.55	0.40	0.22	1.12	0.74	0.92	1.03	0.97	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	19.3	80.7		288.2	26.4	4.2	157.2	36.2	34.5	87.0	53.2	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	19.3	80.7		288.2	26.4	4.2	157.2	36.2	34.5	87.0	53.2	
LOS	B	F		F	C	A	F	D	C	F	D	
Approach Delay		64.1			161.9			47.1			63.0	
Approach LOS		E			F			D			E	
Queue Length 50th (m)	20.4	~98.7		~84.2	31.6	0.0	~24.3	68.7	59.0	~33.5	111.0	
Queue Length 95th (m)	34.9	#161.3		#140.9	52.2	9.1	#58.3	104.3	#133.6	#83.2	#189.2	
Internal Link Dist (m)		94.8			111.9			897.3			128.9	
Turn Bay Length (m)						75.0			170.0			
Base Capacity (vph)	429	492		248	558	527	104	581	699	266	686	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.44	1.03		1.55	0.40	0.22	1.12	0.74	0.92	1.03	0.97	

Intersection Summary		
Area Type:	Other	
Cycle Length: 90		
Actuated Cycle Length: 90		
Natural Cycle: 110		
Control Type: Semi Act-Uncoord		
Maximum v/c Ratio: 1.55		
Intersection Signal Delay: 78.1		Intersection LOS: E
Intersection Capacity Utilization 132.3%		ICU Level of Service H
Analysis Period (min) 15		

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Erbsville Road & Columbia St W



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	94	59	125	34	59	30	999	77	46	865	20
Future Volume (vph)	84	94	59	125	34	59	30	999	77	46	865	20
Ideal Flow (vphpl)	1775	1650	1650	1775	1650	1650	1775	1650	1650	1775	1900	1750
Storage Length (m)	0.0		0.0	0.0		0.0	20.0		0.0	25.0		25.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	0.0			0.0			65.0			50.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor	1.00	0.99		0.99	0.99		1.00	1.00		1.00		0.98
Frt		0.942			0.905			0.989				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1637	1478	0	1637	1311	0	1519	2973	0	1653	3438	1488
Flt Permitted	0.683			0.534			0.328			0.212		
Satd. Flow (perm)	1172	1478	0	915	1311	0	524	2973	0	369	3438	1456
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		29			59			15				33
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		155.7			226.8			139.9			921.3	
Travel Time (s)		11.2			16.3			8.4			55.3	
Confl. Peds. (#/hr)	4		7	7		4	1		2	2		1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	4%	5%	3%	14%	12%	11%	4%	6%	2%	5%	0%
Adj. Flow (vph)	84	94	59	125	34	59	30	999	77	46	865	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	84	153	0	125	93	0	30	1076	0	46	865	20
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		1	6	6
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		53.0	53.0		4.5	53.0	53.0
Minimum Split (s)	14.0	14.0		14.0	14.0		59.0	59.0		9.0	68.0	68.0
Total Split (s)	26.0	26.0		26.0	26.0		65.0	65.0		9.0	74.0	74.0
Total Split (%)	26.0%	26.0%		26.0%	26.0%		65.0%	65.0%		9.0%	74.0%	74.0%
Maximum Green (s)	20.0	20.0		20.0	20.0		59.0	59.0		4.5	68.0	68.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		3.5	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		1.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		2.5	4.0	4.0
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		Max	Max		None	Max	Max
Walk Time (s)	10.0	10.0		10.0	10.0		40.0	40.0			40.0	40.0
Flash Dont Walk (s)	16.0	16.0		16.0	16.0		13.0	13.0			13.0	13.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0			0	0
Act Effct Green (s)	18.0	18.0		18.0	18.0		64.9	64.9		71.6	70.1	70.1
Actuated g/C Ratio	0.19	0.19		0.19	0.19		0.68	0.68		0.75	0.73	0.73
v/c Ratio	0.38	0.51		0.73	0.32		0.08	0.53		0.13	0.34	0.02

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	39.2	34.2		61.5	17.7		8.5	10.4		4.7	5.5	0.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	39.2	34.2		61.5	17.7		8.5	10.4		4.7	5.5	0.9
LOS	D	C		E	B		A	B		A	A	A
Approach Delay		36.0			42.8			10.4			5.4	
Approach LOS		D			D			B			A	
Queue Length 50th (m)	14.5	21.7		23.2	5.6		2.2	59.6		2.1	29.4	0.0
Queue Length 95th (m)	29.0	41.6		#47.6	19.3		6.5	83.2		5.4	41.8	1.4
Internal Link Dist (m)		131.7			202.8			115.9			897.3	
Turn Bay Length (m)							20.0			25.0		25.0
Base Capacity (vph)	268	361		209	346		353	2012		362	2508	1071
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.31	0.42		0.60	0.27		0.08	0.53		0.13	0.34	0.02

Intersection Summary		
Area Type:	Other	
Cycle Length: 100		
Actuated Cycle Length: 96.1		
Natural Cycle: 85		
Control Type: Semi Act-Uncoord		
Maximum v/c Ratio: 0.73		
Intersection Signal Delay: 13.8		Intersection LOS: B
Intersection Capacity Utilization 106.9%		ICU Level of Service G
Analysis Period (min) 15		

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Erbsville Road & Keats Way



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	355	377	321	295	466	118	632	819	221	247	769	364
Future Volume (vph)	355	377	321	295	466	118	632	819	221	247	769	364
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1775	1775	1750	1775	1775	1750
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	1.00	0.95	0.95	1.00
Frt		0.954			0.980				0.850			0.850
Flt Protected		0.983			0.983			0.979			0.988	
Satd. Flow (prot)	0	2789	0	0	2853	0	0	3113	1444	0	3219	1430
Flt Permitted		0.983			0.983			0.979			0.988	
Satd. Flow (perm)	0	2789	0	0	2853	0	0	3113	1444	0	3219	1430
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		147.8			470.9			152.2			97.5	
Travel Time (s)		8.9			28.3			9.1			5.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	2%	11%	4%	7%	6%	10%	3%	3%	2%	4%	4%
Adj. Flow (vph)	355	377	321	295	466	118	632	819	221	247	769	364
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1053	0	0	879	0	0	1451	221	0	1016	364
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization	152.4%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized									MOYes			MOYes
Traffic Volume (veh/h)	355	377	321	295	466	118	632	819	221	247	769	364
Future Volume (veh/h)	355	377	321	295	466	118	632	819	221	247	769	364
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	355	377	321	295	466	118	632	819	221	247	769	364
Approach Volume (veh/h)		1053			879			1451			1016	
Crossing Volume (veh/h)		1311#			1806#			979			1393#	
High Capacity (veh/h)		481			317			633			449	
High v/c (veh/h)		2.19			2.77			2.29			2.26	
Low Capacity (veh/h)		363			228			492			336	
Low v/c (veh/h)		2.90			3.86			2.95			3.02	

Intersection Summary			
Maximum v/c High	2.77		
Maximum v/c Low	3.86		
Intersection Capacity Utilization	152.4%	ICU Level of Service	H
# Crossing flow exceeds 1200, method is not applicable			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	708	38	34	1605	64	0	0	45	0	0	26
Future Volume (vph)	0	708	38	34	1605	64	0	0	45	0	0	26
Ideal Flow (vphpl)	1900	1650	1650	1900	1650	1650	1900	1650	1650	1650	1650	1900
Storage Length (m)	0.0		0.0	25.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		1	0		1
Taper Length (m)	0.0			60.0			0.0			0.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.992			0.994				0.865			0.865
Flt Protected				0.950								
Satd. Flow (prot)	0	2901	0	1752	2941	0	0	0	1334	0	0	1644
Flt Permitted				0.950								
Satd. Flow (perm)	0	2901	0	1752	2941	0	0	0	1334	0	0	1644
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		83.2			147.8			60.1			74.6	
Travel Time (s)		5.0			8.9			4.3			5.4	
Confl. Peds. (#/hr)			1	1								
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	7%	11%	3%	6%	5%	0%	0%	7%	0%	0%	0%
Adj. Flow (vph)	0	708	38	34	1605	64	0	0	45	0	0	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	746	0	34	1669	0	0	0	45	0	0	26
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 63.4%		ICU Level of Service B	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	708	38	34	1605	64	0	0	45	0	0	26
Future Volume (Veh/h)	0	708	38	34	1605	64	0	0	45	0	0	26
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	708	38	34	1605	64	0	0	45	0	0	26
Pedestrians								1				
Lane Width (m)								3.6				
Walking Speed (m/s)								1.2				
Percent Blockage								0				
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		83										
pX, platoon unblocked				0.95			0.95	0.95	0.95	0.95	0.95	
vC, conflicting volume	1669			747			1624	2465	374	2104	2452	834
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1669			635			1556	2438	243	2059	2425	834
tC, single (s)	4.1			4.2			7.5	6.5	7.0	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.4	3.5	4.0	3.3
p0 queue free %	100			96			100	100	94	100	100	92
cM capacity (veh/h)	390			892			66	29	707	28	30	315

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	472	274	34	1070	599	45	26
Volume Left	0	0	34	0	0	0	0
Volume Right	0	38	0	0	64	45	26
cSH	1700	1700	892	1700	1700	707	315
Volume to Capacity	0.28	0.16	0.04	0.63	0.35	0.06	0.08
Queue Length 95th (m)	0.0	0.0	0.9	0.0	0.0	1.6	2.1
Control Delay (s)	0.0	0.0	9.2	0.0	0.0	10.4	17.4
Lane LOS			A			B	C
Approach Delay (s)	0.0		0.2			10.4	17.4
Approach LOS						B	C

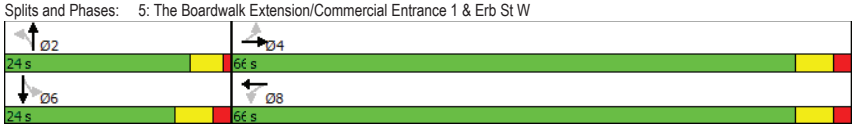
Intersection Summary				
Average Delay	0.5			
Intersection Capacity Utilization	63.4%	ICU Level of Service	B	
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	637	76	277	1309	40	43	9	43	62	14	73
Future Volume (vph)	59	637	76	277	1309	40	43	9	43	62	14	73
Ideal Flow (vphpl)	1775	1900	1900	1900	1900	1750	1900	1900	1900	1775	1900	1750
Storage Length (m)	30.0		0.0	60.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	55.0			0.0			7.5			0.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00							
Frt		0.984			0.996			0.876			0.874	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1606	3365	0	1770	3383	0	1770	1632	0	1466	1642	0
Flt Permitted	0.176			0.375			0.701			0.723		
Satd. Flow (perm)	297	3365	0	699	3383	0	1306	1632	0	1116	1642	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		33			8			43			73	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		435.4			83.2			96.1			96.6	
Travel Time (s)		26.1			5.0			6.9			7.0	
Confl. Peds. (#/hr)	3					3						
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	6%	2%	2%	6%	13%	2%	2%	2%	15%	2%	1%
Adj. Flow (vph)	59	637	76	277	1309	40	43	9	43	62	14	73
Shared Lane Traffic (%)												
Lane Group Flow (vph)	59	713	0	277	1349	0	43	52	0	62	87	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	60.0	60.0		60.0	60.0		5.0	5.0		7.0	7.0	
Minimum Split (s)	66.0	66.0		66.0	66.0		22.5	22.5		13.0	13.0	
Total Split (s)	66.0	66.0		66.0	66.0		24.0	24.0		24.0	24.0	
Total Split (%)	73.3%	73.3%		73.3%	73.3%		26.7%	26.7%		26.7%	26.7%	
Maximum Green (s)	60.0	60.0		60.0	60.0		19.5	19.5		18.0	18.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.5	3.5		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		1.0	1.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		0.0	-2.0		0.0	0.0		-2.0	0.0	
Total Lost Time (s)	4.0	4.0		6.0	4.0		4.5	4.5		4.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Walk Time (s)	50.0	50.0		50.0	50.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		11.0	11.0		15.0	15.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	65.9	65.9		64.4	65.9		11.1	11.1		12.2	10.2	
Actuated g/C Ratio	0.80	0.80		0.78	0.80		0.13	0.13		0.15	0.12	
v/c Ratio	0.25	0.27		0.51	0.50		0.25	0.20		0.38	0.33	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	6.9	3.3		9.6	4.8		34.5	14.4		38.2	14.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	6.9	3.3		9.6	4.8		34.5	14.4		38.2	14.4	
LOS	A	A		A	A		C	B		D	B	
Approach Delay		3.5			5.6			23.5			24.3	
Approach LOS		A			A			C			C	
Queue Length 50th (m)	2.3	13.7		16.2	35.8		6.4	1.3		9.4	2.1	
Queue Length 95th (m)	9.2	25.7		45.6	63.8		15.7	10.8		21.1	14.6	
Internal Link Dist (m)		411.4			59.2			72.1			72.6	
Turn Bay Length (m)	30.0			60.0								
Base Capacity (vph)	236	2690		543	2699		308	417		270	414	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.25	0.27		0.51	0.50		0.14	0.12		0.23	0.21	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 82.7			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.51			
Intersection Signal Delay: 6.7		Intersection LOS: A	
Intersection Capacity Utilization 122.0%		ICU Level of Service H	
Analysis Period (min) 15			

Splits and Phases: 5: The Boardwalk Extension/Commercial Entrance 1 & Erb St W



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	593	5	31	959	495	5	2	25	230	0	15
Future Volume (vph)	18	593	5	31	959	495	5	2	25	230	0	15
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1550	1550	1550	1550	1550	1750
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.999			0.950			0.895			0.981	
Flt Protected		0.999			0.999			0.992		0.950	0.958	
Satd. Flow (prot)	0	2994	0	0	2838	0	0	773	0	1399	1384	0
Flt Permitted		0.999			0.999			0.992		0.950	0.958	
Satd. Flow (perm)	0	2994	0	0	2838	0	0	773	0	1399	1384	0
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		149.9			435.4			54.9			87.3	
Travel Time (s)		9.0			26.1			4.0			6.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	4%	80%	77%	5%	0%	60%	0%	88%	0%	0%	0%
Adj. Flow (vph)	18	593	5	31	959	495	5	2	25	230	0	15
Shared Lane Traffic (%)										46%		
Lane Group Flow (vph)	0	616	0	0	1485	0	0	32	0	124	121	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization	94.5%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Traffic Volume (veh/h)	18	593	5	31	959	495	5	2	25	230	0	15
Future Volume (veh/h)	18	593	5	31	959	495	5	2	25	230	0	15
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	18	593	5	31	959	495	5	2	25	230	0	15
Approach Volume (veh/h)		616			1485			32			245	
Crossing Volume (veh/h)		261			25			841			995	
High Capacity (veh/h)		1129			1358			709			625	
High v/c (veh/h)		0.55			1.09			0.05			0.39	
Low Capacity (veh/h)		929			1137			557			485	
Low v/c (veh/h)		0.66			1.31			0.06			0.51	

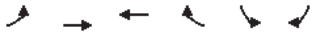
Intersection Summary			
Maximum v/c High	1.09		
Maximum v/c Low	1.31		
Intersection Capacity Utilization	94.5%	ICU Level of Service	F

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	173	651	7	53	229	709	4	1	30	223	0	29
Future Volume (vph)	173	651	7	53	229	709	4	1	30	223	0	29
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1550	1550	1550	1550	1550	1750
Storage Length (m)	30.0		30.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (m)	85.0			0.0			0.0			0.0		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.999			0.893			0.884			0.965	
Flt Protected		0.990			0.997			0.994		0.950	0.963	
Satd. Flow (prot)	0	3005	0	0	2754	0	0	1198	0	777	848	0
Flt Permitted		0.990			0.997			0.994		0.950	0.963	
Satd. Flow (perm)	0	3005	0	0	2754	0	0	1198	0	777	848	0
Link Speed (k/h)		70			60			50			50	
Link Distance (m)		346.1			149.9			61.3			415.1	
Travel Time (s)		17.8			9.0			4.4			29.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	3%	0%	8%	4%	0%	0%	0%	16%	80%	0%	0%
Adj. Flow (vph)	173	651	7	53	229	709	4	1	30	223	0	29
Shared Lane Traffic (%)										43%		
Lane Group Flow (vph)	0	831	0	0	991	0	0	35	0	127	125	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization	87.5%	ICU Level of Service	E
Analysis Period (min)	15		

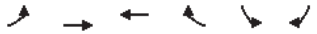
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Traffic Volume (veh/h)	173	651	7	53	229	709	4	1	30	223	0	29
Future Volume (veh/h)	173	651	7	53	229	709	4	1	30	223	0	29
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	173	651	7	53	229	709	4	1	30	223	0	29
Approach Volume (veh/h)		831			991			35			252	
Crossing Volume (veh/h)		276			178			1047			286	
High Capacity (veh/h)		1115			1205			599			1106	
High v/c (veh/h)		0.75			0.82			0.06			0.23	
Low Capacity (veh/h)		917			998			462			909	
Low v/c (veh/h)		0.91			0.99			0.08			0.28	

Intersection Summary			
Maximum v/c High	0.82		
Maximum v/c Low	0.99		
Intersection Capacity Utilization	87.5%	ICU Level of Service	E



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	10	714	247	19	90	13
Future Volume (vph)	10	714	247	19	90	13
Ideal Flow (vphpl)	1650	1650	1650	1650	1765	1765
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.990		0.983	
Flt Protected		0.999			0.958	
Satd. Flow (prot)	0	1613	1575	0	1643	0
Flt Permitted		0.999			0.958	
Satd. Flow (perm)	0	1613	1575	0	1643	0
Link Speed (k/h)		70	70		60	
Link Distance (m)		189.3	346.1		103.7	
Travel Time (s)		9.7	17.8		6.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	14%	2%	4%	0%	0%	9%
Adj. Flow (vph)	10	714	247	19	90	13
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	724	266	0	103	0
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 65.4%		ICU Level of Service C	
Analysis Period (min) 15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	10	714	247	19	90	13
Future Volume (Veh/h)	10	714	247	19	90	13
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	10	714	247	19	90	13
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	266				990	256
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	266				990	256
tC, single (s)	4.2				6.4	6.3
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.4
p0 queue free %	99				67	98
cM capacity (veh/h)	1231				273	765

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	724	266	103
Volume Left	10	0	90
Volume Right	0	19	13
cSH	1231	1700	297
Volume to Capacity	0.01	0.16	0.35
Queue Length 95th (m)	0.2	0.0	12.0
Control Delay (s)	0.2	0.0	23.4
Lane LOS	A		C
Approach Delay (s)	0.2	0.0	23.4
Approach LOS			C

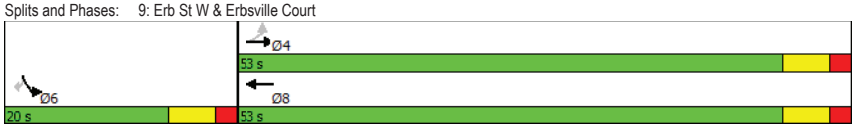
Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	65.4%	ICU Level of Service	C
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	69	818	741	48	118	86
Future Volume (vph)	69	818	741	48	118	86
Ideal Flow (vphpl)	1775	1900	1750	1750	1775	1750
Storage Length (m)	25.0			0.0	50.0	0.0
Storage Lanes	1			0	1	1
Taper Length (m)	75.0				55.0	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor	1.00		1.00		1.00	0.98
Frt			0.991			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1686	3505	3054	0	1637	1473
Flt Permitted	0.342				0.950	
Satd. Flow (perm)	607	3505	3054	0	1634	1446
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			20			86
Link Speed (k/h)		60	60		50	
Link Distance (m)		470.9	231.7		128.8	
Travel Time (s)		28.3	13.9		9.3	
Confl. Peds. (#/hr)	2			2	2	6
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	3%	8%	4%	3%	1%
Adj. Flow (vph)	69	818	741	48	118	86
Shared Lane Traffic (%)						
Lane Group Flow (vph)	69	818	789	0	118	86
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4					6
Detector Phase	4	4	8		6	6
Switch Phase						
Minimum Initial (s)	40.0	40.0	40.0		8.0	8.0
Minimum Split (s)	47.0	47.0	47.0		14.0	14.0
Total Split (s)	53.0	53.0	53.0		20.0	20.0
Total Split (%)	72.6%	72.6%	72.6%		27.4%	27.4%
Maximum Green (s)	47.0	47.0	47.0		14.0	14.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0		-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0		4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	Max	Max	Max		None	None
Walk Time (s)	26.0	26.0	26.0		7.0	7.0
Flash Dont Walk (s)	14.0	14.0	14.0		15.0	15.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)	52.9	52.9	52.9		12.5	12.5
Actuated g/C Ratio	0.76	0.76	0.76		0.18	0.18
v/c Ratio	0.15	0.31	0.34		0.40	0.26

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Control Delay	4.9	4.2	4.3		29.5	8.5
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	4.9	4.2	4.3		29.5	8.5
LOS	A	A	A		C	A
Approach Delay		4.2	4.3		20.6	
Approach LOS		A	A		C	
Queue Length 50th (m)	2.5	17.7	17.1		14.4	0.0
Queue Length 95th (m)	8.0	30.8	30.5		28.7	10.6
Internal Link Dist (m)		446.9	207.7		104.8	
Turn Bay Length (m)	25.0				50.0	
Base Capacity (vph)	460	2660	2323		375	398
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.15	0.31	0.34		0.31	0.22

Intersection Summary			
Area Type:	Other		
Cycle Length: 73			
Actuated Cycle Length: 69.7			
Natural Cycle: 65			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.40			
Intersection Signal Delay: 6.0		Intersection LOS: A	
Intersection Capacity Utilization 77.1%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 9: Erb St W & Erbsville Court



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	29	0	0	4	0	1667	12	0	1226	176
Future Volume (vph)	0	0	29	0	0	4	0	1667	12	0	1226	176
Ideal Flow (vphpl)	0	0	1750	0	0	1750	0	1775	1775	0	1775	1775
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor												
Frt			0.865			0.865		0.999			0.981	
Flt Protected												
Satd. Flow (prot)	0	0	1514	0	0	1009	0	3206	0	0	3143	0
Flt Permitted												
Satd. Flow (perm)	0	0	1514	0	0	1009	0	3206	0	0	3143	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		40.5			37.7			83.9			220.2	
Travel Time (s)		2.9			2.7			5.0			13.2	
Confl. Peds. (#/hr)									2	2		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	50%	0%	5%	17%	0%	6%	0%
Adj. Flow (vph)	0	0	29	0	0	4	0	1667	12	0	1226	176
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	29	0	0	4	0	1679	0	0	1402	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 59.7%		ICU Level of Service B	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	29	0	0	4	0	1667	12	0	1226	176
Future Volume (Veh/h)	0	0	29	0	0	4	0	1667	12	0	1226	176
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	0	29	0	0	4	0	1667	12	0	1226	176
Pedestrians					2							
Lane Width (m)					3.6							
Walking Speed (m/s)					1.2							
Percent Blockage					0							
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	2152	2995	701	2317	3077	842	1402			1681		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2152	2995	701	2317	3077	842	1402			1681		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	7.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.8	2.2			2.2		
p0 queue free %	100	100	92	100	100	98	100			100		
cM capacity (veh/h)	27	14	386	19	12	225	493			385		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	29	4	1111	568	817	585
Volume Left	0	0	0	0	0	0
Volume Right	29	4	0	12	0	176
cSH	386	225	1700	1700	1700	1700
Volume to Capacity	0.08	0.02	0.65	0.33	0.48	0.34
Queue Length 95th (m)	1.9	0.4	0.0	0.0	0.0	0.0
Control Delay (s)	15.1	21.3	0.0	0.0	0.0	0.0
Lane LOS	C	C				
Approach Delay (s)	15.1	21.3	0.0		0.0	
Approach LOS	C	C				

Intersection Summary					
Average Delay	0.2				
Intersection Capacity Utilization	59.7%	ICU Level of Service		B	
Analysis Period (min)	15				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	116	21	33	93	68	102	373	1450	73	41	1011	194
Future Volume (vph)	116	21	33	93	68	102	373	1450	73	41	1011	194
Ideal Flow (vphpl)	1775	1650	1650	1550	1550	1550	1650	1650	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.908			0.948			0.994			0.977	
Flt Protected	0.950				0.983			0.990			0.998	
Satd. Flow (prot)	1492	1498	0	0	1434	0	0	2991	0	0	2888	0
Flt Permitted	0.950				0.983			0.990			0.998	
Satd. Flow (perm)	1492	1498	0	0	1434	0	0	2991	0	0	2888	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		115.1			101.1			188.2			237.1	
Travel Time (s)		8.3			7.3			11.3			14.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	13%	0%	0%	1%	0%	1%	0%	4%	2%	11%	6%	4%
Adj. Flow (vph)	116	21	33	93	68	102	373	1450	73	41	1011	194
Shared Lane Traffic (%)												
Lane Group Flow (vph)	116	54	0	0	263	0	0	1896	0	0	1246	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization	137.0%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Traffic Volume (veh/h)	116	21	33	93	68	102	373	1450	73	41	1011	194
Future Volume (veh/h)	116	21	33	93	68	102	373	1450	73	41	1011	194
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	116	21	33	93	68	102	373	1450	73	41	1011	194
Approach Volume (veh/h)		170			263			1896			1246	
Crossing Volume (veh/h)		1145			1939#			178			534	
High Capacity (veh/h)		552			283			1205			908	
High v/c (veh/h)		0.31			0.93			1.57			1.37	
Low Capacity (veh/h)		423			201			998			732	
Low v/c (veh/h)		0.40			1.31			1.90			1.70	

Intersection Summary					
Maximum v/c High		1.57			
Maximum v/c Low		1.90			
Intersection Capacity Utilization		137.0%	ICU Level of Service		H
# Crossing flow exceeds 1200, method is not applicable					



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	18	0	1848	1100	36
Future Volume (vph)	0	18	0	1848	1100	36
Ideal Flow (vphpl)	0	1750	0	1900	1750	1750
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Frt		0.865			0.995	
Flt Protected						
Satd. Flow (prot)	0	1514	0	3471	3139	0
Flt Permitted						
Satd. Flow (perm)	0	1514	0	3471	3139	0
Link Speed (k/h)	50			60	60	
Link Distance (m)	55.4			149.5	188.2	
Travel Time (s)	4.0			9.0	11.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	4%	5%	17%
Adj. Flow (vph)	0	18	0	1848	1100	36
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	18	0	1848	1136	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	54.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	18	0	1848	1100	36
Future Volume (Veh/h)	0	18	0	1848	1100	36
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	18	0	1848	1100	36
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	2042	568	1136			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2042	568	1136			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	96	100			
cM capacity (veh/h)	50	471	622			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	18	924	924	733	403
Volume Left	0	0	0	0	0
Volume Right	18	0	0	0	36
cSH	471	1700	1700	1700	1700
Volume to Capacity	0.04	0.54	0.54	0.43	0.24
Queue Length 95th (m)	1.0	0.0	0.0	0.0	0.0
Control Delay (s)	12.9	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	12.9	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	54.4%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	11	35	114	1822	1072	43
Future Volume (vph)	11	35	114	1822	1072	43
Ideal Flow (vphpl)	1775	1750	1775	1900	1750	1750
Storage Length (m)	0.0	0.0	85.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	0.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Frt		0.850			0.994	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1686	1444	1670	3471	3148	0
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	1686	1444	1670	3471	3148	0
Link Speed (k/h)	50			60	60	
Link Distance (m)	62.4			166.4	149.5	
Travel Time (s)	4.5			10.0	9.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	3%	1%	4%	5%	5%
Adj. Flow (vph)	11	35	114	1822	1072	43
Shared Lane Traffic (%)						
Lane Group Flow (vph)	11	35	114	1822	1115	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 60.4%		ICU Level of Service B	
Analysis Period (min) 15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	11	35	114	1822	1072	43
Future Volume (Veh/h)	11	35	114	1822	1072	43
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	11	35	114	1822	1072	43
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	2232	558	1115			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2232	558	1115			
tC, single (s)	6.8	7.0	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	64	93	82			
cM capacity (veh/h)	30	471	628			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	11	35	114	911	911	715	400
Volume Left	11	0	114	0	0	0	0
Volume Right	0	35	0	0	0	0	43
cSH	30	471	628	1700	1700	1700	1700
Volume to Capacity	0.36	0.07	0.18	0.54	0.54	0.42	0.24
Queue Length 95th (m)	9.2	1.9	5.3	0.0	0.0	0.0	0.0
Control Delay (s)	179.5	13.3	12.0	0.0	0.0	0.0	0.0
Lane LOS	F	B	B				
Approach Delay (s)	53.0		0.7			0.0	
Approach LOS	F						

Intersection Summary				
Average Delay		1.2		
Intersection Capacity Utilization		60.4%	ICU Level of Service	B
Analysis Period (min)		15		



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	8	0	1950	1088	12
Future Volume (vph)	0	8	0	1950	1088	12
Ideal Flow (vphpl)	0	1750	0	1900	1750	1750
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Ped Bike Factor						
Frt		0.865			0.998	
Flt Protected						
Satd. Flow (prot)	0	1514	0	3471	3159	0
Flt Permitted						
Satd. Flow (perm)	0	1514	0	3471	3159	0
Link Speed (k/h)	50			60	60	
Link Distance (m)	67.0			178.5	166.4	
Travel Time (s)	4.8			10.7	10.0	
Confl. Peds. (#/hr)			2			2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	4%	5%	8%
Adj. Flow (vph)	0	8	0	1950	1088	12
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	8	0	1950	1100	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	57.2%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	8	0	1950	1088	12
Future Volume (Veh/h)	0	8	0	1950	1088	12
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	8	0	1950	1088	12
Pedestrians	2					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	2071	552	1102			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2071	552	1102			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	98	100			
cM capacity (veh/h)	48	482	640			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	8	975	975	725	375
Volume Left	0	0	0	0	0
Volume Right	8	0	0	0	12
cSH	482	1700	1700	1700	1700
Volume to Capacity	0.02	0.57	0.57	0.43	0.22
Queue Length 95th (m)	0.4	0.0	0.0	0.0	0.0
Control Delay (s)	12.6	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	12.6	0.0		0.0	
Approach LOS	B				

Intersection Summary				
Average Delay		0.0		
Intersection Capacity Utilization		57.2%	ICU Level of Service	B
Analysis Period (min)		15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	47	41	338	126	240	189	1652	687	176	923	36
Future Volume (vph)	25	47	41	338	126	240	189	1652	687	176	923	36
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.946			0.949			0.959			0.995	
Flt Protected		0.989			0.977			0.996			0.992	
Satd. Flow (prot)	0	2326	0	0	2754	0	0	2872	0	0	2984	0
Flt Permitted		0.989			0.977			0.996			0.992	
Satd. Flow (perm)	0	2326	0	0	2754	0	0	2872	0	0	2984	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		112.4			150.8			180.3			178.5	
Travel Time (s)		8.1			10.9			10.8			10.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	47%	9%	33%	4%	7%	7%	15%	4%	2%	2%	4%	4%
Adj. Flow (vph)	25	47	41	338	126	240	189	1652	687	176	923	36
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	113	0	0	704	0	0	2528	0	0	1135	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization	159.0%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Traffic Volume (veh/h)	25	47	41	338	126	240	189	1652	687	176	923	36
Future Volume (veh/h)	25	47	41	338	126	240	189	1652	687	176	923	36
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	25	47	41	338	126	240	189	1652	687	176	923	36
Approach Volume (veh/h)		113			704			2528			1135	
Crossing Volume (veh/h)		1437#			1866#			248			653	
High Capacity (veh/h)		433			301			1140			826	
High v/c (veh/h)		0.26			2.34			2.22			1.37	
Low Capacity (veh/h)		323			215			939			659	
Low v/c (veh/h)		0.35			3.27			2.69			1.72	

Intersection Summary					
Maximum v/c High		2.34			
Maximum v/c Low		3.27			
Intersection Capacity Utilization		159.0%	ICU Level of Service		H
# Crossing flow exceeds 1200, method is not applicable					

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	477	174	368	185	0	5	0	12	0	0	0
Future Volume (vph)	0	477	174	368	185	0	5	0	12	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.964						0.905				
Flt Protected					0.968			0.986				
Satd. Flow (prot)	0	1796	0	0	1803	0	0	1662	0	0	1863	0
Flt Permitted					0.968			0.986				
Satd. Flow (perm)	0	1796	0	0	1803	0	0	1662	0	0	1863	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		59.0			65.2			468.5			55.6	
Travel Time (s)		4.2			4.7			33.7			4.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	477	174	368	185	0	5	0	12	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	651	0	0	553	0	0	17	0	0	0	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	79.1%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	477	174	368	185	0	5	0	12	0	0	0
Future Volume (Veh/h)	0	477	174	368	185	0	5	0	12	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	477	174	368	185	0	5	0	12	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	185			651			1485	1485	564	1497	1572	185
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	185			651			1485	1485	564	1497	1572	185
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			61			93	100	98	100	100	100
cM capacity (veh/h)	1390			935			71	76	525	68	67	857

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	651	553	17	0
Volume Left	0	368	5	0
Volume Right	174	0	12	0
cSH	1390	935	183	1700
Volume to Capacity	0.00	0.39	0.09	0.00
Queue Length 95th (m)	0.0	15.2	2.4	0.0
Control Delay (s)	0.0	9.2	26.7	0.0
Lane LOS		A	D	A
Approach Delay (s)	0.0	9.2	26.7	0.0
Approach LOS			D	A

Intersection Summary				
Average Delay		4.5		
Intersection Capacity Utilization		79.1%	ICU Level of Service	D
Analysis Period (min)		15		

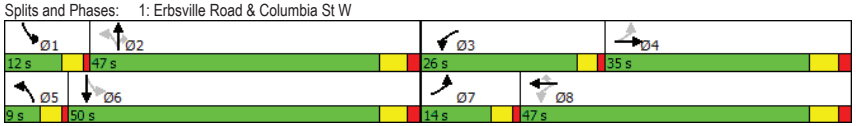
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	187	367	181	590	522	287	72	475	519	158	584	157
Future Volume (vph)	187	367	181	590	522	287	72	475	519	158	584	157
Ideal Flow (vphpl)	1775	1650	1650	1775	1900	1750	1775	1900	1750	1775	1650	1650
Storage Length (m)	0.0		0.0	0.0		75.0	0.0		170.0	0.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	0.0			7.5			80.0			0.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	0.99				0.97					1.00	
Frt		0.950				0.850			0.850		0.968	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1670	1535	0	1653	1881	1473	1686	1881	1488	1653	1565	0
Flt Permitted	0.215			0.121			0.096			0.195		
Satd. Flow (perm)	376	1535	0	211	1881	1424	170	1881	1488	339	1565	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		20				267			491		13	
Link Speed (k/h)		50			60			60			60	
Link Distance (m)		118.8			135.9			921.3			152.9	
Travel Time (s)		8.6			8.2			55.3			9.2	
Confl. Peds. (#/hr)	4		6	6		4	1					1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	2%	0%	2%	1%	1%	0%	1%	0%	2%	2%	0%
Adj. Flow (vph)	187	367	181	590	522	287	72	475	519	158	584	157
Shared Lane Traffic (%)												
Lane Group Flow (vph)	187	548	0	590	522	287	72	475	519	158	741	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	7	4		3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	17.4		5.0	17.4	17.4	5.0	31.8	31.8	5.0	31.8	
Minimum Split (s)	9.0	23.4		9.0	23.4	23.4	9.0	37.8	37.8	9.0	37.8	
Total Split (s)	14.0	35.0		26.0	47.0	47.0	9.0	47.0	47.0	12.0	50.0	
Total Split (%)	11.7%	29.2%		21.7%	39.2%	39.2%	7.5%	39.2%	39.2%	10.0%	41.7%	
Maximum Green (s)	10.0	29.0		22.0	41.0	41.0	5.0	41.0	41.0	8.0	44.0	
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	
All-Red Time (s)	1.0	2.0		1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	-2.0		0.0	-2.0	-2.0	0.0	-2.0	-2.0	0.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Max		None	Max	Max	None	Max	Max	None	Max	
Walk Time (s)		7.0			7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		11.0			11.0	11.0		11.0	11.0		11.0	
Pedestrian Calls (#/hr)		0			0	0		0	0		0	
Act Effct Green (s)	41.0	31.0		57.0	43.0	43.0	48.0	43.0	43.0	54.2	47.8	
Actuated g/C Ratio	0.34	0.26		0.48	0.36	0.36	0.40	0.36	0.36	0.45	0.40	
v/c Ratio	0.79	1.33		1.62	0.77	0.42	0.55	0.70	0.61	0.66	1.18	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	46.7	200.9		318.7	43.4	6.2	35.6	39.9	6.8	34.4	128.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	46.7	200.9		318.7	43.4	6.2	35.6	39.9	6.8	34.4	128.4	
LOS	D	F		F	D	A	D	D	A	C	F	
Approach Delay		161.7			151.9			23.5			111.8	
Approach LOS		F			F			C			F	
Queue Length 50th (m)	26.7	~173.8		~195.9	114.0	3.2	9.9	100.3	4.5	22.9	~224.5	
Queue Length 95th (m)	#56.7	#244.6		#268.3	158.6	23.3	#19.5	140.5	33.7	#38.7	#301.0	
Internal Link Dist (m)		94.8			111.9			897.3			128.9	
Turn Bay Length (m)						75.0			170.0			
Base Capacity (vph)	236	411		364	674	681	131	674	848	240	630	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.79	1.33		1.62	0.77	0.42	0.55	0.70	0.61	0.66	1.18	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Natural Cycle: 150			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.62			
Intersection Signal Delay: 111.5		Intersection LOS: F	
Intersection Capacity Utilization 134.2%		ICU Level of Service H	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Erbsville Road & Columbia St W



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	64	93	56	153	89	53	38	993	175	63	1233	24
Future Volume (vph)	64	93	56	153	89	53	38	993	175	63	1233	24
Ideal Flow (vphpl)	1775	1650	1650	1775	1650	1650	1775	1650	1650	1775	1900	1750
Storage Length (m)	0.0		0.0	0.0		0.0	20.0		0.0	25.0		25.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	0.0			0.0			65.0			50.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor	0.99	0.99		1.00	0.99		1.00					0.98
Frt		0.944			0.944			0.978				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1686	1549	0	1621	1545	0	1686	3027	0	1686	3539	1488
Flt Permitted	0.589			0.573			0.171			0.179		
Satd. Flow (perm)	1037	1549	0	976	1545	0	303	3027	0	318	3539	1454
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		32			32			36				85
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		155.7			226.8			139.9			921.3	
Travel Time (s)		11.2			16.3			8.4			55.3	
Confl. Peds. (#/hr)	10		3	3		10	3					3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	4%	0%	0%	0%	1%	3%	0%	2%	0%
Adj. Flow (vph)	64	93	56	153	89	53	38	993	175	63	1233	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	64	149	0	153	142	0	38	1168	0	63	1233	24
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		5.0	43.5		5.0	43.5	43.5
Minimum Split (s)	14.0	14.0		14.0	14.0		9.0	49.5		9.0	49.5	49.5
Total Split (s)	27.0	27.0		27.0	27.0		9.0	54.0		9.0	54.0	54.0
Total Split (%)	30.0%	30.0%		30.0%	30.0%		10.0%	60.0%		10.0%	60.0%	60.0%
Maximum Green (s)	21.0	21.0		21.0	21.0		5.0	48.0		5.0	48.0	48.0
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		1.0	2.0		1.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		2.0	4.0		2.0	4.0	4.0
Lead/Lag							Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max		None	Max	Max
Walk Time (s)	10.0	10.0		10.0	10.0			40.0			40.0	40.0
Flash Dont Walk (s)	16.0	16.0		16.0	16.0			13.0			13.0	13.0
Pedestrian Calls (#/hr)	0	0		0	0			0			0	0
Act Effct Green (s)	18.7	18.7		18.7	18.7		62.9	55.5		63.3	57.3	57.3
Actuated g/C Ratio	0.21	0.21		0.21	0.21		0.71	0.62		0.71	0.64	0.64
v/c Ratio	0.29	0.43		0.75	0.41		0.12	0.62		0.19	0.54	0.02

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	33.8	27.9		56.6	27.2		5.1	13.0		5.7	11.3	0.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	33.8	27.9		56.6	27.2		5.1	13.0		5.7	11.3	0.0
LOS	C	C		E	C		A	B		A	B	A
Approach Delay		29.6			42.4			12.8			10.9	
Approach LOS		C			D			B			B	
Queue Length 50th (m)	10.0	18.6		26.6	17.4		1.8	68.2		3.0	70.4	0.0
Queue Length 95th (m)	22.0	36.8		#53.4	35.0		4.9	95.6		7.2	95.5	0.0
Internal Link Dist (m)		131.7			202.8			115.9			897.3	
Turn Bay Length (m)							20.0			25.0		25.0
Base Capacity (vph)	270	426		253	425		323	1897		334	2274	964
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.24	0.35		0.60	0.33		0.12	0.62		0.19	0.54	0.02

Intersection Summary		
Area Type:	Other	
Cycle Length: 90		
Actuated Cycle Length: 89.1		
Natural Cycle: 75		
Control Type: Semi Act-Uncoord		
Maximum v/c Ratio: 0.75		
Intersection Signal Delay: 16.0		Intersection LOS: B
Intersection Capacity Utilization 81.6%		ICU Level of Service D
Analysis Period (min) 15		
# 95th percentile volume exceeds capacity, queue may be longer.		
Queue shown is maximum after two cycles.		

Splits and Phases: 2: Erbsville Road & Keats Way



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	601	598	871	221	576	152	608	829	260	142	1076	457
Future Volume (vph)	601	598	871	221	576	152	608	829	260	142	1076	457
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1775	1775	1750	1775	1775	1750
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	1.00	0.95	0.95	1.00
Frt		0.937			0.976				0.850			0.850
Flt Protected		0.986			0.988			0.979			0.994	
Satd. Flow (prot)	0	2848	0	0	2962	0	0	3228	1403	0	3266	1458
Flt Permitted		0.986			0.988			0.979			0.994	
Satd. Flow (perm)	0	2848	0	0	2962	0	0	3228	1403	0	3266	1458
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		147.8			470.9			152.2			97.5	
Travel Time (s)		8.9			28.3			9.1			5.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	4%	3%	2%	1%	4%	1%	6%	0%	3%	2%
Adj. Flow (vph)	601	598	871	221	576	152	608	829	260	142	1076	457
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	2070	0	0	949	0	0	1437	260	0	1218	457
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization	195.7%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized									MOYes			MOYes
Traffic Volume (veh/h)	601	598	871	221	576	152	608	829	260	142	1076	457
Future Volume (veh/h)	601	598	871	221	576	152	608	829	260	142	1076	457
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	601	598	871	221	576	152	608	829	260	142	1076	457
Approach Volume (veh/h)		2070			949			1437			1218	
Crossing Volume (veh/h)		1439#			2038#			1341#			1405#	
High Capacity (veh/h)		432			260			469			445	
High v/c (veh/h)		4.79			3.65			3.06			2.74	
Low Capacity (veh/h)		322			182			353			333	
Low v/c (veh/h)		6.43			5.21			4.07			3.66	

Intersection Summary					
Maximum v/c High		4.79			
Maximum v/c Low		6.43			
Intersection Capacity Utilization		195.7%	ICU Level of Service		H
# Crossing flow exceeds 1200, method is not applicable					

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1699	72	81	1317	78	0	0	118	0	0	26
Future Volume (vph)	0	1699	72	81	1317	78	0	0	118	0	0	26
Ideal Flow (vphpl)	1900	1650	1650	1900	1650	1650	1900	1650	1650	1650	1650	1900
Storage Length (m)	0.0		0.0	25.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		1	0		1
Taper Length (m)	0.0			60.0			0.0			0.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.994			0.992				0.865			0.865
Flt Protected				0.950								
Satd. Flow (prot)	0	3058	0	1787	3051	0	0	0	1427	0	0	1644
Flt Permitted				0.950								
Satd. Flow (perm)	0	3058	0	1787	3051	0	0	0	1427	0	0	1644
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		83.2			147.8			60.7			74.6	
Travel Time (s)		5.0			8.9			4.4			5.4	
Confl. Peds. (#/hr)	3		4	4		3	1		1	1		1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	2%	0%	1%	2%	1%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	1699	72	81	1317	78	0	0	118	0	0	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1771	0	81	1395	0	0	0	118	0	0	26
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 72.1%		ICU Level of Service C	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1699	72	81	1317	78	0	0	118	0	0	26
Future Volume (Veh/h)	0	1699	72	81	1317	78	0	0	118	0	0	26
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	1699	72	81	1317	78	0	0	118	0	0	26
Pedestrians		1			1			4			3	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		83										
pX, platoon unblocked				0.69			0.69	0.69	0.69	0.69	0.69	
vC, conflicting volume	1398			1775			2586	3299	890	2490	3296	702
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1398			1221			2400	3434	0	2259	3430	702
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			79			100	100	84	100	100	93
cM capacity (veh/h)	494			393			10	4	748	11	4	384

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	1133	638	81	878	517	118	26
Volume Left	0	0	81	0	0	0	0
Volume Right	0	72	0	0	78	118	26
cSH	1700	1700	393	1700	1700	748	384
Volume to Capacity	0.67	0.38	0.21	0.52	0.30	0.16	0.07
Queue Length 95th (m)	0.0	0.0	6.1	0.0	0.0	4.5	1.7
Control Delay (s)	0.0	0.0	16.5	0.0	0.0	10.7	15.0
Lane LOS			C			B	C
Approach Delay (s)	0.0		0.9			10.7	15.0
Approach LOS						B	C

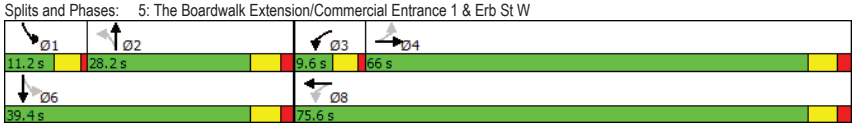
Intersection Summary				
Average Delay		0.9		
Intersection Capacity Utilization		72.1%	ICU Level of Service	C
Analysis Period (min)		15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	1368	98	85	1210	46	60	36	296	106	22	117
Future Volume (vph)	82	1368	98	85	1210	46	60	36	296	106	22	117
Ideal Flow (vphpl)	1775	1900	1900	1900	1900	1750	1900	1900	1900	1775	1900	1750
Storage Length (m)	30.0		0.0	60.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	55.0			0.0			7.5			0.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00							
Frt		0.990			0.995			0.866			0.874	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1686	3504	0	1770	3488	0	1770	1613	0	1670	1642	0
Flt Permitted	0.185			0.081			0.668			0.173		
Satd. Flow (perm)	328	3504	0	151	3488	0	1244	1613	0	304	1642	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			6			134			82	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		435.4			83.2			94.9			96.6	
Travel Time (s)		26.1			5.0			6.8			7.0	
Confl. Peds. (#/hr)	1					1						
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	2%	2%	2%	3%	0%	2%	2%	2%	1%	2%	1%
Adj. Flow (vph)	82	1368	98	85	1210	46	60	36	296	106	22	117
Shared Lane Traffic (%)												
Lane Group Flow (vph)	82	1466	0	85	1256	0	60	332	0	106	139	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		3	8		2	2		1	6	
Switch Phase												
Minimum Initial (s)	60.0	60.0		5.0	60.0		5.0	5.0		5.0	7.0	
Minimum Split (s)	66.0	66.0		9.5	66.0		24.0	24.0		9.5	13.0	
Total Split (s)	66.0	66.0		9.6	75.6		28.2	28.2		11.2	39.4	
Total Split (%)	57.4%	57.4%		8.3%	65.7%		24.5%	24.5%		9.7%	34.3%	
Maximum Green (s)	60.0	60.0		5.1	69.6		22.2	22.2		6.7	33.4	
Yellow Time (s)	4.0	4.0		3.5	4.0		4.0	4.0		3.5	4.0	
All-Red Time (s)	2.0	2.0		1.0	2.0		2.0	2.0		1.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		0.0	-2.0		-2.0	0.0		0.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.5	4.0		4.0	6.0		4.5	4.0	
Lead/Lag	Lag	Lag		Lead			Lag	Lag		Lead		
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		None	Max		None	None		None	None	
Walk Time (s)	50.0	50.0			50.0		7.0	7.0			7.0	
Flash Dont Walk (s)	10.0	10.0			10.0		11.0	11.0			15.0	
Pedestrian Calls (#/hr)	0	0			0		0	0			0	
Act Effct Green (s)	64.1	64.1		71.2	71.7		20.6	18.6		31.3	31.8	
Actuated g/C Ratio	0.57	0.57		0.64	0.64		0.18	0.17		0.28	0.29	
v/c Ratio	0.44	0.73		0.50	0.56		0.26	0.87		0.63	0.26	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	25.1	21.1		18.6	12.7		41.5	50.3		48.9	14.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	25.1	21.1		18.6	12.7		41.5	50.3		48.9	14.6	
LOS	C	C		B	B		D	D		D	B	
Approach Delay		21.4			13.1			48.9			29.5	
Approach LOS		C			B			D			C	
Queue Length 50th (m)	11.2	135.1		7.4	83.6		11.9	45.9		18.6	9.7	
Queue Length 95th (m)	28.6	167.6		14.4	104.8		24.6	#91.2		#35.8	25.5	
Internal Link Dist (m)		411.4			59.2			70.9			72.6	
Turn Bay Length (m)	30.0			60.0								
Base Capacity (vph)	188	2019		170	2244		270	428		167	578	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.44	0.73		0.50	0.56		0.22	0.78		0.63	0.24	

Intersection Summary		
Area Type:	Other	
Cycle Length: 115		
Actuated Cycle Length: 111.5		
Natural Cycle: 110		
Control Type: Semi Act-Uncoord		
Maximum v/c Ratio: 0.87		
Intersection Signal Delay: 21.8		Intersection LOS: C
Intersection Capacity Utilization 111.5%		ICU Level of Service H
Analysis Period (min) 15		
# 95th percentile volume exceeds capacity, queue may be longer.		
Queue shown is maximum after two cycles.		

Splits and Phases: 5: The Boardwalk Extension/Commercial Entrance 1 & Erb St W



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	1275	2	28	994	588	4	1	29	310	0	29
Future Volume (vph)	30	1275	2	28	994	588	4	1	29	310	0	29
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1550	1550	1550	1550	1550	1750
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	0.95	0.95	1.00
Frt					0.945			0.885			0.974	
Flt Protected		0.999			0.999			0.994		0.950	0.960	
Satd. Flow (prot)	0	3129	0	0	2907	0	0	989	0	1399	1377	0
Flt Permitted		0.999			0.999			0.994		0.950	0.960	
Satd. Flow (perm)	0	3129	0	0	2907	0	0	989	0	1399	1377	0
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		149.9			435.4			54.9			87.3	
Travel Time (s)		9.0			26.1			4.0			6.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	50%	68%	1%	0%	25%	0%	41%	0%	0%	0%
Adj. Flow (vph)	30	1275	2	28	994	588	4	1	29	310	0	29
Shared Lane Traffic (%)										45%		
Lane Group Flow (vph)	0	1307	0	0	1610	0	0	34	0	170	169	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization	102.4%	ICU Level of Service	G
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Traffic Volume (veh/h)	30	1275	2	28	994	588	4	1	29	310	0	29
Future Volume (veh/h)	30	1275	2	28	994	588	4	1	29	310	0	29
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	30	1275	2	28	994	588	4	1	29	310	0	29
Approach Volume (veh/h)		1307			1610			34			339	
Crossing Volume (veh/h)		338			35			1615#			1026	
High Capacity (veh/h)		1062			1347			373			609	
High v/c (veh/h)		1.23			1.19			0.09			0.56	
Low Capacity (veh/h)		869			1127			273			471	
Low v/c (veh/h)		1.50			1.43			0.12			0.72	

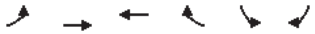
Intersection Summary					
Maximum v/c High		1.23			
Maximum v/c Low		1.50			
Intersection Capacity Utilization		102.4%	ICU Level of Service		G
# Crossing flow exceeds 1200, method is not applicable					

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	118	306	7	52	592	382	6	7	76	925	7	248
Future Volume (vph)	118	306	7	52	592	382	6	7	76	925	7	248
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1550	1550	1550	1550	1550	1750
Storage Length (m)	30.0		30.0	0.0		0.0	0.0		0.0	50.0		0.0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (m)	85.0			0.0			0.0			75.0		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.998			0.944			0.885			0.936	
Flt Protected		0.986			0.997			0.997		0.950	0.973	
Satd. Flow (prot)	0	3063	0	0	2913	0	0	1345	0	1399	1341	0
Flt Permitted		0.986			0.997			0.997		0.950	0.973	
Satd. Flow (perm)	0	3063	0	0	2913	0	0	1345	0	1399	1341	0
Link Speed (k/h)		70			60			50			50	
Link Distance (m)		346.1			149.9			61.3			415.1	
Travel Time (s)		17.8			9.0			4.4			29.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	1%	0%	3%	2%	0%	0%	0%	2%	0%	0%	0%
Adj. Flow (vph)	118	306	7	52	592	382	6	7	76	925	7	248
Shared Lane Traffic (%)										35%		
Lane Group Flow (vph)	0	431	0	0	1026	0	0	89	0	601	579	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization	106.2%	ICU Level of Service	G
Analysis Period (min)	15		

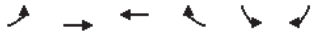
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Traffic Volume (veh/h)	118	306	7	52	592	382	6	7	76	925	7	248
Future Volume (veh/h)	118	306	7	52	592	382	6	7	76	925	7	248
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	118	306	7	52	592	382	6	7	76	925	7	248
Approach Volume (veh/h)		431			1026			89			1180	
Crossing Volume (veh/h)		984			131			1349#			650	
High Capacity (veh/h)		631			1250			466			828	
High v/c (veh/h)		0.68			0.82			0.19			1.43	
Low Capacity (veh/h)		490			1039			350			661	
Low v/c (veh/h)		0.88			0.99			0.25			1.79	

Intersection Summary					
Maximum v/c High		1.43			
Maximum v/c Low		1.79			
Intersection Capacity Utilization		106.2%	ICU Level of Service	G	
# Crossing flow exceeds 1200, method is not applicable					



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	12	372	701	138	50	9
Future Volume (vph)	12	372	701	138	50	9
Ideal Flow (vphpl)	1650	1650	1650	1650	1765	1765
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.978		0.979	
Flt Protected		0.998			0.959	
Satd. Flow (prot)	0	1631	1595	0	1657	0
Flt Permitted		0.998			0.959	
Satd. Flow (perm)	0	1631	1595	0	1657	0
Link Speed (k/h)		70	70		60	
Link Distance (m)		189.3	346.1		103.7	
Travel Time (s)		9.7	17.8		6.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	1%	1%	2%	0%	0%
Adj. Flow (vph)	12	372	701	138	50	9
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	384	839	0	59	0
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 62.4%		ICU Level of Service B	
Analysis Period (min) 15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	12	372	701	138	50	9
Future Volume (Veh/h)	12	372	701	138	50	9
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	12	372	701	138	50	9
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	839				1166	770
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	839				1166	770
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				77	98
cM capacity (veh/h)	804				213	404

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	384	839	59
Volume Left	12	0	50
Volume Right	0	138	9
cSH	804	1700	230
Volume to Capacity	0.01	0.49	0.26
Queue Length 95th (m)	0.4	0.0	7.9
Control Delay (s)	0.5	0.0	26.0
Lane LOS	A		D
Approach Delay (s)	0.5	0.0	26.0
Approach LOS			D

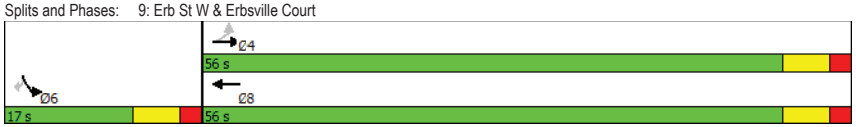
Intersection Summary				
Average Delay		1.3		
Intersection Capacity Utilization		62.4%	ICU Level of Service	B
Analysis Period (min)		15		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	39	942	943	44	64	46
Future Volume (vph)	39	942	943	44	64	46
Ideal Flow (vphpl)	1775	1900	1750	1750	1775	1750
Storage Length (m)	25.0			0.0	50.0	0.0
Storage Lanes	1			0	1	1
Taper Length (m)	75.0				55.0	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor	1.00		1.00		1.00	0.99
Frt			0.993			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1686	3539	3233	0	1653	1488
Flt Permitted	0.275				0.950	
Satd. Flow (perm)	488	3539	3233	0	1650	1465
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			16			46
Link Speed (k/h)		60	60		50	
Link Distance (m)		470.9	231.7		128.8	
Travel Time (s)		28.3	13.9		9.3	
Confl. Peds. (#/hr)	5			5	2	3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	2%	2%	2%	2%	0%
Adj. Flow (vph)	39	942	943	44	64	46
Shared Lane Traffic (%)						
Lane Group Flow (vph)	39	942	987	0	64	46
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4					6
Detector Phase	4	4	8		6	6
Switch Phase						
Minimum Initial (s)	40.0	40.0	40.0		8.0	8.0
Minimum Split (s)	47.0	47.0	47.0		14.0	14.0
Total Split (s)	56.0	56.0	56.0		17.0	17.0
Total Split (%)	76.7%	76.7%	76.7%		23.3%	23.3%
Maximum Green (s)	50.0	50.0	50.0		11.0	11.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0		-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0		4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	Max	Max	Max		None	None
Walk Time (s)	26.0	26.0	26.0		7.0	7.0
Flash Dont Walk (s)	14.0	14.0	14.0		15.0	15.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)	58.3	58.3	58.3		10.9	10.9
Actuated g/C Ratio	0.79	0.79	0.79		0.15	0.15
v/c Ratio	0.10	0.34	0.38		0.26	0.18

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Control Delay	3.7	3.4	3.7		30.0	10.5
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	3.7	3.4	3.7		30.0	10.5
LOS	A	A	A		C	B
Approach Delay		3.4	3.7		21.8	
Approach LOS		A	A		C	
Queue Length 50th (m)	1.1	18.1	19.4		8.0	0.0
Queue Length 95th (m)	4.2	30.6	33.5		18.4	8.3
Internal Link Dist (m)		446.9	207.7		104.8	
Turn Bay Length (m)	25.0				50.0	
Base Capacity (vph)	387	2806	2567		293	297
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.10	0.34	0.38		0.22	0.15

Intersection Summary		
Area Type:	Other	
Cycle Length: 73		
Actuated Cycle Length: 73.5		
Natural Cycle: 65		
Control Type: Semi Act-Uncoord		
Maximum v/c Ratio: 0.38		
Intersection Signal Delay: 4.5		Intersection LOS: A
Intersection Capacity Utilization 49.1%		ICU Level of Service A
Analysis Period (min) 15		

Splits and Phases: 9: Erb St W & Erbsville Court



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	202	0	0	17	0	1715	13	0	2143	52
Future Volume (vph)	0	0	202	0	0	17	0	1715	13	0	2143	52
Ideal Flow (vphpl)	0	0	1750	0	0	1750	0	1775	1775	0	1775	1775
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor												
Frt			0.865			0.865		0.999			0.996	
Flt Protected												
Satd. Flow (prot)	0	0	1514	0	0	1514	0	3272	0	0	3263	0
Flt Permitted												
Satd. Flow (perm)	0	0	1514	0	0	1514	0	3272	0	0	3263	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		40.5			37.7			83.9			220.2	
Travel Time (s)		2.9			2.7			5.0			13.2	
Confl. Peds. (#/hr)									3	3		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	3%	0%
Adj. Flow (vph)	0	0	202	0	0	17	0	1715	13	0	2143	52
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	202	0	0	17	0	1728	0	0	2195	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 85.4%		ICU Level of Service E	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	202	0	0	17	0	1715	13	0	2143	52
Future Volume (Veh/h)	0	0	202	0	0	17	0	1715	13	0	2143	52
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	0	202	0	0	17	0	1715	13	0	2143	52
Pedestrians					3							
Lane Width (m)					3.6							
Walking Speed (m/s)					1.2							
Percent Blockage					0							
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	3044	3900	1098	2998	3920	867	2195			1731		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	3044	3900	1098	2998	3920	867	2195			1731		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	4	100	100	94	100			100		
cM capacity (veh/h)	5	3	211	0	3	299	244			368		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	202	17	1143	585	1429	766
Volume Left	0	0	0	0	0	0
Volume Right	202	17	0	13	0	52
cSH	211	299	1700	1700	1700	1700
Volume to Capacity	0.96	0.06	0.67	0.34	0.84	0.45
Queue Length 95th (m)	65.2	1.4	0.0	0.0	0.0	0.0
Control Delay (s)	98.6	17.7	0.0	0.0	0.0	0.0
Lane LOS	F	C				
Approach Delay (s)	98.6	17.7	0.0		0.0	
Approach LOS	F	C				

Intersection Summary					
Average Delay	4.9				
Intersection Capacity Utilization	85.4%	ICU Level of Service		E	
Analysis Period (min)	15				



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	486	72	224	81	46	97	135	1134	86	125	2165	170
Future Volume (vph)	486	72	224	81	46	97	135	1134	86	125	2165	170
Ideal Flow (vphpl)	1775	1650	1650	1550	1550	1550	1650	1650	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.886			0.942			0.990			0.990	
Flt Protected	0.950				0.982			0.995			0.997	
Satd. Flow (prot)	1606	1462	0	0	1425	0	0	3012	0	0	2984	0
Flt Permitted	0.950				0.982			0.995			0.997	
Satd. Flow (perm)	1606	1462	0	0	1425	0	0	3012	0	0	2984	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		115.1			101.1			188.2			237.1	
Travel Time (s)		8.3			7.3			11.3			14.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	0%	0%	0%	3%	0%	0%	3%	0%	1%	4%	2%
Adj. Flow (vph)	486	72	224	81	46	97	135	1134	86	125	2165	170
Shared Lane Traffic (%)												
Lane Group Flow (vph)	486	296	0	0	224	0	0	1355	0	0	2460	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization	181.0%	ICU Level of Service	H
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Traffic Volume (veh/h)	486	72	224	81	46	97	135	1134	86	125	2165	170
Future Volume (veh/h)	486	72	224	81	46	97	135	1134	86	125	2165	170
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	486	72	224	81	46	97	135	1134	86	125	2165	170
Approach Volume (veh/h)		782			224			1355			2460	
Crossing Volume (veh/h)		2371#			1755#			683			262	
High Capacity (veh/h)		194			331			806			1128	
High v/c (veh/h)		4.02			0.68			1.68			2.18	
Low Capacity (veh/h)		132			239			642			928	
Low v/c (veh/h)		5.94			0.94			2.11			2.65	

Intersection Summary			
Maximum v/c High	4.02		
Maximum v/c Low	5.94		
Intersection Capacity Utilization	181.0%	ICU Level of Service	H
# Crossing flow exceeds 1200, method is not applicable			



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	61	0	1352	2415	39
Future Volume (vph)	0	61	0	1352	2415	39
Ideal Flow (vphpl)	0	1750	0	1900	1750	1750
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Ped Bike Factor						
Frt		0.865			0.998	
Flt Protected						
Satd. Flow (prot)	0	1514	0	3505	3213	0
Flt Permitted						
Satd. Flow (perm)	0	1514	0	3505	3213	0
Link Speed (k/h)	50			60	60	
Link Distance (m)	55.4			149.5	188.2	
Travel Time (s)	4.0			9.0	11.3	
Confl. Peds. (#/hr)			5			5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	3%	3%	21%
Adj. Flow (vph)	0	61	0	1352	2415	39
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	61	0	1352	2454	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	84.6%	ICU Level of Service	E
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	61	0	1352	2415	39
Future Volume (Veh/h)	0	61	0	1352	2415	39
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	61	0	1352	2415	39
Pedestrians	5					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	3116	1232	2459			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	3116	1232	2459			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	64	100			
cM capacity (veh/h)	9	171	191			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	61	676	676	1610	844
Volume Left	0	0	0	0	0
Volume Right	61	0	0	0	39
cSH	171	1700	1700	1700	1700
Volume to Capacity	0.36	0.40	0.40	0.95	0.50
Queue Length 95th (m)	12.0	0.0	0.0	0.0	0.0
Control Delay (s)	37.3	0.0	0.0	0.0	0.0
Lane LOS	E				
Approach Delay (s)	37.3	0.0		0.0	
Approach LOS	E				

Intersection Summary					
Average Delay		0.6			
Intersection Capacity Utilization		84.6%	ICU Level of Service		E
Analysis Period (min)		15			

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	20	116	120	1316	2402	90
Future Volume (vph)	20	116	120	1316	2402	90
Ideal Flow (vphpl)	1775	1750	1775	1900	1750	1750
Storage Length (m)	0.0	0.0	85.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	0.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Ped Bike Factor						
Frt		0.850			0.995	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1686	1473	1686	3539	3214	0
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	1686	1473	1686	3539	3214	0
Link Speed (k/h)	50			60	60	
Link Distance (m)	62.4			166.4	149.5	
Travel Time (s)	4.5			10.0	9.0	
Confl. Peds. (#/hr)		2	3			3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	1%	0%	2%	3%	1%
Adj. Flow (vph)	20	116	120	1316	2402	90
Shared Lane Traffic (%)						
Lane Group Flow (vph)	20	116	120	1316	2492	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	96.3%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	116	120	1316	2402	90
Future Volume (Veh/h)	20	116	120	1316	2402	90
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	20	116	120	1316	2402	90
Pedestrians	3			2		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.2			1.2		
Percent Blockage	0			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	3348	1251	2495			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	3348	1251	2495			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	30	35			
cM capacity (veh/h)	2	165	186			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	20	116	120	658	658	1601	891
Volume Left	20	0	120	0	0	0	0
Volume Right	0	116	0	0	0	0	90
cSH	2	165	186	1700	1700	1700	1700
Volume to Capacity	9.09	0.70	0.65	0.39	0.39	0.94	0.52
Queue Length 95th (m)	Err	33.8	30.1	0.0	0.0	0.0	0.0
Control Delay (s)	Err	67.0	54.3	0.0	0.0	0.0	0.0
Lane LOS	F	F	F				
Approach Delay (s)	1527.6		4.5			0.0	
Approach LOS	F						

Intersection Summary				
Average Delay	52.7			
Intersection Capacity Utilization	96.3%	ICU Level of Service		F
Analysis Period (min)	15			



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	67	0	1428	2435	32
Future Volume (vph)	0	67	0	1428	2435	32
Ideal Flow (vphpl)	0	1750	0	1900	1750	1750
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Ped Bike Factor						
Frt		0.865			0.998	
Flt Protected						
Satd. Flow (prot)	0	1484	0	3539	3223	0
Flt Permitted						
Satd. Flow (perm)	0	1484	0	3539	3223	0
Link Speed (k/h)	50			60	60	
Link Distance (m)	67.0			178.5	166.4	
Travel Time (s)	4.8			10.7	10.0	
Confl. Peds. (#/hr)			1			1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	2%	0%	2%	3%	0%
Adj. Flow (vph)	0	67	0	1428	2435	32
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	67	0	1428	2467	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	85.4%	ICU Level of Service	E
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	67	0	1428	2435	32
Future Volume (Veh/h)	0	67	0	1428	2435	32
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	67	0	1428	2435	32
Pedestrians	1					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	3166	1234	2468			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	3166	1234	2468			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	60	100			
cM capacity (veh/h)	8	168	191			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	67	714	714	1623	844
Volume Left	0	0	0	0	0
Volume Right	67	0	0	0	32
cSH	168	1700	1700	1700	1700
Volume to Capacity	0.40	0.42	0.42	0.95	0.50
Queue Length 95th (m)	14.0	0.0	0.0	0.0	0.0
Control Delay (s)	40.0	0.0	0.0	0.0	0.0
Lane LOS	E				
Approach Delay (s)	40.0	0.0		0.0	
Approach LOS	E				

Intersection Summary				
Average Delay		0.7		
Intersection Capacity Utilization		85.4%	ICU Level of Service	E
Analysis Period (min)		15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	156	226	463	209	222	231	1161	479	333	2085	82
Future Volume (vph)	38	156	226	463	209	222	231	1161	479	333	2085	82
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.919			0.963			0.962			0.995	
Flt Protected		0.995			0.975			0.994			0.993	
Satd. Flow (prot)	0	2726	0	0	2908	0	0	2932	0	0	3017	0
Flt Permitted		0.995			0.975			0.994			0.993	
Satd. Flow (perm)	0	2726	0	0	2908	0	0	2932	0	0	3017	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		112.4			150.8			180.3			178.5	
Travel Time (s)		8.1			10.9			10.8			10.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	9%	3%	6%	1%	2%	1%	8%	2%	0%	1%	3%	1%
Adj. Flow (vph)	38	156	226	463	209	222	231	1161	479	333	2085	82
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	420	0	0	894	0	0	1871	0	0	2500	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization	201.1%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Traffic Volume (veh/h)	38	156	226	463	209	222	231	1161	479	333	2085	82
Future Volume (veh/h)	38	156	226	463	209	222	231	1161	479	333	2085	82
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	38	156	226	463	209	222	231	1161	479	333	2085	82
Approach Volume (veh/h)		420			894			1871			2500	
Crossing Volume (veh/h)		2881#			1430#			527			903	
High Capacity (veh/h)		124			436			913			674	
High v/c (veh/h)		3.39			2.05			2.05			3.71	
Low Capacity (veh/h)		79			325			737			527	
Low v/c (veh/h)		5.30			2.75			2.54			4.74	

Intersection Summary					
Maximum v/c High		3.71			
Maximum v/c Low		5.30			
Intersection Capacity Utilization		201.1%	ICU Level of Service		H
# Crossing flow exceeds 1200, method is not applicable					



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	333	17	65	349	0	151	0	419	0	0	0
Future Volume (vph)	0	333	17	65	349	0	151	0	419	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.993						0.901				
Flt Protected					0.992			0.987				
Satd. Flow (prot)	0	1850	0	0	1848	0	0	1657	0	0	1863	0
Flt Permitted					0.992			0.987				
Satd. Flow (perm)	0	1850	0	0	1848	0	0	1657	0	0	1863	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		89.5			122.9			465.8			113.8	
Travel Time (s)		6.4			8.8			33.5			8.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	333	17	65	349	0	151	0	419	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	350	0	0	414	0	0	570	0	0	0	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	84.7%	ICU Level of Service	E
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	333	17	65	349	0	151	0	419	0	0	0
Future Volume (Veh/h)	0	333	17	65	349	0	151	0	419	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	333	17	65	349	0	151	0	419	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	349			350			820	820	342	1240	829	349
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	349			350			820	820	342	1240	829	349
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			95			46	100	40	100	100	100
cM capacity (veh/h)	1210			1209			282	293	701	59	290	694

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	350	414	570	0
Volume Left	0	65	151	0
Volume Right	17	0	419	0
cSH	1210	1209	503	1700
Volume to Capacity	0.00	0.05	1.13	0.00
Queue Length 95th (m)	0.0	1.4	155.4	0.0
Control Delay (s)	0.0	1.7	109.9	0.0
Lane LOS		A	F	A
Approach Delay (s)	0.0	1.7	109.9	0.0
Approach LOS			F	A

Intersection Summary				
Average Delay		47.5		
Intersection Capacity Utilization		84.7%	ICU Level of Service	E
Analysis Period (min)		15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	72	229	58	489	188	172	62	460	427	142	481	94
Future Volume (vph)	72	229	58	489	188	172	62	460	427	142	481	94
Ideal Flow (vphpl)	1775	1650	1650	1775	1900	1750	1775	1900	1750	1775	1650	1650
Storage Length (m)	0.0		0.0	75.0		0.0	0.0		170.0	0.0		0.0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (m)	0.0			7.5			80.0			0.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		1.00		0.97	1.00				1.00	
Frt		0.970				0.850			0.850		0.975	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1637	1538	0	1653	1727	1390	1561	1810	1473	1621	1513	0
Flt Permitted	0.639			0.322			0.270			0.176		
Satd. Flow (perm)	1095	1538	0	560	1727	1352	442	1810	1473	300	1513	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14				172			427		14	
Link Speed (k/h)		50			60			60			60	
Link Distance (m)		118.8			135.9			921.3			152.9	
Travel Time (s)		8.6			8.2			55.3			9.2	
Confl. Peds. (#/hr)	3		1	1		3	4					4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	7%	2%	10%	7%	8%	5%	1%	4%	5%	10%
Adj. Flow (vph)	72	229	58	489	188	172	62	460	427	142	481	94
Shared Lane Traffic (%)												
Lane Group Flow (vph)	72	287	0	489	188	172	62	460	427	142	575	0
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Detector Phase	7	4		3	8	8	2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	22.8		5.0	22.8	22.8	26.4	26.4	26.4	5.0	26.4	
Minimum Split (s)	9.0	28.8		9.0	28.8	28.8	32.4	32.4	32.4	9.0	32.4	
Total Split (s)	9.0	28.8		18.0	37.8	37.8	34.2	34.2	34.2	9.0	43.2	
Total Split (%)	10.0%	32.0%		20.0%	42.0%	42.0%	38.0%	38.0%	38.0%	10.0%	48.0%	
Maximum Green (s)	5.0	22.8		14.0	31.8	31.8	28.2	28.2	28.2	5.0	37.2	
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	
All-Red Time (s)	1.0	2.0		1.0	2.0	2.0	2.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	-2.0		0.0	-2.0	-2.0	0.0	-2.0	-2.0	0.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0	6.0	4.0	4.0	4.0	4.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	Max		None	Max	Max	Max	Max	Max	None	Max	
Walk Time (s)		7.0			7.0	7.0	7.0	7.0	7.0		7.0	
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0		11.0	
Pedestrian Calls (#/hr)		0			0	0	0	0	0		0	
Act Effct Green (s)	29.8	24.8		42.8	35.6	35.6	28.2	30.2	30.2	39.2	39.2	
Actuated g/C Ratio	0.33	0.28		0.48	0.40	0.40	0.31	0.34	0.34	0.44	0.44	
v/c Ratio	0.18	0.66		1.12	0.28	0.27	0.45	0.76	0.55	0.70	0.86	

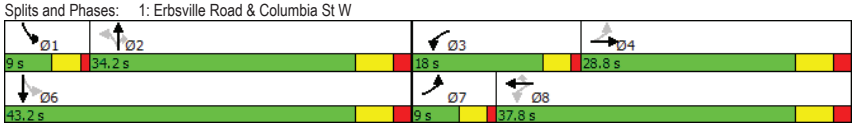
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	15.3	36.0		102.4	20.7	4.3	37.2	36.2	5.3	37.0	37.8	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	15.3	36.0		102.4	20.7	4.3	37.2	36.2	5.3	37.0	37.8	
LOS	B	D		F	C	A	D	D	A	D	D	
Approach Delay		31.8			64.4			22.4			37.7	
Approach LOS		C			E			C			D	
Queue Length 50th (m)	6.9	43.9		~76.7	23.5	0.0	8.9	73.8	0.0	15.5	89.8	
Queue Length 95th (m)	14.5	72.5		#164.0	40.2	12.7	22.9	#113.7	20.4	#35.1	#155.3	
Internal Link Dist (m)		94.8			111.9			897.3			128.9	
Turn Bay Length (m)				75.0					170.0			
Base Capacity (vph)	392	433		436	683	639	138	607	777	204	666	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.18	0.66		1.12	0.28	0.27	0.45	0.76	0.55	0.70	0.86	

Intersection Summary		
Area Type:	Other	
Cycle Length: 90		
Actuated Cycle Length: 90		
Natural Cycle: 90		
Control Type: Semi Act-Uncoord		
Maximum v/c Ratio: 1.12		
Intersection Signal Delay: 39.8		Intersection LOS: D
Intersection Capacity Utilization 120.8%		ICU Level of Service H
Analysis Period (min) 15		

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Erbsville Road & Columbia St W

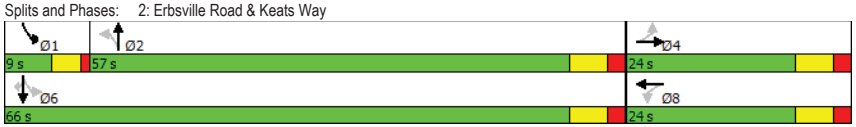


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	33	43	160	34	41	40	865	157	41	934	16
Future Volume (vph)	29	33	43	160	34	41	40	865	157	41	934	16
Ideal Flow (vphpl)	1775	1650	1650	1775	1650	1650	1775	1650	1650	1775	1900	1750
Storage Length (m)	0.0		0.0	0.0		0.0	20.0		0.0	25.0		25.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	0.0			0.0			65.0			50.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor	1.00	0.99		0.99	0.99		1.00	1.00		1.00		0.98
Frt		0.915			0.918			0.977				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1637	1428	0	1637	1330	0	1519	2926	0	1653	3438	1488
Flt Permitted	0.708			0.708			0.306			0.225		
Satd. Flow (perm)	1216	1428	0	1212	1330	0	489	2926	0	391	3438	1456
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		43			41			40				36
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		155.7			226.8			139.9			921.3	
Travel Time (s)		11.2			16.3			8.4			55.3	
Confl. Peds. (#/hr)	4		7	7		4	1		2	2		1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	4%	5%	3%	14%	12%	11%	4%	6%	2%	5%	0%
Adj. Flow (vph)	29	33	43	160	34	41	40	865	157	41	934	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	29	76	0	160	75	0	40	1022	0	41	934	16
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		1	6	6
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		42.6	42.6		5.0	42.6	42.6
Minimum Split (s)	14.0	14.0		14.0	14.0		48.6	48.6		9.0	57.6	57.6
Total Split (s)	24.0	24.0		24.0	24.0		57.0	57.0		9.0	66.0	66.0
Total Split (%)	26.7%	26.7%		26.7%	26.7%		63.3%	63.3%		10.0%	73.3%	73.3%
Maximum Green (s)	18.0	18.0		18.0	18.0		51.0	51.0		5.0	60.0	60.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		3.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		1.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		2.0	4.0	4.0
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		Max	Max		None	Max	Max
Walk Time (s)	10.0	10.0		10.0	10.0		29.6	29.6			29.6	29.6
Flash Dont Walk (s)	16.0	16.0		16.0	16.0		13.0	13.0			13.0	13.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0			0	0
Act Effct Green (s)	17.0	17.0		17.0	17.0		57.0	57.0		64.3	62.3	62.3
Actuated g/C Ratio	0.19	0.19		0.19	0.19		0.65	0.65		0.74	0.71	0.71
v/c Ratio	0.12	0.24		0.68	0.26		0.13	0.53		0.11	0.38	0.02

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	29.7	17.4		47.7	18.2		9.2	10.2		4.3	5.8	0.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	29.7	17.4		47.7	18.2		9.2	10.2		4.3	5.8	0.6
LOS	C	B		D	B		A	B		A	A	A
Approach Delay		20.8			38.3			10.2			5.6	
Approach LOS		C			D			B			A	
Queue Length 50th (m)	4.2	4.8		26.2	5.0		2.9	52.1		1.8	31.2	0.0
Queue Length 95th (m)	11.7	16.4		47.8	16.7		8.2	72.9		4.6	43.1	0.8
Internal Link Dist (m)		131.7			202.8			115.9			897.3	
Turn Bay Length (m)							20.0			25.0		25.0
Base Capacity (vph)	278	360		277	336		319	1925		389	2453	1049
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.10	0.21		0.58	0.22		0.13	0.53		0.11	0.38	0.02

Intersection Summary		
Area Type:	Other	
Cycle Length: 90		
Actuated Cycle Length: 87.3		
Natural Cycle: 75		
Control Type: Semi Act-Uncoord		
Maximum v/c Ratio: 0.68		
Intersection Signal Delay: 11.5		Intersection LOS: B
Intersection Capacity Utilization 89.5%		ICU Level of Service E
Analysis Period (min) 15		

Splits and Phases: 2: Erbsville Road & Keats Way



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	461	465	709	224	539	170	751	765	203	127	831	433
Future Volume (vph)	461	465	709	224	539	170	751	765	203	127	831	433
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1775	1775	1750	1775	1775	1750
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	1.00	0.95	0.95	1.00
Frt		0.935			0.973				0.850			0.850
Flt Protected		0.986			0.988			0.976			0.993	
Satd. Flow (prot)	0	2715	0	0	2841	0	0	3092	1444	0	3228	1430
Flt Permitted		0.986			0.988			0.976			0.993	
Satd. Flow (perm)	0	2715	0	0	2841	0	0	3092	1444	0	3228	1430
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		147.8			470.9			152.2			97.5	
Travel Time (s)		8.9			28.3			9.1			5.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	2%	11%	4%	7%	6%	10%	3%	3%	2%	4%	4%
Adj. Flow (vph)	461	465	709	224	539	170	751	765	203	127	831	433
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1635	0	0	933	0	0	1516	203	0	958	433
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization	175.2%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized									MOYes			MOYes
Traffic Volume (veh/h)	461	465	709	224	539	170	751	765	203	127	831	433
Future Volume (veh/h)	461	465	709	224	539	170	751	765	203	127	831	433
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	461	465	709	224	539	170	751	765	203	127	831	433
Approach Volume (veh/h)		1635			933			1516			958	
Crossing Volume (veh/h)		1182			1977#			1053			1514#	
High Capacity (veh/h)		536			274			596			406	
High v/c (veh/h)		3.05			3.41			2.54			2.36	
Low Capacity (veh/h)		409			193			460			300	
Low v/c (veh/h)		4.00			4.83			3.30			3.19	

Intersection Summary					
Maximum v/c High		3.41			
Maximum v/c Low		4.83			
Intersection Capacity Utilization		175.2%	ICU Level of Service		H
# Crossing flow exceeds 1200, method is not applicable					

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1420	129	102	1516	99	0	0	143	0	0	43
Future Volume (vph)	0	1420	129	102	1516	99	0	0	143	0	0	43
Ideal Flow (vphpl)	1900	1650	1650	1900	1650	1650	1900	1650	1650	1650	1650	1900
Storage Length (m)	0.0		0.0	25.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	1		0	0		1	0		1
Taper Length (m)	0.0			60.0			0.0			0.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.988			0.991				0.865			0.865
Flt Protected				0.950								
Satd. Flow (prot)	0	2886	0	1752	2933	0	0	0	1334	0	0	1644
Flt Permitted				0.950								
Satd. Flow (perm)	0	2886	0	1752	2933	0	0	0	1334	0	0	1644
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		83.2			147.8			60.7			74.6	
Travel Time (s)		5.0			8.9			4.4			5.4	
Confl. Peds. (#/hr)			1	1								
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	7%	11%	3%	6%	5%	0%	0%	7%	0%	0%	0%
Adj. Flow (vph)	0	1420	129	102	1516	99	0	0	143	0	0	43
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1549	0	102	1615	0	0	0	143	0	0	43
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 66.8%		ICU Level of Service C	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1420	129	102	1516	99	0	0	143	0	0	43
Future Volume (Veh/h)	0	1420	129	102	1516	99	0	0	143	0	0	43
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	1420	129	102	1516	99	0	0	143	0	0	43
Pedestrians								1				
Lane Width (m)								3.6				
Walking Speed (m/s)								1.2				
Percent Blockage								0				
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		83										
pX, platoon unblocked				0.66			0.66	0.66	0.66	0.66	0.66	
vC, conflicting volume	1615			1550			2490	3304	776	2622	3320	808
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1615			806			2229	3461	0	2429	3483	808
tC, single (s)	4.1			4.2			7.5	6.5	7.0	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.4	3.5	4.0	3.3
p0 queue free %	100			81			100	100	80	100	100	87
cM capacity (veh/h)	409			534			12	4	705	8	4	328

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	947	602	102	1011	604	143	43
Volume Left	0	0	102	0	0	0	0
Volume Right	0	129	0	0	99	143	43
cSH	1700	1700	534	1700	1700	705	328
Volume to Capacity	0.56	0.35	0.19	0.59	0.36	0.20	0.13
Queue Length 95th (m)	0.0	0.0	5.6	0.0	0.0	6.0	3.6
Control Delay (s)	0.0	0.0	13.3	0.0	0.0	11.4	17.6
Lane LOS			B			B	C
Approach Delay (s)	0.0		0.8			11.4	17.6
Approach LOS						B	C

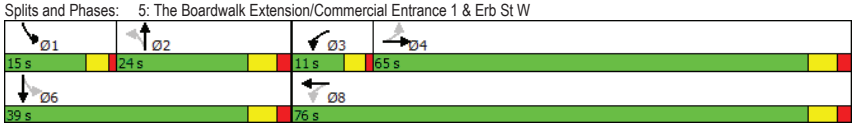
Intersection Summary				
Average Delay	1.1			
Intersection Capacity Utilization	66.8%	ICU Level of Service		C
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	114	1256	246	166	1345	51	59	21	151	148	27	126
Future Volume (vph)	114	1256	246	166	1345	51	59	21	151	148	27	126
Ideal Flow (vphpl)	1775	1900	1900	1900	1900	1750	1900	1900	1900	1775	1900	1750
Storage Length (m)	30.0		0.0	60.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	55.0			0.0			7.5			0.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00							
Frt		0.975			0.995			0.868			0.876	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1606	3341	0	1770	3378	0	1770	1617	0	1466	1645	0
Flt Permitted	0.164			0.076			0.660			0.276		
Satd. Flow (perm)	277	3341	0	142	3378	0	1229	1617	0	426	1645	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		30			6			151			61	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		435.4			83.2			74.0			96.6	
Travel Time (s)		26.1			5.0			5.3			7.0	
Confl. Peds. (#/hr)	3					3						
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	6%	2%	2%	6%	13%	2%	2%	2%	15%	2%	1%
Adj. Flow (vph)	114	1256	246	166	1345	51	59	21	151	148	27	126
Shared Lane Traffic (%)												
Lane Group Flow (vph)	114	1502	0	166	1396	0	59	172	0	148	153	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		3	8		2	2		1	6	
Switch Phase												
Minimum Initial (s)	50.0	50.0		5.0	50.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	65.0	65.0		9.5	65.0		24.0	24.0		9.5	24.0	
Total Split (s)	65.0	65.0		11.0	76.0		24.0	24.0		15.0	39.0	
Total Split (%)	56.5%	56.5%		9.6%	66.1%		20.9%	20.9%		13.0%	33.9%	
Maximum Green (s)	59.0	59.0		7.0	70.0		18.0	18.0		11.0	33.0	
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0		1.0	2.0		2.0	2.0		1.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		0.0	-2.0		-2.0	-2.0		0.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lag	Lag		Lead			Lag	Lag		Lead		
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		None	Max		None	None		None	None	
Walk Time (s)	50.0	50.0			50.0		7.0	7.0			7.0	
Flash Dont Walk (s)	10.0	10.0			10.0		11.0	11.0			15.0	
Pedestrian Calls (#/hr)	0	0			0		0	0			0	
Act Effct Green (s)	62.1	62.1		73.1	73.1		12.5	12.5		27.1	27.1	
Actuated g/C Ratio	0.57	0.57		0.68	0.68		0.12	0.12		0.25	0.25	
v/c Ratio	0.72	0.78		0.83	0.61		0.42	0.54		0.71	0.33	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	47.1	21.6		49.4	11.6		53.4	16.4		53.4	21.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	47.1	21.6		49.4	11.6		53.4	16.4		53.4	21.4	
LOS	D	C		D	B		D	B		D	C	
Approach Delay		23.4			15.6			25.9			37.1	
Approach LOS		C			B			C			D	
Queue Length 50th (m)	17.5	126.5		15.9	81.7		12.4	4.3		27.4	16.2	
Queue Length 95th (m)	#56.8	176.0		#58.4	118.4		25.9	24.6		#50.0	34.0	
Internal Link Dist (m)		411.4			59.2			50.0			72.6	
Turn Bay Length (m)	30.0			60.0								
Base Capacity (vph)	159	1929		201	2283		227	422		212	573	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.72	0.78		0.83	0.61		0.26	0.41		0.70	0.27	

Intersection Summary		
Area Type:	Other	
Cycle Length: 115		
Actuated Cycle Length: 108.2		
Natural Cycle: 110		
Control Type: Semi Act-Uncoord		
Maximum v/c Ratio: 0.83		
Intersection Signal Delay: 21.4		Intersection LOS: C
Intersection Capacity Utilization 124.2%		ICU Level of Service H
Analysis Period (min) 15		
# 95th percentile volume exceeds capacity, queue may be longer.		
Queue shown is maximum after two cycles.		

Splits and Phases: 5: The Boardwalk Extension/Commercial Entrance 1 & Erb St W



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	1023	1	9	816	784	5	3	5	662	1	43
Future Volume (vph)	24	1023	1	9	816	784	5	3	5	662	1	43
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1550	1550	1550	1550	1550	1750
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	0.95	0.95	1.00
Frt					0.927			0.948			0.982	
Flt Protected		0.999						0.981		0.950	0.958	
Satd. Flow (prot)	0	3012	0	0	2822	0	0	919	0	1399	1385	0
Flt Permitted		0.999						0.981		0.950	0.958	
Satd. Flow (perm)	0	3012	0	0	2822	0	0	919	0	1399	1385	0
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		149.9			435.4			54.9			87.3	
Travel Time (s)		9.0			26.1			4.0			6.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	4%	80%	77%	5%	0%	60%	0%	88%	0%	0%	0%
Adj. Flow (vph)	24	1023	1	9	816	784	5	3	5	662	1	43
Shared Lane Traffic (%)										46%		
Lane Group Flow (vph)	0	1048	0	0	1609	0	0	13	0	357	349	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization	100.2%	ICU Level of Service	G
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Traffic Volume (veh/h)	24	1023	1	9	816	784	5	3	5	662	1	43
Future Volume (veh/h)	24	1023	1	9	816	784	5	3	5	662	1	43
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	24	1023	1	9	816	784	5	3	5	662	1	43
Approach Volume (veh/h)		1048			1609			13			706	
Crossing Volume (veh/h)		672			32			1709#			830	
High Capacity (veh/h)		813			1351			344			715	
High v/c (veh/h)		1.29			1.19			0.04			0.99	
Low Capacity (veh/h)		648			1130			250			563	
Low v/c (veh/h)		1.62			1.42			0.05			1.25	

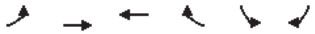
Intersection Summary					
Maximum v/c High		1.29			
Maximum v/c Low		1.62			
Intersection Capacity Utilization		100.2%	ICU Level of Service		G
# Crossing flow exceeds 1200, method is not applicable					

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	135	207	15	106	230	530	13	11	69	740	2	146
Future Volume (vph)	135	207	15	106	230	530	13	11	69	740	2	146
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1550	1550	1550	1550	1550	1750
Storage Length (m)	30.0		30.0	0.0		0.0	0.0		0.0	50.0		0.0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (m)	85.0			0.0			0.0			75.0		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.994			0.908			0.900			0.950	
Flt Protected		0.981			0.994			0.993		0.950	0.968	
Satd. Flow (prot)	0	2961	0	0	2773	0	0	1238	0	777	886	0
Flt Permitted		0.981			0.994			0.993		0.950	0.968	
Satd. Flow (perm)	0	2961	0	0	2773	0	0	1238	0	777	886	0
Link Speed (k/h)		70			60			50			50	
Link Distance (m)		346.1			149.9			61.3			415.1	
Travel Time (s)		17.8			9.0			4.4			29.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	3%	0%	8%	4%	0%	0%	0%	16%	80%	0%	0%
Adj. Flow (vph)	135	207	15	106	230	530	13	11	69	740	2	146
Shared Lane Traffic (%)										39%		
Lane Group Flow (vph)	0	357	0	0	866	0	0	93	0	451	437	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization	89.5%	ICU Level of Service	E
Analysis Period (min)	15		

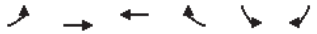
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Traffic Volume (veh/h)	135	207	15	106	230	530	13	11	69	740	2	146
Future Volume (veh/h)	135	207	15	106	230	530	13	11	69	740	2	146
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	135	207	15	106	230	530	13	11	69	740	2	146
Approach Volume (veh/h)		357			866			93			888	
Crossing Volume (veh/h)		848			159			1082			349	
High Capacity (veh/h)		705			1223			582			1053	
High v/c (veh/h)		0.51			0.71			0.16			0.84	
Low Capacity (veh/h)		554			1014			448			861	
Low v/c (veh/h)		0.64			0.85			0.21			1.03	

Intersection Summary					
Maximum v/c High		0.84			
Maximum v/c Low		1.03			
Intersection Capacity Utilization		89.5%	ICU Level of Service		E



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	8	340	299	68	50	10
Future Volume (vph)	8	340	299	68	50	10
Ideal Flow (vphpl)	1650	1650	1650	1650	1765	1765
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.975		0.977	
Flt Protected		0.999			0.960	
Satd. Flow (prot)	0	1612	1558	0	1631	0
Flt Permitted		0.999			0.960	
Satd. Flow (perm)	0	1612	1558	0	1631	0
Link Speed (k/h)		70	70		60	
Link Distance (m)		189.3	346.1		103.7	
Travel Time (s)		9.7	17.8		6.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	14%	2%	4%	0%	0%	9%
Adj. Flow (vph)	8	340	299	68	50	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	348	367	0	60	0
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 38.3%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	8	340	299	68	50	10
Future Volume (Veh/h)	8	340	299	68	50	10
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	8	340	299	68	50	10
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	367				689	333
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	367				689	333
tC, single (s)	4.2				6.4	6.3
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.4
p0 queue free %	99				88	99
cM capacity (veh/h)	1128				412	693

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	348	367	60
Volume Left	8	0	50
Volume Right	0	68	10
cSH	1128	1700	442
Volume to Capacity	0.01	0.22	0.14
Queue Length 95th (m)	0.2	0.0	3.7
Control Delay (s)	0.3	0.0	14.4
Lane LOS	A		B
Approach Delay (s)	0.3	0.0	14.4
Approach LOS			B

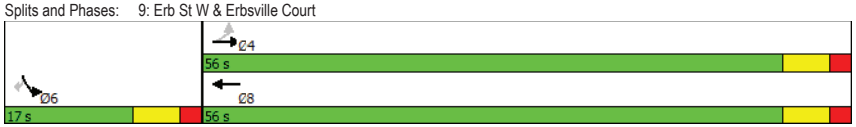
Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	38.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	28	774	872	21	26	29
Future Volume (vph)	28	774	872	21	26	29
Ideal Flow (vphpl)	1775	1900	1750	1750	1775	1750
Storage Length (m)	25.0			0.0	50.0	0.0
Storage Lanes	1			0	1	1
Taper Length (m)	75.0				55.0	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Ped Bike Factor	1.00		1.00		1.00	0.98
Frt			0.996			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1686	3505	3067	0	1637	1473
Flt Permitted	0.312				0.950	
Satd. Flow (perm)	554	3505	3067	0	1634	1446
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			8			29
Link Speed (k/h)		60	60		50	
Link Distance (m)		470.9	231.7		128.8	
Travel Time (s)		28.3	13.9		9.3	
Confl. Peds. (#/hr)	2			2	2	6
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	3%	8%	4%	3%	1%
Adj. Flow (vph)	28	774	872	21	26	29
Shared Lane Traffic (%)						
Lane Group Flow (vph)	28	774	893	0	26	29
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4					6
Detector Phase	4	4	8		6	6
Switch Phase						
Minimum Initial (s)	40.0	40.0	40.0		8.0	8.0
Minimum Split (s)	47.0	47.0	47.0		14.0	14.0
Total Split (s)	56.0	56.0	56.0		17.0	17.0
Total Split (%)	76.7%	76.7%	76.7%		23.3%	23.3%
Maximum Green (s)	50.0	50.0	50.0		11.0	11.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0		-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0		4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	Max	Max	Max		None	None
Walk Time (s)	26.0	26.0	26.0		7.0	7.0
Flash Dont Walk (s)	14.0	14.0	14.0		15.0	15.0
Pedestrian Calls (#/hr)	0	0	0		0	0
Act Effct Green (s)	62.3	62.3	62.3		10.1	10.1
Actuated g/C Ratio	0.85	0.85	0.85		0.14	0.14
v/c Ratio	0.06	0.26	0.34		0.12	0.13

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Control Delay	2.7	2.3	2.7		28.7	12.2
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	2.7	2.3	2.7		28.7	12.2
LOS	A	A	A		C	B
Approach Delay		2.3	2.7		20.0	
Approach LOS		A	A		B	
Queue Length 50th (m)	0.8	14.0	17.5		3.9	0.0
Queue Length 95th (m)	2.6	20.1	25.4		9.7	6.7
Internal Link Dist (m)		446.9	207.7		104.8	
Turn Bay Length (m)	25.0				50.0	
Base Capacity (vph)	472	2989	2617		292	282
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.06	0.26	0.34		0.09	0.10

Intersection Summary			
Area Type:	Other		
Cycle Length: 73			
Actuated Cycle Length: 73.1			
Natural Cycle: 65			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.34			
Intersection Signal Delay: 3.1		Intersection LOS: A	
Intersection Capacity Utilization 48.8%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 9: Erb St W & Erbsville Court



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	109	0	0	4	0	1357	12	0	1325	107
Future Volume (vph)	0	0	109	0	0	4	0	1357	12	0	1325	107
Ideal Flow (vphpl)	0	0	1750	0	0	1750	0	1775	1775	0	1775	1775
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor												
Frt			0.865			0.865		0.999			0.989	
Flt Protected												
Satd. Flow (prot)	0	0	1514	0	0	1009	0	3205	0	0	3160	0
Flt Permitted												
Satd. Flow (perm)	0	0	1514	0	0	1009	0	3205	0	0	3160	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		40.5			37.7			83.9			220.2	
Travel Time (s)		2.9			2.7			5.0			13.2	
Confl. Peds. (#/hr)									2	2		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	50%	0%	5%	17%	0%	6%	0%
Adj. Flow (vph)	0	0	109	0	0	4	0	1357	12	0	1325	107
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	109	0	0	4	0	1369	0	0	1432	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 56.8%		ICU Level of Service B	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	109	0	0	4	0	1357	12	0	1325	107
Future Volume (Veh/h)	0	0	109	0	0	4	0	1357	12	0	1325	107
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	0	109	0	0	4	0	1357	12	0	1325	107
Pedestrians					2							
Lane Width (m)					3.6							
Walking Speed (m/s)					1.2							
Percent Blockage					0							
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	2061	2750	716	2136	2797	686	1432			1371		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2061	2750	716	2136	2797	686	1432			1371		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	7.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.8	2.2			2.2		
p0 queue free %	100	100	71	100	100	99	100			100		
cM capacity (veh/h)	32	20	377	20	19	295	481			506		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	109	4	905	464	883	549
Volume Left	0	0	0	0	0	0
Volume Right	109	4	0	12	0	107
cSH	377	295	1700	1700	1700	1700
Volume to Capacity	0.29	0.01	0.53	0.27	0.52	0.32
Queue Length 95th (m)	9.4	0.3	0.0	0.0	0.0	0.0
Control Delay (s)	18.4	17.4	0.0	0.0	0.0	0.0
Lane LOS	C	C				
Approach Delay (s)	18.4	17.4	0.0		0.0	
Approach LOS	C	C				

Intersection Summary					
Average Delay		0.7			
Intersection Capacity Utilization	56.8%	ICU Level of Service		B	
Analysis Period (min)	15				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	394	53	129	49	54	62	279	1254	58	55	1574	259
Future Volume (vph)	394	53	129	49	54	62	279	1254	58	55	1574	259
Ideal Flow (vphpl)	1775	1650	1650	1550	1550	1550	1650	1650	1650	1650	1650	1650
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.894			0.949			0.995			0.979	
Flt Protected	0.950				0.985			0.991			0.999	
Satd. Flow (prot)	1492	1475	0	0	1439	0	0	2995	0	0	2896	0
Flt Permitted	0.950				0.985			0.991			0.999	
Satd. Flow (perm)	1492	1475	0	0	1439	0	0	2995	0	0	2896	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		115.1			101.1			188.2			237.1	
Travel Time (s)		8.3			7.3			11.3			14.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	13%	0%	0%	1%	0%	1%	0%	4%	2%	11%	6%	4%
Adj. Flow (vph)	394	53	129	49	54	62	279	1254	58	55	1574	259
Shared Lane Traffic (%)												
Lane Group Flow (vph)	394	182	0	0	165	0	0	1591	0	0	1888	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization	161.0%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Traffic Volume (veh/h)	394	53	129	49	54	62	279	1254	58	55	1574	259
Future Volume (veh/h)	394	53	129	49	54	62	279	1254	58	55	1574	259
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	394	53	129	49	54	62	279	1254	58	55	1574	259
Approach Volume (veh/h)		576			165			1591			1888	
Crossing Volume (veh/h)		1678#			1927#			502			382	
High Capacity (veh/h)		353			286			932			1025	
High v/c (veh/h)		1.63			0.58			1.71			1.84	
Low Capacity (veh/h)		257			203			753			836	
Low v/c (veh/h)		2.24			0.81			2.11			2.26	

Intersection Summary			
Maximum v/c High	1.84		
Maximum v/c Low	2.26		
Intersection Capacity Utilization	161.0%	ICU Level of Service	H
# Crossing flow exceeds 1200, method is not applicable			



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	39	1	1490	1725	56
Future Volume (vph)	0	39	1	1490	1725	56
Ideal Flow (vphpl)	0	1750	0	1900	1750	1750
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Frt		0.865			0.995	
Flt Protected						
Satd. Flow (prot)	0	1514	0	3471	3140	0
Flt Permitted						
Satd. Flow (perm)	0	1514	0	3471	3140	0
Link Speed (k/h)	50			60	60	
Link Distance (m)	55.4			149.5	188.2	
Travel Time (s)	4.0			9.0	11.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	4%	5%	17%
Adj. Flow (vph)	0	39	1	1490	1725	56
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	39	0	1491	1781	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	63.7%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	39	1	1490	1725	56
Future Volume (Veh/h)	0	39	1	1490	1725	56
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	39	1	1490	1725	56
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	2500	890	1781			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2500	890	1781			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	87	100			
cM capacity (veh/h)	24	290	353			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	39	498	993	1150	631
Volume Left	0	1	0	0	0
Volume Right	39	0	0	0	56
cSH	290	353	1700	1700	1700
Volume to Capacity	0.13	0.00	0.58	0.68	0.37
Queue Length 95th (m)	3.7	0.1	0.0	0.0	0.0
Control Delay (s)	19.4	0.1	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	19.4	0.0		0.0	
Approach LOS	C				

Intersection Summary				
Average Delay		0.2		
Intersection Capacity Utilization		63.7%	ICU Level of Service	B
Analysis Period (min)		15		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	45	85	87	1529	1597	129
Future Volume (vph)	45	85	87	1529	1597	129
Ideal Flow (vphpl)	1775	1750	1775	1900	1750	1750
Storage Length (m)	0.0	0.0	85.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	0.0		100.0			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Frt		0.850			0.989	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1686	1444	1670	3471	3132	0
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	1686	1444	1670	3471	3132	0
Link Speed (k/h)	50			60	60	
Link Distance (m)	62.4			166.4	149.5	
Travel Time (s)	4.5			10.0	9.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	3%	1%	4%	5%	5%
Adj. Flow (vph)	45	85	87	1529	1597	129
Shared Lane Traffic (%)						
Lane Group Flow (vph)	45	85	87	1529	1726	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	70.9%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	45	85	87	1529	1597	129
Future Volume (Veh/h)	45	85	87	1529	1597	129
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	45	85	87	1529	1597	129
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	2600	863	1726			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2600	863	1726			
tC, single (s)	6.8	7.0	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	71	76			
cM capacity (veh/h)	16	296	366			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	45	85	87	764	764	1065	661
Volume Left	45	0	87	0	0	0	0
Volume Right	0	85	0	0	0	0	129
cSH	16	296	366	1700	1700	1700	1700
Volume to Capacity	2.84	0.29	0.24	0.45	0.45	0.63	0.39
Queue Length 95th (m)	50.5	9.3	7.3	0.0	0.0	0.0	0.0
Control Delay (s)	1323.3	22.0	17.9	0.0	0.0	0.0	0.0
Lane LOS	F	C	C				
Approach Delay (s)	472.4		1.0			0.0	
Approach LOS	F						

Intersection Summary				
Average Delay	18.1			
Intersection Capacity Utilization	70.9%	ICU Level of Service		C
Analysis Period (min)	15			



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	57	0	1625	1623	39
Future Volume (vph)	0	57	0	1625	1623	39
Ideal Flow (vphpl)	0	1750	0	1900	1750	1750
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Ped Bike Factor						
Frt		0.865			0.996	
Flt Protected						
Satd. Flow (prot)	0	1514	0	3471	3152	0
Flt Permitted						
Satd. Flow (perm)	0	1514	0	3471	3152	0
Link Speed (k/h)	50			60	60	
Link Distance (m)	67.0			178.5	166.4	
Travel Time (s)	4.8			10.7	10.0	
Confl. Peds. (#/hr)			2			2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	4%	5%	8%
Adj. Flow (vph)	0	57	0	1625	1623	39
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	57	0	1625	1662	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	60.6%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	57	0	1625	1623	39
Future Volume (Veh/h)	0	57	0	1625	1623	39
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	57	0	1625	1623	39
Pedestrians	2					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	2457	833	1664			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2457	833	1664			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	82	100			
cM capacity (veh/h)	26	315	391			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	57	812	812	1082	580
Volume Left	0	0	0	0	0
Volume Right	57	0	0	0	39
cSH	315	1700	1700	1700	1700
Volume to Capacity	0.18	0.48	0.48	0.64	0.34
Queue Length 95th (m)	5.2	0.0	0.0	0.0	0.0
Control Delay (s)	18.9	0.0	0.0	0.0	0.0
Lane LOS	C				
Approach Delay (s)	18.9	0.0		0.0	
Approach LOS	C				

Intersection Summary					
Average Delay		0.3			
Intersection Capacity Utilization		60.6%	ICU Level of Service		B
Analysis Period (min)		15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	105	136	188	187	238	247	289	1284	390	226	1302	132
Future Volume (vph)	105	136	188	187	238	247	289	1284	390	226	1302	132
Ideal Flow (vphpl)	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.934			0.945			0.970			0.988	
Flt Protected		0.988			0.986			0.993			0.993	
Satd. Flow (prot)	0	2246	0	0	2751	0	0	2870	0	0	2965	0
Flt Permitted		0.988			0.986			0.993			0.993	
Satd. Flow (perm)	0	2246	0	0	2751	0	0	2870	0	0	2965	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		112.4			150.8			180.3			178.5	
Travel Time (s)		8.1			10.9			10.8			10.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	47%	9%	33%	4%	7%	7%	15%	4%	2%	2%	4%	4%
Adj. Flow (vph)	105	136	188	187	238	247	289	1284	390	226	1302	132
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	429	0	0	672	0	0	1963	0	0	1660	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary			
Area Type:	Other		
Control Type: Roundabout			
Intersection Capacity Utilization	169.8%	ICU Level of Service	H
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Traffic Volume (veh/h)	105	136	188	187	238	247	289	1284	390	226	1302	132
Future Volume (veh/h)	105	136	188	187	238	247	289	1284	390	226	1302	132
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	105	136	188	187	238	247	289	1284	390	226	1302	132
Approach Volume (veh/h)		429			672			1963			1660	
Crossing Volume (veh/h)		1715#			1678#			467			714	
High Capacity (veh/h)		342			353			958			786	
High v/c (veh/h)		1.25			1.90			2.05			2.11	
Low Capacity (veh/h)		248			257			777			624	
Low v/c (veh/h)		1.73			2.61			2.53			2.66	

Intersection Summary					
Maximum v/c High		2.11			
Maximum v/c Low		2.66			
Intersection Capacity Utilization		169.8%	ICU Level of Service		H
# Crossing flow exceeds 1200, method is not applicable					

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	200	46	107	132	0	28	0	77	0	0	0
Future Volume (vph)	0	200	46	107	132	0	28	0	77	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.975						0.901				
Flt Protected					0.978			0.987				
Satd. Flow (prot)	0	1816	0	0	1822	0	0	1657	0	0	1863	0
Flt Permitted					0.978			0.987				
Satd. Flow (perm)	0	1816	0	0	1822	0	0	1657	0	0	1863	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		90.1			88.4			466.6			89.2	
Travel Time (s)		6.5			6.4			33.6			6.4	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	200	46	107	132	0	28	0	77	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	246	0	0	239	0	0	105	0	0	0	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	42.5%	ICU Level of Service A	
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	200	46	107	132	0	28	0	77	0	0	0
Future Volume (Veh/h)	0	200	46	107	132	0	28	0	77	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	200	46	107	132	0	28	0	77	0	0	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	132			246			569	569	223	646	592	132
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	132			246			569	569	223	646	592	132
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			92			93	100	91	100	100	100
cM capacity (veh/h)	1453			1320			406	397	817	327	385	917

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	246	239	105	0
Volume Left	0	107	28	0
Volume Right	46	0	77	0
cSH	1453	1320	643	1700
Volume to Capacity	0.00	0.08	0.16	0.00
Queue Length 95th (m)	0.0	2.1	4.6	0.0
Control Delay (s)	0.0	4.0	11.7	0.0
Lane LOS		A	B	A
Approach Delay (s)	0.0	4.0	11.7	0.0
Approach LOS			B	A

Intersection Summary				
Average Delay	3.7			
Intersection Capacity Utilization	42.5%	ICU Level of Service	A	
Analysis Period (min)	15			

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Columbia Street West & Platinum Drive.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Option A Extension
Report generation date: 2019-07-31 10:14:35 PM

Summary of intersection performance

	AM					
	Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	A1 - Total 2031					
Leg North	0.00	0.00	0.00	A	6.96	A
Leg West	1.74	8.86	0.64	A		
Leg South	0.02	3.48	0.02	A		
Leg East	0.81	4.83	0.45	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D3 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D4 - Total 2031, AM " model duration: 8:00 AM - 9:30 AM
"D5 - Total 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Total 2031, Sat" model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 10:14:35 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-24
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

(Default Analysis Set) - Total 2031, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, AM	Total 2031	AM		ONE HOUR	08:00	09:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,South,East				6.96	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	(untitled)	
West	West	(untitled)	
South	South	(untitled)	
East	East	(untitled)	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	3.50	4.50	30.00	20.00	40.00	25.00	
West	3.50	4.50	30.00	20.00	40.00	25.00	
South	3.50	4.50	30.00	20.00	40.00	25.00	

East	3.50	4.50	30.00	20.00	40.00	25.00	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.579	1357.445
West		(calculated)	(calculated)	0.579	1357.445
South		(calculated)	(calculated)	0.579	1357.445
East		(calculated)	(calculated)	0.579	1357.445

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	0.00	100.000
West	ONE HOUR	✓	651.00	100.000
South	ONE HOUR	✓	17.00	100.000
East	ONE HOUR	✓	553.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	0.000	0.000	0.000
	West	0.000	0.000	174.000	477.000
	South	0.000	5.000	0.000	12.000
	East	0.000	185.000	368.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.25	0.25	0.25	0.25
	West	0.00	0.00	0.27	0.73
	South	0.00	0.29	0.00	0.71
	East	0.00	0.33	0.67	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.000	1.000	1.000
	West	1.000	1.000	1.000	1.000
	South	1.000	1.000	1.000	1.000
	East	1.000	1.000	1.000	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	0.0	0.0	0.0
	West	0.0	0.0	0.0	0.0
	South	0.0	0.0	0.0	0.0
	East	0.0	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.00	0.00	0.00	~1	A	0.00	0.00	0.00	0.00	0.00	0.00	0.00
West	0.64	8.86	1.74	2.00	A	597.37	896.05	101.54	6.80	1.13	101.56	6.80
South	0.02	3.48	0.02	~1	A	15.60	23.40	1.29	3.32	0.01	1.29	3.32
East	0.45	4.83	0.81	1.00	A	507.44	761.16	54.70	4.31	0.61	54.70	4.31

Main Results for each time segment

Main results: (08:00-08:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	0.00	0.00	0.00	0.00	418.32	0.00	1115.34	553.10	0.000	0.00	0.00	0.000	A
West	490.11	122.53	487.36	142.44	275.88	0.00	1197.78	684.84	0.409	0.00	0.69	5.048	A
South	12.80	3.20	12.75	406.14	357.10	0.00	1150.77	906.97	0.011	0.00	0.01	3.162	A
East	416.33	104.08	414.56	366.10	3.75	0.00	1355.27	1123.03	0.307	0.00	0.44	3.821	A

Main results: (08:15-08:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	0.00	0.00	0.00	0.00	501.09	0.00	1067.44	553.10	0.000	0.00	0.00	0.000	A
West	585.24	146.31	584.00	170.62	330.47	0.00	1166.18	684.84	0.502	0.69	0.99	6.171	A
South	15.28	3.82	15.27	486.56	427.91	0.00	1109.79	906.97	0.014	0.01	0.01	3.288	A
East	497.14	124.28	496.60	438.69	4.49	0.00	1354.85	1123.03	0.367	0.44	0.58	4.191	A

Main results: (08:30-08:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	0.00	0.00	0.00	0.00	613.43	0.00	1002.42	553.10	0.000	0.00	0.00	0.000	A
West	716.76	179.19	713.87	208.88	404.55	0.00	1123.31	684.84	0.638	0.99	1.72	8.730	A
South	18.72	4.68	18.70	595.36	523.06	0.00	1054.72	906.97	0.018	0.01	0.02	3.474	A
East	608.86	152.22	607.93	536.26	5.50	0.00	1354.26	1123.03	0.450	0.58	0.81	4.817	A

Main results: (08:45-09:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	0.00	0.00	0.00	0.00	614.35	0.00	1001.88	553.10	0.000	0.00	0.00	0.000	A
West	716.76	179.19	716.67	209.19	405.17	0.00	1122.95	684.84	0.638	1.72	1.74	8.855	A
South	18.72	4.68	18.72	596.72	525.12	0.00	1053.53	906.97	0.018	0.02	0.02	3.478	A
East	608.86	152.22	608.85	538.33	5.51	0.00	1354.26	1123.03	0.450	0.81	0.81	4.829	A

Main results: (09:00-09:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	0.00	0.00	0.00	0.00	502.55	0.00	1066.59	553.10	0.000	0.00	0.00	0.000	A
West	585.24	146.31	588.11	171.12	331.43	0.00	1165.62	684.84	0.502	1.74	1.02	6.266	A
South	15.28	3.82	15.30	488.63	430.92	0.00	1108.05	906.97	0.014	0.02	0.01	3.293	A
East	497.14	124.28	498.05	441.72	4.50	0.00	1354.84	1123.03	0.367	0.81	0.58	4.207	A

Main results: (09:15-09:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	0.00	0.00	0.00	0.00	420.65	0.00	1113.99	553.10	0.000	0.00	0.00	0.000	A
West	490.11	122.53	491.40	143.23	277.42	0.00	1196.89	684.84	0.409	1.02	0.70	5.111	A
South	12.80	3.20	12.81	408.76	360.05	0.00	1149.06	906.97	0.011	0.01	0.01	3.167	A
East	416.33	104.08	416.88	369.10	3.77	0.00	1355.26	1123.03	0.307	0.58	0.45	3.840	A

Queueing Delay Results for each time segment

Queueing Delay results: (08:00-08:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.00	0.00	0.000	A	A
West	9.95	0.66	5.048	A	A
South	0.17	0.01	3.162	A	A
East	6.45	0.43	3.821	A	A

Queueing Delay results: (08:15-08:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.00	0.00	0.000	A	A
West	14.45	0.96	6.171	A	A
South	0.21	0.01	3.288	A	A
East	8.47	0.56	4.191	A	A

Queueing Delay results: (08:30-08:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.00	0.00	0.000	A	A
West	24.45	1.63	8.730	A	A
South	0.27	0.02	3.474	A	A
East	11.84	0.79	4.817	A	A

Queueing Delay results: (08:45-09:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.00	0.00	0.000	A	A
West	25.98	1.73	8.855	A	A
South	0.27	0.02	3.478	A	A
East	12.17	0.81	4.829	A	A

Queueing Delay results: (09:00-09:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service

North	0.00	0.00	0.000	A	A
West	15.93	1.06	6.266	A	A
South	0.21	0.01	3.293	A	A
East	8.95	0.60	4.207	A	A

Queueing Delay results: (09:15-09:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.00	0.00	0.000	A	A
West	10.79	0.72	5.111	A	A
South	0.17	0.01	3.167	A	A
East	6.81	0.45	3.840	A	A

Queue Variation Results for each time segment

Queue Variation results: (08:00-08:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.00	~1	~1	~1	~1			N/A	N/A
West	0.69	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.01	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.44	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:15-08:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.00	~1	~1	~1	~1			N/A	N/A
West	0.99	0.00	0.00	1.00	2.00			N/A	N/A
South	0.01	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.58	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:30-08:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.00	~1	~1	~1	~1			N/A	N/A
West	1.72	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.02	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.81	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:45-09:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.00	~1	~1	~1	~1			N/A	N/A
West	1.74	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.02	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.81	0.00	0.00	0.00	1.00			N/A	N/A

Queue Variation results: (09:00-09:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.00	~1	~1	~1	~1			N/A	N/A
West	1.02	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.01	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.58	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:15-09:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.00	~1	~1	~1	~1			N/A	N/A
West	0.70	0.00	0.00	1.00	1.00			N/A	N/A
South	0.01	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.45	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Columbia Street West & Platinum Drive.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Option A Extension
Report generation date: 2019-07-31 10:15:13 PM

Summary of intersection performance

	PM					
	Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	A1 - Total 2031					
Leg North	0.00	0.00	0.00	A	5.37	A
Leg West	0.41	3.87	0.29	A		
Leg South	1.20	6.95	0.55	A		
Leg East	0.56	4.47	0.36	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D3 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D4 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Total 2031, PM " model duration: 4:00 PM - 5:30 PM
"D6 - Total 2031, Sat" model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 10:15:12 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-24
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

(Default Analysis Set) - Total 2031, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, PM	Total 2031	PM		ONE HOUR	16:00	17:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,South,East				5.37	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	(untitled)	
West	West	(untitled)	
South	South	(untitled)	
East	East	(untitled)	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	3.50	4.50	30.00	20.00	40.00	25.00	
West	3.50	4.50	30.00	20.00	40.00	25.00	
South	3.50	4.50	30.00	20.00	40.00	25.00	
East	3.50	4.50	30.00	20.00	40.00	25.00	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.579	1357.445
West		(calculated)	(calculated)	0.579	1357.445
South		(calculated)	(calculated)	0.579	1357.445
East		(calculated)	(calculated)	0.579	1357.445

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	0.00	100.000
West	ONE HOUR	✓	350.00	100.000
South	ONE HOUR	✓	570.00	100.000
East	ONE HOUR	✓	414.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	**West**	**South**	**East**
From	**North**	0.000	0.000	0.000	0.000
	West	0.000	0.000	17.000	333.000
	South	0.000	151.000	0.000	419.000
	East	0.000	349.000	65.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	**West**	**South**	**East**
From	**North**	0.25	0.25	0.25	0.25
	West	0.00	0.00	0.05	0.95
	South	0.00	0.26	0.00	0.74
	East	0.00	0.84	0.16	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.000	1.000	1.000
	West	1.000	1.000	1.000	1.000
	South	1.000	1.000	1.000	1.000
	East	1.000	1.000	1.000	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	0.0	0.0	0.0
	West	0.0	0.0	0.0	0.0
	South	0.0	0.0	0.0	0.0
	East	0.0	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.00	0.00	0.00	~1	A	0.00	0.00	0.00	0.00	0.00	0.00	0.00
West	0.29	3.87	0.41	~1	A	321.17	481.75	29.02	3.61	0.32	29.02	3.61
South	0.55	6.95	1.20	?	A	523.04	784.56	74.53	5.70	0.83	74.54	5.70
East	0.36	4.47	0.56	1.00	A	379.89	569.84	38.54	4.06	0.43	38.54	4.06

Main Results for each time segment

Main results: (16:00-16:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	0.00	0.00	0.00	0.00	423.52	0.00	1112.33	578.99	0.000	0.00	0.00	0.000	A
West	263.50	65.87	262.51	374.78	48.74	0.00	1329.24	999.30	0.198	0.00	0.25	3.371	A
South	429.13	107.28	426.95	61.49	249.76	0.00	1212.89	639.63	0.354	0.00	0.54	4.566	A
East	311.68	77.92	310.42	563.61	113.11	0.00	1291.98	1175.60	0.241	0.00	0.32	3.662	A

Main results: (16:15-16:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	0.00	0.00	0.00	0.00	507.33	0.00	1063.82	578.99	0.000	0.00	0.00	0.000	A
West	314.64	78.66	314.39	448.96	58.38	0.00	1323.66	999.30	0.238	0.25	0.31	3.566	A
South	512.42	128.10	511.57	73.65	299.12	0.00	1184.33	639.63	0.433	0.54	0.75	5.344	A
East	372.18	93.04	371.81	675.17	135.52	0.00	1279.01	1175.60	0.291	0.32	0.41	3.966	A

Main results: (16:30-16:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	0.00	0.00	0.00	0.00	621.00	0.00	998.04	578.99	0.000	0.00	0.00	0.000	A
West	385.36	96.34	384.95	549.53	71.47	0.00	1316.08	999.30	0.293	0.31	0.41	3.864	A
South	627.58	156.90	625.83	90.17	366.25	0.00	1145.47	639.63	0.548	0.75	1.19	6.904	A
East	455.82	113.96	455.21	826.30	165.79	0.00	1261.49	1175.60	0.361	0.41	0.56	4.462	A

Main results: (16:45-17:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	0.00	0.00	0.00	0.00	622.06	0.00	997.42	578.99	0.000	0.00	0.00	0.000	A
West	385.36	96.34	385.35	550.49	71.56	0.00	1316.03	999.30	0.293	0.41	0.41	3.867	A
South	627.58	156.90	627.54	90.28	366.64	0.00	1145.25	639.63	0.548	1.19	1.20	6.953	A
East	455.82	113.96	455.81	827.93	166.24	0.00	1261.23	1175.60	0.361	0.56	0.56	4.469	A

Main results: (17:00-17:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	0.00	0.00	0.00	0.00	508.98	0.00	1062.87	578.99	0.000	0.00	0.00	0.000	A
West	314.64	78.66	315.04	450.45	58.53	0.00	1323.57	999.30	0.238	0.41	0.31	3.572	A
South	512.42	128.10	514.14	73.83	299.74	0.00	1183.97	639.63	0.433	1.20	0.77	5.389	A
East	372.18	93.04	372.78	677.68	136.20	0.00	1278.62	1175.60	0.291	0.56	0.41	3.976	A

Main results: (17:15-17:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	0.00	0.00	0.00	0.00	425.97	0.00	1110.91	578.99	0.000	0.00	0.00	0.000	A
West	263.50	65.87	263.76	376.97	48.99	0.00	1329.09	999.30	0.198	0.31	0.25	3.381	A
South	429.13	107.28	430.00	61.81	250.95	0.00	1212.21	639.63	0.354	0.77	0.55	4.608	A
East	311.68	77.92	312.05	567.04	113.91	0.00	1291.52	1175.60	0.241	0.41	0.32	3.678	A

Queueing Delay Results for each time segment

Queueing Delay results: (16:00-16:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.00	0.00	0.000	A	A
West	3.62	0.24	3.371	A	A
South	7.91	0.53	4.566	A	A
East	4.64	0.31	3.662	A	A

Queueing Delay results: (16:15-16:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.00	0.00	0.000	A	A
West	4.59	0.31	3.566	A	A
South	11.04	0.74	5.344	A	A
East	6.02	0.40	3.966	A	A

Queueing Delay results: (16:30-16:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.00	0.00	0.000	A	A
West	6.07	0.40	3.864	A	A
South	17.21	1.15	6.904	A	A
East	8.25	0.55	4.462	A	A

Queueing Delay results: (16:45-17:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.00	0.00	0.000	A	A
West	6.19	0.41	3.867	A	A
South	17.97	1.20	6.953	A	A
East	8.44	0.56	4.469	A	A

Queueing Delay results: (17:00-17:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service

North	0.00	0.00	0.000	A	A
West	4.78	0.32	3.572	A	A
South	11.92	0.79	5.389	A	A
East	6.32	0.42	3.976	A	A

Queueing Delay results: (17:15-17:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.00	0.00	0.000	A	A
West	3.78	0.25	3.381	A	A
South	8.48	0.57	4.608	A	A
East	4.87	0.32	3.678	A	A

Queue Variation Results for each time segment

Queue Variation results: (16:00-16:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.00	~1	~1	~1	~1			N/A	N/A
West	0.25	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.54	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.32	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:15-16:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.00	~1	~1	~1	~1			N/A	N/A
West	0.31	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.75	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.41	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:30-16:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.00	~1	~1	~1	~1			N/A	N/A
West	0.41	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.19	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.56	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:45-17:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.00	~1	~1	~1	~1			N/A	N/A
West	0.41	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.20	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.56	0.00	0.00	0.00	1.00			N/A	N/A

Queue Variation results: (17:00-17:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.00	~1	~1	~1	~1			N/A	N/A
West	0.31	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.77	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.41	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:15-17:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.00	~1	~1	~1	~1			N/A	N/A
West	0.25	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.55	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.32	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Columbia Street West & Platinum Drive.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Option A Extension
Report generation date: 2019-07-31 10:15:36 PM

Summary of intersection performance

	Sat					
	Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	A1 - Total 2031					
Leg North	0.00	0.00	0.00	A	3.40	A
Leg West	0.27	3.53	0.21	A		
Leg South	0.10	3.23	0.09	A		
Leg East	0.24	3.34	0.20	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D3 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D4 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Total 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Total 2031, Sat " model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 10:15:35 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-24
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

(Default Analysis Set) - Total 2031, Sat

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
(Default Analysis Set)	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, Sat	Total 2031	Sat		ONE HOUR	12:00	13:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,South,East				3.40	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	(untitled)	
West	West	(untitled)	
South	South	(untitled)	
East	East	(untitled)	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	3.50	4.50	30.00	20.00	40.00	25.00	
West	3.50	4.50	30.00	20.00	40.00	25.00	
South	3.50	4.50	30.00	20.00	40.00	25.00	

East	3.50	4.50	30.00	20.00	40.00	25.00	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.579	1357.445
West		(calculated)	(calculated)	0.579	1357.445
South		(calculated)	(calculated)	0.579	1357.445
East		(calculated)	(calculated)	0.579	1357.445

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	0.00	100.000
West	ONE HOUR	✓	246.00	100.000
South	ONE HOUR	✓	105.00	100.000
East	ONE HOUR	✓	239.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	0.000	0.000	0.000
	West	0.000	0.000	46.000	200.000
	South	0.000	28.000	0.000	77.000
	East	0.000	132.000	107.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.25	0.25	0.25	0.25
	West	0.00	0.00	0.19	0.81
	South	0.00	0.27	0.00	0.73
	East	0.00	0.55	0.45	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.000	1.000	1.000
	West	1.000	1.000	1.000	1.000
	South	1.000	1.000	1.000	1.000
	East	1.000	1.000	1.000	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	0.0	0.0	0.0
	West	0.0	0.0	0.0	0.0
	South	0.0	0.0	0.0	0.0
	East	0.0	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.00	0.00	0.00	~1	A	0.00	0.00	0.00	0.00	0.00	0.00	0.00
West	0.21	3.53	0.27	~1	A	225.73	338.60	18.96	3.36	0.21	18.96	3.36
South	0.09	3.23	0.10	~1	A	96.35	144.52	7.51	3.12	0.08	7.51	3.12
East	0.20	3.34	0.24	~1	A	219.31	328.97	17.59	3.21	0.20	17.59	3.21

Main Results for each time segment

Main results: (12:00-12:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	0.00	0.00	0.00	0.00	200.33	0.00	1241.50	566.55	0.000	0.00	0.00	0.000	A
West	185.20	46.30	184.55	120.05	80.28	0.00	1310.98	813.46	0.141	0.00	0.16	3.194	A
South	79.05	19.76	78.79	114.79	150.04	0.00	1270.61	810.74	0.062	0.00	0.07	3.020	A
East	179.93	44.98	179.32	207.81	21.01	0.00	1345.29	1150.35	0.134	0.00	0.15	3.086	A

Main results: (12:15-12:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	0.00	0.00	0.00	0.00	239.87	0.00	1218.62	566.55	0.000	0.00	0.00	0.000	A
West	221.15	55.29	220.99	143.74	96.13	0.00	1301.81	813.46	0.170	0.16	0.20	3.330	A
South	94.39	23.60	94.33	137.45	179.67	0.00	1253.46	810.74	0.075	0.07	0.08	3.105	A
East	214.86	53.71	214.71	248.84	25.16	0.00	1342.89	1150.35	0.160	0.15	0.19	3.190	A

Main results: (12:30-12:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	0.00	0.00	0.00	0.00	293.73	0.00	1187.44	566.55	0.000	0.00	0.00	0.000	A
West	270.85	67.71	270.61	176.02	117.71	0.00	1289.32	813.46	0.210	0.20	0.26	3.533	A
South	115.61	28.90	115.52	168.31	220.01	0.00	1230.11	810.74	0.094	0.08	0.10	3.229	A
East	263.14	65.79	262.93	304.72	30.80	0.00	1339.62	1150.35	0.196	0.19	0.24	3.343	A

Main results: (12:45-13:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	0.00	0.00	0.00	0.00	293.97	0.00	1187.31	566.55	0.000	0.00	0.00	0.000	A
West	270.85	67.71	270.85	176.16	117.81	0.00	1289.26	813.46	0.210	0.26	0.27	3.534	A
South	115.61	28.90	115.61	168.45	220.20	0.00	1230.00	810.74	0.094	0.10	0.10	3.229	A
East	263.14	65.79	263.14	304.98	30.83	0.00	1339.60	1150.35	0.196	0.24	0.24	3.343	A

Main results: (13:00-13:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	0.00	0.00	0.00	0.00	240.26	0.00	1218.39	566.55	0.000	0.00	0.00	0.000	A
West	221.15	55.29	221.39	143.98	96.29	0.00	1301.72	813.46	0.170	0.27	0.21	3.332	A
South	94.39	23.60	94.48	137.68	179.99	0.00	1253.27	810.74	0.075	0.10	0.08	3.108	A
East	214.86	53.71	215.07	249.28	25.19	0.00	1342.86	1150.35	0.160	0.24	0.19	3.194	A

Main results: (13:15-13:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	0.00	0.00	0.00	0.00	201.17	0.00	1241.01	566.55	0.000	0.00	0.00	0.000	A
West	185.20	46.30	185.36	120.55	80.62	0.00	1310.79	813.46	0.141	0.21	0.17	3.198	A
South	79.05	19.76	79.11	115.28	150.70	0.00	1270.23	810.74	0.062	0.08	0.07	3.024	A
East	179.93	44.98	180.08	208.72	21.10	0.00	1345.24	1150.35	0.134	0.19	0.16	3.091	A

Queueing Delay Results for each time segment

Queueing Delay results: (12:00-12:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.00	0.00	0.000	A	A
West	2.41	0.16	3.194	A	A
South	0.98	0.07	3.020	A	A
East	2.27	0.15	3.086	A	A

Queueing Delay results: (12:15-12:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.00	0.00	0.000	A	A
West	3.02	0.20	3.330	A	A
South	1.20	0.08	3.105	A	A
East	2.81	0.19	3.190	A	A

Queueing Delay results: (12:30-12:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.00	0.00	0.000	A	A
West	3.91	0.26	3.533	A	A
South	1.53	0.10	3.229	A	A
East	3.60	0.24	3.343	A	A

Queueing Delay results: (12:45-13:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.00	0.00	0.000	A	A
West	3.98	0.27	3.534	A	A
South	1.55	0.10	3.229	A	A
East	3.66	0.24	3.343	A	A

Queueing Delay results: (13:00-13:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service

North	0.00	0.00	0.000	A	A
West	3.13	0.21	3.332	A	A
South	1.24	0.08	3.108	A	A
East	2.91	0.19	3.194	A	A

Queueing Delay results: (13:15-13:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.00	0.00	0.000	A	A
West	2.51	0.17	3.198	A	A
South	1.01	0.07	3.024	A	A
East	2.35	0.16	3.091	A	A

Queue Variation Results for each time segment

Queue Variation results: (12:00-12:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.00	~1	~1	~1	~1			N/A	N/A
West	0.16	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.07	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.15	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (12:15-12:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.00	~1	~1	~1	~1			N/A	N/A
West	0.20	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.08	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.19	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (12:30-12:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.00	~1	~1	~1	~1			N/A	N/A
West	0.26	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.10	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.24	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (12:45-13:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.00	~1	~1	~1	~1			N/A	N/A
West	0.27	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.10	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.24	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (13:00-13:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.00	~1	~1	~1	~1			N/A	N/A
West	0.21	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.08	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.19	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (13:15-13:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.00	~1	~1	~1	~1			N/A	N/A
West	0.17	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.07	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.16	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Erb Street & Commercial Entrance 1,Boardwalk Extension - 95%.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Option A Extension
Report generation date: 2019-07-26 11:41:02 AM

Summary of intersection performance

	AM					
	Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	Option A - Total 2031					
Leg North	0.20	4.48	0.16	A	6.61	A
Leg West	0.75	3.20	0.42	A		
Leg South	0.08	2.83	0.08	A		
Leg East	4.21	8.65	0.80	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D4 - Total 2031, AM " model duration: 8:00 AM - 9:30 AM
"D5 - Total 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Total 2031, Sat" model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-26 11:41:02 AM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-24
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Option A - Total 2031, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Pedestrian Crossing	Leg North - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default settings only. Is this correct?
Warning	Pedestrian Crossing	Leg North - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg West - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default settings only. Is this correct?
Warning	Pedestrian Crossing	Leg West - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg South - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default settings only. Is this correct?
Warning	Pedestrian Crossing	Leg South - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg East - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default settings only. Is this correct?
Warning	Pedestrian Crossing	Leg East - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Option A	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, AM	Total 2031	AM		ONE HOUR	08:00	09:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Erb Street & Commercial Entrance 1/Boardwalk Extension	Roundabout	North,West,South,East				6.61	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	(untitled)	
West	West	(untitled)	
South	South	(untitled)	
East	East	(untitled)	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	3.50	8.00	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Pedestrian Crossings

Leg	Crossing Type
North	Unsignalled Pedestrian Crossing
West	Unsignalled Pedestrian Crossing
South	Unsignalled Pedestrian Crossing
East	Unsignalled Pedestrian Crossing

Unsignalled Pedestrian Crossing Crossings

Leg	Space between crossing and intersection entry (PCE)	Vehicles queueing on exit (PCE)	Central Refuge	Crossing Data Type	Crossing length (m)	Crossing time (s)	Crossing length (entry side) (m)	Crossing time (entry side) (s)	Crossing length (exit side) (m)	Crossing time (exit side) (s)
North	0.00	0.00		Distance	0.00	0.00				
West	0.00	0.00		Distance	0.00	0.00				
South	0.00	0.00		Distance	0.00	0.00				
East	0.00	0.00		Distance	0.00	0.00				

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			95.00
West	Percentage			95.00
South	Percentage			95.00
East	Percentage			95.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2314.528
West		(calculated)	(calculated)	0.723	2314.528
South		(calculated)	(calculated)	0.647	1915.359
East		(calculated)	(calculated)	0.723	2314.528

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	149.00	100.000
West	ONE HOUR	✓	772.00	100.000
South	ONE HOUR	✓	95.00	100.000
East	ONE HOUR	✓	1626.00	100.000

Pedestrian Flows

General Flows Data

Leg	Profile Type	Average Pedestrian Flow (Ped/hr)
North	ONE HOUR	0.00
West	ONE HOUR	0.00
South	ONE HOUR	0.00
East	ONE HOUR	0.00

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	73.000	14.000	62.000
	West	59.000	0.000	76.000	637.000
	South	9.000	43.000	0.000	43.000
	East	40.000	1309.000	277.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.49	0.09	0.42
	West	0.08	0.00	0.10	0.83
	South	0.09	0.45	0.00	0.45
	East	0.02	0.81	0.17	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.010	1.000	1.150
	West	1.050	1.000	1.000	1.060
	South	1.000	1.000	1.000	1.000
	East	1.130	1.060	1.000	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
	North	0.0	1.0	0.0	15.0
From	West	5.0	0.0	0.0	6.0
	South	0.0	0.0	0.0	0.0
	East	13.0	6.0	0.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.16	4.48	0.20	~1	A	136.73	205.09	12.54	3.67	0.14	12.54	3.67
West	0.42	3.20	0.75	1.05	A	708.40	1062.60	50.03	2.82	0.56	50.03	2.82
South	0.08	2.83	0.08	~1	A	87.17	130.76	5.74	2.64	0.06	5.74	2.64
East	0.80	8.65	4.21	9.46	A	1492.05	2238.07	216.63	5.81	2.41	216.65	5.81

Main Results for each time segment

Main results: (08:00-08:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	112.18	28.04	111.81	81.05	1221.48	0.00	1431.46	720.72	0.078	0.00	0.09	2.899	A
West	581.20	145.30	579.62	1068.56	264.73	0.00	2123.14	1808.53	0.274	0.00	0.40	2.454	A
South	71.52	17.88	71.33	275.26	569.09	0.00	1547.40	667.21	0.046	0.00	0.05	2.438	A
East	1224.14	306.03	1219.19	557.07	83.34	0.00	2254.28	1950.57	0.543	0.00	1.24	3.637	A

Main results: (08:15-08:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	133.95	33.49	133.80	96.98	1461.68	0.00	1257.81	720.72	0.106	0.09	0.13	3.403	A
West	694.01	173.50	693.50	1278.70	316.79	0.00	2085.51	1808.53	0.333	0.40	0.52	2.723	A
South	85.40	21.35	85.35	329.38	680.91	0.00	1475.10	667.21	0.058	0.05	0.06	2.589	A
East	1461.74	365.44	1458.94	666.54	99.72	0.00	2242.44	1950.57	0.652	1.24	1.94	4.811	A

Main results: (08:30-08:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	164.05	41.01	163.75	118.62	1785.00	0.00	1024.06	720.72	0.160	0.13	0.20	4.446	A
West	849.99	212.50	849.08	1561.73	387.02	0.00	2034.73	1808.53	0.418	0.52	0.75	3.196	A
South	104.60	26.15	104.51	402.47	833.63	0.00	1376.35	667.21	0.076	0.06	0.08	2.830	A
East	1790.26	447.56	1781.52	816.04	122.10	0.00	2226.26	1950.57	0.804	1.94	4.12	8.344	A

Main results: (08:45-09:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	164.05	41.01	164.05	118.90	1793.21	0.00	1018.13	720.72	0.161	0.20	0.20	4.479	A
West	849.99	212.50	849.98	1568.66	388.59	0.00	2033.59	1808.53	0.418	0.75	0.75	3.202	A
South	104.60	26.15	104.60	404.01	834.56	0.00	1375.75	667.21	0.076	0.08	0.08	2.831	A
East	1790.26	447.56	1789.89	816.94	122.21	0.00	2226.17	1950.57	0.804	4.12	4.21	8.651	A

Main results: (09:00-09:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS

North	133.95	33.49	134.25	97.38	1473.13	0.00	1249.53	720.72	0.107	0.20	0.13	3.430	A
West	694.01	173.50	694.91	1288.37	319.00	0.00	2083.90	1808.53	0.333	0.75	0.53	2.732	A
South	85.40	21.35	85.48	331.55	682.37	0.00	1474.16	667.21	0.058	0.08	0.06	2.594	A
East	1461.74	365.44	1470.61	667.95	99.90	0.00	2242.30	1950.57	0.652	4.21	2.00	4.956	A

Main results: (09:15-09:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	112.18	28.04	112.32	81.43	1229.30	0.00	1425.81	720.72	0.079	0.13	0.09	2.915	A
West	581.20	145.30	581.72	1075.29	266.34	0.00	2121.98	1808.53	0.274	0.53	0.40	2.461	A
South	71.52	17.88	71.57	276.86	571.19	0.00	1546.04	667.21	0.046	0.06	0.05	2.443	A
East	1224.14	306.03	1227.09	559.13	83.63	0.00	2254.06	1950.57	0.543	2.00	1.26	3.696	A

Queueing Delay Results for each time segment

Queueing Delay results: (08:00-08:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	1.33	0.09	2.899	A	A
West	5.83	0.39	2.454	A	A
South	0.71	0.05	2.438	A	A
East	17.99	1.20	3.637	A	A

Queueing Delay results: (08:15-08:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	1.87	0.12	3.403	A	A
West	7.73	0.52	2.723	A	A
South	0.91	0.06	2.589	A	A
East	28.06	1.87	4.811	A	A

Queueing Delay results: (08:30-08:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.97	0.20	4.446	A	A
West	11.06	0.74	3.196	A	A
South	1.22	0.08	2.830	A	A
East	57.09	3.81	8.344	A	A

Queueing Delay results: (08:45-09:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	3.04	0.20	4.479	A	A
West	11.29	0.75	3.202	A	A
South	1.23	0.08	2.831	A	A
East	62.68	4.18	8.651	A	A

Queueing Delay results: (09:00-09:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	1.95	0.13	3.430	A	A
West	8.05	0.54	2.732	A	A
South	0.94	0.06	2.594	A	A
East	31.39	2.09	4.956	A	A

Queueing Delay results: (09:15-09:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	1.38	0.09	2.915	A	A
West	6.06	0.40	2.461	A	A
South	0.74	0.05	2.443	A	A

East	19.43	1.30	3.696	A	A

Queue Variation Results for each time segment

Queue Variation results: (08:00-08:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.09	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.40	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.05	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.24	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:15-08:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.13	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.52	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.94	0.00	0.00	4.20	6.31			N/A	N/A

Queue Variation results: (08:30-08:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.20	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.75	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.08	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	4.12	0.00	0.00	1.05	9.46			N/A	N/A

Queue Variation results: (08:45-09:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.20	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.75	0.00	0.00	0.00	1.05			N/A	N/A
South	0.08	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	4.21	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:00-09:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.13	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.53	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or		N/A	N/A

						very big.			
East	2.00	0.00	0.00	4.20	6.31			N/A	N/A

Queue Variation results: (09:15-09:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.09	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.40	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.05	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.26	0.00	0.00	2.10	3.15			N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Erb Street & Commercial Entrance 1,Boardwalk Extension - 95%.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Option A Extension
Report generation date: 2019-07-26 11:41:38 AM

Summary of intersection performance

	PM					
	Queue (PCE)	**Delay (s)**	**V/C Ratio**	**LOS**	**Intersection Delay (s)**	**Intersection LOS**
	Option A - Total 2031					
Leg North	0.28	3.76	0.22	A	6.98	A
Leg West	3.85	8.29	0.79	A		
Leg South	1.13	9.56	0.53	A		
Leg East	2.16	5.31	0.68	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D4 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Total 2031, PM " model duration: 4:00 PM - 5:30 PM
"D6 - Total 2031, Sat" model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-26 11:41:37 AM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-24
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Option A - Total 2031, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Pedestrian Crossing	Leg North - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default settings only. Is this correct?
Warning	Pedestrian Crossing	Leg North - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg West - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default settings only. Is this correct?
Warning	Pedestrian Crossing	Leg West - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg South - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default settings only. Is this correct?
Warning	Pedestrian Crossing	Leg South - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg East - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default settings only. Is this correct?
Warning	Pedestrian Crossing	Leg East - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Option A	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, PM	Total 2031	PM		ONE HOUR	16:00	17:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Erb Street & Commercial Entrance 1/Boardwalk Extension	Roundabout	North,West,South,East				6.98	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	(untitled)	
West	West	(untitled)	
South	South	(untitled)	
East	East	(untitled)	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	3.50	8.00	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Pedestrian Crossings

Leg	Crossing Type
North	Unsignalled Pedestrian Crossing
West	Unsignalled Pedestrian Crossing
South	Unsignalled Pedestrian Crossing
East	Unsignalled Pedestrian Crossing

Unsignalled Pedestrian Crossing Crossings

Leg	Space between crossing and intersection entry (PCE)	Vehicles queueing on exit (PCE)	Central Refuge	Crossing Data Type	Crossing length (m)	Crossing time (s)	Crossing length (entry side) (m)	Crossing time (entry side) (s)	Crossing length (exit side) (m)	Crossing time (exit side) (s)
North	0.00	0.00		Distance	0.00	0.00				
West	0.00	0.00		Distance	0.00	0.00				
South	0.00	0.00		Distance	0.00	0.00				
East	0.00	0.00		Distance	0.00	0.00				

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			95.00
West	Percentage			95.00
South	Percentage			95.00
East	Percentage			95.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2314.528
West		(calculated)	(calculated)	0.723	2314.528
South		(calculated)	(calculated)	0.647	1915.359
East		(calculated)	(calculated)	0.723	2314.528

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	245.00	100.000
West	ONE HOUR	✓	1548.00	100.000
South	ONE HOUR	✓	392.00	100.000
East	ONE HOUR	✓	1341.00	100.000

Pedestrian Flows

General Flows Data

Leg	Profile Type	Average Pedestrian Flow (Ped/hr)
North	ONE HOUR	0.00
West	ONE HOUR	0.00
South	ONE HOUR	0.00
East	ONE HOUR	0.00

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	117.000	22.000	106.000
	West	82.000	0.000	98.000	1368.000
	South	36.000	60.000	0.000	296.000
	East	46.000	1210.000	85.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.48	0.09	0.43
	West	0.05	0.00	0.06	0.88
	South	0.09	0.15	0.00	0.76
	East	0.03	0.90	0.06	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.010	1.000	1.010
	West	1.000	1.000	1.000	1.020
	South	1.000	1.000	1.000	1.000
	East	1.000	1.030	1.000	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
	North	0.0	1.0	0.0	1.0
	West	0.0	0.0	0.0	2.0
From	South	0.0	0.0	0.0	0.0
	East	0.0	3.0	0.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.22	3.76	0.28	~1	A	224.82	337.22	17.83	3.17	0.20	17.83	3.17
West	0.79	8.29	3.85	8.14	A	1420.47	2130.71	198.65	5.59	2.21	198.67	5.59
South	0.53	9.56	1.13	2.00	A	359.71	539.56	59.07	6.57	0.66	59.07	6.57
East	0.68	5.31	2.16	3.08	A	1230.53	1845.79	126.21	4.10	1.40	126.22	4.10

Main Results for each time segment

Main results: (16:00-16:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	184.45	46.11	183.92	122.99	1016.61	0.00	1579.57	757.17	0.117	0.00	0.13	2.603	A
West	1165.42	291.35	1160.86	1040.67	159.86	0.00	2198.95	1930.20	0.530	0.00	1.14	3.513	A
South	295.12	73.78	293.76	153.78	1166.94	0.00	1160.84	534.52	0.254	0.00	0.34	4.146	A
East	1009.58	252.39	1006.16	1327.27	133.43	0.00	2218.06	2145.97	0.455	0.00	0.85	3.041	A

Main results: (16:15-16:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	220.25	55.06	220.05	147.17	1216.52	0.00	1435.04	757.17	0.153	0.13	0.18	2.989	A
West	1391.62	347.91	1389.05	1245.29	191.28	0.00	2176.24	1930.20	0.639	1.14	1.78	4.639	A
South	352.40	88.10	351.64	184.01	1396.32	0.00	1012.53	534.52	0.348	0.34	0.53	5.442	A
East	1205.53	301.38	1204.00	1588.26	159.70	0.00	2199.08	2145.97	0.548	0.85	1.24	3.711	A

Main results: (16:30-16:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	269.75	67.44	269.36	179.81	1488.04	0.00	1238.75	757.17	0.218	0.18	0.28	3.745	A
West	1704.38	426.09	1696.41	1523.32	234.09	0.00	2145.30	1930.20	0.794	1.78	3.77	8.021	A
South	431.60	107.90	429.28	224.94	1705.55	0.00	812.58	534.52	0.531	0.53	1.11	9.336	A
East	1476.47	369.12	1472.86	1939.84	194.99	0.00	2173.56	2145.97	0.679	1.24	2.14	5.249	A

Main results: (16:45-17:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	269.75	67.44	269.74	180.54	1491.79	0.00	1236.04	757.17	0.218	0.28	0.28	3.758	A
West	1704.38	426.09	1704.07	1527.03	234.51	0.00	2144.99	1930.20	0.795	3.77	3.85	8.293	A
South	431.60	107.90	431.51	225.68	1712.89	0.00	807.84	534.52	0.534	1.11	1.13	9.557	A
East	1476.47	369.12	1476.39	1948.46	195.94	0.00	2172.87	2145.97	0.680	2.14	2.16	5.306	A

Main results: (17:00-17:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS

North	220.25	55.06	220.64	148.20	1221.95	0.00	1431.12	757.17	0.154	0.28	0.18	3.003	A
West	1391.62	347.91	1399.70	1250.67	191.91	0.00	2175.78	1930.20	0.640	3.85	1.83	4.768	A
South	352.40	88.10	354.75	185.06	1406.55	0.00	1005.91	534.52	0.350	1.13	0.54	5.549	A
East	1205.53	301.38	1209.13	1600.28	161.02	0.00	2198.12	2145.97	0.548	2.16	1.26	3.753	A

Main results: (17:15-17:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	184.45	46.11	184.65	123.74	1021.76	0.00	1575.84	757.17	0.117	0.18	0.13	2.613	A
West	1165.42	291.35	1168.11	1045.85	160.56	0.00	2198.45	1930.20	0.530	1.83	1.16	3.566	A
South	295.12	73.78	295.92	154.62	1174.05	0.00	1156.24	534.52	0.255	0.54	0.34	4.188	A
East	1009.58	252.39	1011.15	1335.62	134.35	0.00	2217.40	2145.97	0.455	1.26	0.86	3.068	A

Queueing Delay Results for each time segment

Queueing Delay results: (16:00-16:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	1.96	0.13	2.603	A	A
West	16.56	1.10	3.513	A	A
South	4.96	0.33	4.146	A	A
East	12.48	0.83	3.041	A	A

Queueing Delay results: (16:15-16:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.70	0.18	2.989	A	A
West	25.81	1.72	4.639	A	A
South	7.73	0.52	5.442	A	A
East	18.09	1.21	3.711	A	A

Queueing Delay results: (16:30-16:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	4.12	0.27	3.745	A	A
West	52.44	3.50	8.021	A	A
South	15.80	1.05	9.336	A	A
East	30.74	2.05	5.249	A	A

Queueing Delay results: (16:45-17:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	4.20	0.28	3.758	A	A
West	57.31	3.82	8.293	A	A
South	16.85	1.12	9.557	A	A
East	32.24	2.15	5.306	A	A

Queueing Delay results: (17:00-17:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.81	0.19	3.003	A	A
West	28.71	1.91	4.768	A	A
South	8.44	0.56	5.549	A	A
East	19.44	1.30	3.753	A	A

Queueing Delay results: (17:15-17:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.04	0.14	2.613	A	A
West	17.82	1.19	3.566	A	A
South	5.29	0.35	4.188	A	A

East	13.22	0.88	3.068	A	A

Queue Variation Results for each time segment

Queue Variation results: (16:00-16:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.13	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	1.14	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.34	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.85	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:15-16:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.18	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	1.78	0.00	0.00	3.05	6.11			N/A	N/A
South	0.53	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.24	0.00	0.00	2.05	3.08			N/A	N/A

Queue Variation results: (16:30-16:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.28	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	3.77	0.00	0.00	0.00	8.14			N/A	N/A
South	1.11	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	2.14	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:45-17:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.28	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	3.85	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.13	0.00	0.00	0.00	2.00			N/A	N/A
East	2.16	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:00-17:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.18	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	1.83	0.00	0.00	4.07	5.09			N/A	N/A
South	0.54	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.26	0.00	0.00	1.03	2.05			N/A	N/A

Queue Variation results: (17:15-17:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.13	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	1.16	0.00	0.00	2.04	3.05			N/A	N/A
South	0.34	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.86	0.00	0.00	1.03	1.03			N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Erb Street & Commercial Entrance 1,Boardwalk Extension - 95%.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Option A Extension
Report generation date: 2019-07-26 11:42:04 AM

Summary of intersection performance

	Sat					
	Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	Option A - Total 2031					
Leg North	0.45	4.95	0.31	A	10.14	B
Leg West	6.43	13.53	0.87	B		
Leg South	0.43	6.19	0.30	A		
Leg East	3.85	8.22	0.80	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D4 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Total 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Total 2031, Sat " model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-26 11:42:03 AM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-24
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Option A - Total 2031, Sat

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Pedestrian Crossing	Leg North - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default settings only. Is this correct?
Warning	Pedestrian Crossing	Leg North - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg West - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default settings only. Is this correct?
Warning	Pedestrian Crossing	Leg West - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg South - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default settings only. Is this correct?
Warning	Pedestrian Crossing	Leg South - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg East - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default settings only. Is this correct?
Warning	Pedestrian Crossing	Leg East - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Option A	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, Sat	Total 2031	Sat		ONE HOUR	12:00	13:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Erb Street & Commercial Entrance 1/Boardwalk Extension	Roundabout	North,West,South,East				10.14	B

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	(untitled)	
West	West	(untitled)	
South	South	(untitled)	
East	East	(untitled)	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	3.50	8.00	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Pedestrian Crossings

Leg	Crossing Type
North	Unsignalled Pedestrian Crossing
West	Unsignalled Pedestrian Crossing
South	Unsignalled Pedestrian Crossing
East	Unsignalled Pedestrian Crossing

Unsignalled Pedestrian Crossing Crossings

Leg	Space between crossing and intersection entry (PCE)	Vehicles queueing on exit (PCE)	Central Refuge	Crossing Data Type	Crossing length (m)	Crossing time (s)	Crossing length (entry side) (m)	Crossing time (entry side) (s)	Crossing length (exit side) (m)	Crossing time (exit side) (s)
North	0.00	0.00		Distance	0.00	0.00				
West	0.00	0.00		Distance	0.00	0.00				
South	0.00	0.00		Distance	0.00	0.00				
East	0.00	0.00		Distance	0.00	0.00				

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			95.00
West	Percentage			95.00
South	Percentage			95.00
East	Percentage			95.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2314.528
West		(calculated)	(calculated)	0.723	2314.528
South		(calculated)	(calculated)	0.647	1915.359
East		(calculated)	(calculated)	0.723	2314.528

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	301.00	100.000
West	ONE HOUR	✓	1616.00	100.000
South	ONE HOUR	✓	231.00	100.000
East	ONE HOUR	✓	1562.00	100.000

Pedestrian Flows

General Flows Data

Leg	Profile Type	Average Pedestrian Flow (Ped/hr)
North	ONE HOUR	0.00
West	ONE HOUR	0.00
South	ONE HOUR	0.00
East	ONE HOUR	0.00

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	126.000	27.000	148.000
	West	114.000	0.000	246.000	1256.000
	South	21.000	59.000	0.000	151.000
	East	51.000	1345.000	166.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.42	0.09	0.49
	West	0.07	0.00	0.15	0.78
	South	0.09	0.26	0.00	0.65
	East	0.03	0.86	0.11	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.010	1.000	1.010
	West	1.000	1.000	1.000	1.010
	South	1.000	1.000	1.000	1.000
	East	1.000	1.010	1.000	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
	North	0.0	1.0	0.0	1.0
From	West	0.0	0.0	0.0	1.0
	South	0.0	0.0	0.0	0.0
	East	0.0	1.0	0.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.31	4.95	0.45	1.01	A	276.20	414.30	26.94	3.90	0.30	26.94	3.90
West	0.87	13.53	6.43	22.17	B	1482.87	2224.30	285.54	7.70	3.17	285.57	7.70
South	0.30	6.19	0.43	~1	A	211.97	317.95	25.52	4.82	0.28	25.52	4.82
East	0.80	8.22	3.85	8.07	A	1433.32	2149.98	198.68	5.54	2.21	198.70	5.55

Main Results for each time segment

Main results: (12:00-12:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	226.61	56.65	225.87	139.44	1177.40	0.00	1463.33	755.11	0.155	0.00	0.18	2.934	A
West	1216.61	304.15	1211.29	1147.46	255.81	0.00	2129.59	1839.36	0.571	0.00	1.33	3.928	A
South	173.91	43.48	173.22	329.14	1137.96	0.00	1179.58	667.05	0.147	0.00	0.17	3.576	A
East	1175.96	293.99	1171.40	1165.74	145.44	0.00	2209.38	2053.71	0.532	0.00	1.14	3.482	A

Main results: (12:15-12:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	270.59	67.65	270.27	166.84	1408.83	0.00	1296.01	755.11	0.209	0.18	0.26	3.541	A
West	1452.75	363.19	1449.10	1373.01	306.09	0.00	2093.24	1839.35	0.694	1.33	2.24	5.599	A
South	207.66	51.92	207.35	393.79	1361.40	0.00	1035.11	667.05	0.201	0.17	0.25	4.348	A
East	1404.21	351.05	1401.64	1394.72	174.04	0.00	2188.71	2053.71	0.642	1.14	1.78	4.599	A

Main results: (12:30-12:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	331.41	82.85	330.67	203.37	1720.72	0.00	1070.53	755.11	0.310	0.26	0.45	4.904	A
West	1779.25	444.81	1763.70	1677.22	374.17	0.00	2044.02	1839.35	0.870	2.24	6.13	12.312	B
South	254.34	63.58	253.62	480.07	1657.81	0.00	843.45	667.05	0.302	0.25	0.43	6.095	A
East	1719.79	429.95	1711.83	1699.18	212.25	0.00	2161.08	2053.71	0.796	1.78	3.77	7.943	A

Main results: (12:45-13:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	331.41	82.85	331.39	204.69	1728.28	0.00	1065.07	755.11	0.311	0.45	0.45	4.951	A
West	1779.25	444.81	1778.03	1684.26	375.40	0.00	2043.13	1839.35	0.871	6.13	6.43	13.527	B
South	254.34	63.58	254.31	483.13	1670.31	0.00	835.37	667.05	0.304	0.43	0.43	6.195	A
East	1719.79	429.95	1719.47	1711.12	213.50	0.00	2160.18	2053.71	0.796	3.77	3.85	8.222	A

Main results: (13:00-13:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS

North	270.59	67.65	271.33	168.69	1419.39	0.00	1288.38	755.11	0.210	0.45	0.27	3.573	A
West	1452.75	363.19	1469.13	1382.88	307.84	0.00	2091.98	1839.35	0.694	6.43	2.34	5.973	A
South	207.66	51.92	208.38	398.07	1378.90	0.00	1023.79	667.05	0.203	0.43	0.26	4.420	A
East	1404.21	351.05	1412.28	1411.47	175.80	0.00	2187.43	2053.71	0.642	3.85	1.83	4.733	A

Main results: (13:15-13:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	226.61	56.65	226.94	140.42	1184.68	0.00	1458.07	755.11	0.155	0.27	0.19	2.950	A
West	1216.61	304.15	1220.53	1154.41	257.20	0.00	2128.58	1839.36	0.572	2.34	1.36	4.012	A
South	173.91	43.48	174.23	331.42	1146.31	0.00	1174.18	667.05	0.148	0.26	0.17	3.603	A
East	1175.96	293.99	1178.66	1174.11	146.44	0.00	2208.66	2053.71	0.532	1.83	1.16	3.533	A

Queueing Delay Results for each time segment

Queueing Delay results: (12:00-12:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.71	0.18	2.934	A	A
West	19.25	1.28	3.928	A	A
South	2.53	0.17	3.576	A	A
East	16.56	1.10	3.482	A	A

Queueing Delay results: (12:15-12:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	3.91	0.26	3.541	A	A
West	32.17	2.14	5.599	A	A
South	3.67	0.24	4.348	A	A
East	25.82	1.72	4.599	A	A

Queueing Delay results: (12:30-12:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	6.57	0.44	4.904	A	A
West	80.58	5.37	12.312	B	B
South	6.24	0.42	6.095	A	A
East	52.42	3.49	7.943	A	A

Queueing Delay results: (12:45-13:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	6.78	0.45	4.951	A	A
West	94.64	6.31	13.527	B	B
South	6.49	0.43	6.195	A	A
East	57.31	3.82	8.222	A	A

Queueing Delay results: (13:00-13:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	4.12	0.27	3.573	A	A
West	37.87	2.52	5.973	A	A
South	3.93	0.26	4.420	A	A
East	28.74	1.92	4.733	A	A

Queueing Delay results: (13:15-13:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.84	0.19	2.950	A	A
West	21.03	1.40	4.012	A	A
South	2.66	0.18	3.603	A	A

East	17.83	1.19	3.533	A	A

Queue Variation Results for each time segment

Queue Variation results: (12:00-12:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.18	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	1.33	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.17	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.14	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (12:15-12:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.26	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	2.24	0.00	0.00	4.03	7.05			N/A	N/A
South	0.25	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.78	0.00	0.00	3.03	6.05			N/A	N/A

Queue Variation results: (12:30-12:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.45	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	6.13	0.00	0.00	8.06	22.17			N/A	N/A
South	0.43	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	3.77	0.00	0.00	0.00	8.07			N/A	N/A

Queue Variation results: (12:45-13:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.45	0.00	0.00	0.00	1.01			N/A	N/A
West	6.43	0.00	0.00	2.02	15.12			N/A	N/A
South	0.43	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	3.85	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (13:00-13:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.27	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	2.34	0.00	0.00	5.04	8.06			N/A	N/A
South	0.26	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.83	0.00	0.00	4.03	5.04			N/A	N/A

Queue Variation results: (13:15-13:30)

	Mean	Q05	Q50	Q90	Q95		Marker	Probability Of Reaching	Probability Of Exactly

Leg	(PCE)	(PCE)	(PCE)	(PCE)	(PCE)	Percentile Message	Message	Or Exceeding Marker	Reaching Marker
North	0.19	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	1.36	0.00	0.00	2.02	4.03			N/A	N/A
South	0.17	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.16	0.00	0.00	2.02	3.03			N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Erb Street & Commercial Entrance 1,Boardwalk Extension.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Option A Extension
Report generation date: 2019-07-26 11:38:27 AM

Summary of intersection performance

	AM					
	Queue (PCE)	**Delay (s)**	**V/C Ratio**	**LOS**	**Intersection Delay (s)**	**Intersection LOS**
	Option A - Total 2031					
Leg North	0.24	5.22	0.18	A	8.79	A
Leg West	0.84	3.57	0.44	A		
Leg South	0.09	3.07	0.08	A		
Leg East	5.74	11.93	0.85	B		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D4 - Total 2031, AM " model duration: 8:00 AM - 9:30 AM
"D5 - Total 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Total 2031, Sat" model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-26 11:38:26 AM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-24
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Option A - Total 2031, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Pedestrian Crossing	Leg North - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default settings only. Is this correct?
Warning	Pedestrian Crossing	Leg North - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg West - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default settings only. Is this correct?
Warning	Pedestrian Crossing	Leg West - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg South - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default settings only. Is this correct?
Warning	Pedestrian Crossing	Leg South - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg East - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default settings only. Is this correct?
Warning	Pedestrian Crossing	Leg East - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Option A	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, AM	Total 2031	AM		ONE HOUR	08:00	09:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Erb Street & Commercial Entrance 1/Boardwalk Extension	Roundabout	North,West,South,East				8.79	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	(untitled)	
West	West	(untitled)	
South	South	(untitled)	
East	East	(untitled)	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	3.50	8.00	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Pedestrian Crossings

Leg	Crossing Type
North	Unsignalled Pedestrian Crossing
West	Unsignalled Pedestrian Crossing
South	Unsignalled Pedestrian Crossing
East	Unsignalled Pedestrian Crossing

Unsignalled Pedestrian Crossing Crossings

Leg	Space between crossing and intersection entry (PCE)	Vehicles queueing on exit (PCE)	Central Refuge	Crossing Data Type	Crossing length (m)	Crossing time (s)	Crossing length (entry side) (m)	Crossing time (entry side) (s)	Crossing length (exit side) (m)	Crossing time (exit side) (s)
North	0.00	0.00		Distance	0.00	0.00				
West	0.00	0.00		Distance	0.00	0.00				
South	0.00	0.00		Distance	0.00	0.00				
East	0.00	0.00		Distance	0.00	0.00				

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.647	1814.551
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	149.00	100.000
West	ONE HOUR	✓	772.00	100.000
South	ONE HOUR	✓	95.00	100.000
East	ONE HOUR	✓	1626.00	100.000

Pedestrian Flows

General Flows Data

Leg	Profile Type	Average Pedestrian Flow (Ped/hr)
North	ONE HOUR	0.00
West	ONE HOUR	0.00
South	ONE HOUR	0.00
East	ONE HOUR	0.00

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	73.000	14.000	62.000
	West	59.000	0.000	76.000	637.000
	South	9.000	43.000	0.000	43.000
	East	40.000	1309.000	277.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.49	0.09	0.42
	West	0.08	0.00	0.10	0.83
	South	0.09	0.45	0.00	0.45
	East	0.02	0.81	0.17	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.010	1.000	1.150
	West	1.050	1.000	1.000	1.060
	South	1.000	1.000	1.000	1.000
	East	1.130	1.060	1.000	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
	North	0.0	1.0	0.0	15.0
	West	5.0	0.0	0.0	6.0
From	South	0.0	0.0	0.0	0.0
	East	13.0	6.0	0.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.18	5.22	0.24	~1	A	136.73	205.09	14.25	4.17	0.16	14.25	4.17
West	0.44	3.57	0.84	1.05	A	708.40	1062.60	55.07	3.11	0.61	55.07	3.11
South	0.08	3.07	0.09	~1	A	87.17	130.76	6.20	2.85	0.07	6.20	2.85
East	0.85	11.93	5.74	17.86	B	1492.05	2238.07	272.48	7.30	3.03	272.51	7.31

Main Results for each time segment

Main results: (08:00-08:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	112.18	28.04	111.78	81.02	1220.84	0.00	1310.11	682.79	0.086	0.00	0.10	3.193	A
West	581.20	145.30	579.49	1068.01	264.60	0.00	2001.42	1713.34	0.290	0.00	0.43	2.662	A
South	71.52	17.88	71.31	275.14	568.95	0.00	1446.68	632.10	0.049	0.00	0.05	2.617	A
East	1224.14	306.03	1218.53	556.94	83.32	0.00	2132.47	1847.91	0.574	0.00	1.40	4.115	A

Main results: (08:15-08:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	133.95	33.49	133.78	96.95	1460.96	0.00	1136.51	682.79	0.118	0.10	0.14	3.815	A
West	694.01	173.50	693.44	1278.09	316.65	0.00	1963.79	1713.34	0.353	0.43	0.57	2.982	A
South	85.40	21.35	85.35	329.25	680.84	0.00	1374.33	632.10	0.062	0.05	0.07	2.792	A
East	1461.74	365.44	1458.20	666.47	99.71	0.00	2120.62	1847.91	0.689	1.40	2.29	5.680	A

Main results: (08:30-08:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	164.05	41.01	163.68	118.50	1780.84	0.00	905.25	682.79	0.181	0.14	0.23	5.157	A
West	849.99	212.50	848.94	1558.27	386.26	0.00	1913.47	1713.34	0.444	0.57	0.84	3.558	A
South	104.60	26.15	104.51	401.72	833.47	0.00	1275.65	632.10	0.082	0.07	0.09	3.073	A
East	1790.26	447.56	1777.26	815.89	122.08	0.00	2104.45	1847.91	0.851	2.29	5.54	11.141	B

Main results: (08:45-09:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	164.05	41.01	164.04	118.89	1792.75	0.00	896.64	682.79	0.183	0.23	0.24	5.222	A
West	849.99	212.50	849.97	1568.28	388.51	0.00	1911.84	1713.34	0.445	0.84	0.84	3.569	A
South	104.60	26.15	104.60	403.93	834.55	0.00	1274.94	632.10	0.082	0.09	0.09	3.075	A
East	1790.26	447.56	1789.43	816.94	122.21	0.00	2104.36	1847.91	0.851	5.54	5.74	11.928	B

Main results: (09:00-09:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS

North	133.95	33.49	134.32	97.51	1477.61	0.00	1124.47	682.79	0.119	0.24	0.14	3.865	A
West	694.01	173.50	695.05	1292.10	319.82	0.00	1961.50	1713.34	0.354	0.84	0.58	2.997	A
South	85.40	21.35	85.49	332.36	682.52	0.00	1373.25	632.10	0.062	0.09	0.07	2.795	A
East	1461.74	365.44	1475.20	668.10	99.92	0.00	2120.48	1847.91	0.689	5.74	2.38	5.979	A

Main results: (09:15-09:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	112.18	28.04	112.35	81.45	1230.12	0.00	1303.40	682.79	0.086	0.14	0.10	3.212	A
West	581.20	145.30	581.79	1075.98	266.49	0.00	2000.05	1713.34	0.291	0.58	0.43	2.675	A
South	71.52	17.88	71.58	277.02	571.26	0.00	1445.18	632.10	0.049	0.07	0.05	2.622	A
East	1224.14	306.03	1227.93	559.20	83.64	0.00	2132.24	1847.91	0.574	2.38	1.43	4.202	A

Queueing Delay Results for each time segment

Queueing Delay results: (08:00-08:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	1.46	0.10	3.193	A	A
West	6.32	0.42	2.662	A	A
South	0.77	0.05	2.617	A	A
East	20.26	1.35	4.115	A	A

Queueing Delay results: (08:15-08:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.09	0.14	3.815	A	A
West	8.46	0.56	2.982	A	A
South	0.98	0.07	2.792	A	A
East	32.84	2.19	5.680	A	A

Queueing Delay results: (08:30-08:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	3.43	0.23	5.157	A	A
West	12.28	0.82	3.558	A	A
South	1.32	0.09	3.073	A	A
East	74.19	4.95	11.141	B	B

Queueing Delay results: (08:45-09:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	3.54	0.24	5.222	A	A
West	12.57	0.84	3.569	A	A
South	1.34	0.09	3.075	A	A
East	84.91	5.66	11.928	B	B

Queueing Delay results: (09:00-09:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.21	0.15	3.865	A	A
West	8.85	0.59	2.997	A	A
South	1.01	0.07	2.795	A	A
East	38.10	2.54	5.979	A	A

Queueing Delay results: (09:15-09:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	1.53	0.10	3.212	A	A
West	6.59	0.44	2.675	A	A
South	0.79	0.05	2.622	A	A

East	22.18	1.48	4.202	A	A

Queue Variation Results for each time segment

Queue Variation results: (08:00-08:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.10	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.43	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.05	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.40	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:15-08:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.14	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.57	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.07	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	2.29	0.00	0.00	4.20	7.36			N/A	N/A

Queue Variation results: (08:30-08:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.23	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.84	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.09	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	5.54	0.00	0.00	5.25	17.86			N/A	N/A

Queue Variation results: (08:45-09:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.24	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.84	0.00	0.00	0.00	1.05			N/A	N/A
South	0.09	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	5.74	0.00	0.00	0.00	9.46			N/A	N/A

Queue Variation results: (09:00-09:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.14	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.58	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.07	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

East	2.38	0.00	0.00	5.25	7.36			N/A	N/A

Queue Variation results: (09:15-09:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.10	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.43	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.05	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.43	0.00	0.00	2.10	4.20			N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Erb Street & Commercial Entrance 1,Boardwalk Extension.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Option A Extension
Report generation date: 2019-07-26 11:39:21 AM

Summary of intersection performance

	PM					
	Queue (PCE)	**Delay (s)**	**V/C Ratio**	**LOS**	**Intersection Delay (s)**	**Intersection LOS**
	Option A - Total 2031					
Leg North	0.32	4.30	0.24	A	9.20	A
Leg West	5.24	11.40	0.84	B		
Leg South	1.53	13.03	0.61	B		
Leg East	2.61	6.43	0.72	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D4 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Total 2031, PM " model duration: 4:00 PM - 5:30 PM
"D6 - Total 2031, Sat" model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-26 11:39:20 AM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-24
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Option A - Total 2031, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Pedestrian Crossing	Leg North - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default settings only. Is this correct?
Warning	Pedestrian Crossing	Leg North - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg West - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default settings only. Is this correct?
Warning	Pedestrian Crossing	Leg West - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg South - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default settings only. Is this correct?
Warning	Pedestrian Crossing	Leg South - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg East - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default settings only. Is this correct?
Warning	Pedestrian Crossing	Leg East - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Option A	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, PM	Total 2031	PM		ONE HOUR	16:00	17:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Erb Street & Commercial Entrance 1/Boardwalk Extension	Roundabout	North,West,South,East				9.20	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	(untitled)	
West	West	(untitled)	
South	South	(untitled)	
East	East	(untitled)	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	3.50	8.00	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Pedestrian Crossings

Leg	Crossing Type
North	Unsignalled Pedestrian Crossing
West	Unsignalled Pedestrian Crossing
South	Unsignalled Pedestrian Crossing
East	Unsignalled Pedestrian Crossing

Unsignalled Pedestrian Crossing Crossings

Leg	Space between crossing and intersection entry (PCE)	Vehicles queueing on exit (PCE)	Central Refuge	Crossing Data Type	Crossing length (m)	Crossing time (s)	Crossing length (entry side) (m)	Crossing time (entry side) (s)	Crossing length (exit side) (m)	Crossing time (exit side) (s)
North	0.00	0.00		Distance	0.00	0.00				
West	0.00	0.00		Distance	0.00	0.00				
South	0.00	0.00		Distance	0.00	0.00				
East	0.00	0.00		Distance	0.00	0.00				

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.647	1814.551
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	245.00	100.000
West	ONE HOUR	✓	1548.00	100.000
South	ONE HOUR	✓	392.00	100.000
East	ONE HOUR	✓	1341.00	100.000

Pedestrian Flows

General Flows Data

Leg	Profile Type	Average Pedestrian Flow (Ped/hr)
North	ONE HOUR	0.00
West	ONE HOUR	0.00
South	ONE HOUR	0.00
East	ONE HOUR	0.00

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	117.000	22.000	106.000
	West	82.000	0.000	98.000	1368.000
	South	36.000	60.000	0.000	296.000
	East	46.000	1210.000	85.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.48	0.09	0.43
	West	0.05	0.00	0.06	0.88
	South	0.09	0.15	0.00	0.76
	East	0.03	0.90	0.06	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.010	1.000	1.010
	West	1.000	1.000	1.000	1.020
	South	1.000	1.000	1.000	1.000
	East	1.000	1.030	1.000	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
	North	0.0	1.0	0.0	1.0
	West	0.0	0.0	0.0	2.0
From	South	0.0	0.0	0.0	0.0
	East	0.0	3.0	0.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.24	4.30	0.32	~1	A	224.82	337.22	20.00	3.56	0.22	20.01	3.56
West	0.84	11.40	5.24	16.28	B	1420.47	2130.71	249.58	7.03	2.77	249.61	7.03
South	0.61	13.03	1.53	3.00	B	359.71	539.56	74.13	8.24	0.82	74.13	8.24
East	0.72	6.43	2.61	4.11	A	1230.53	1845.79	146.88	4.77	1.63	146.90	4.78

Main Results for each time segment

Main results: (16:00-16:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	184.45	46.11	183.87	122.92	1016.22	0.00	1458.03	717.32	0.127	0.00	0.15	2.849	A
West	1165.42	291.35	1160.26	1040.28	159.81	0.00	2077.17	1828.61	0.561	0.00	1.29	3.973	A
South	295.12	73.78	293.59	153.72	1166.36	0.00	1060.40	506.39	0.278	0.00	0.38	4.685	A
East	1009.58	252.39	1005.79	1326.59	133.36	0.00	2096.30	2033.03	0.482	0.00	0.95	3.380	A

Main results: (16:15-16:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	220.25	55.06	220.02	147.11	1216.20	0.00	1313.46	717.32	0.168	0.15	0.20	3.322	A
West	1391.62	347.91	1388.38	1244.98	191.25	0.00	2054.45	1828.61	0.677	1.29	2.10	5.472	A
South	352.40	88.10	351.44	183.95	1395.68	0.00	912.13	506.39	0.386	0.38	0.62	6.410	A
East	1205.53	301.38	1203.70	1587.51	159.61	0.00	2077.32	2033.03	0.580	0.95	1.40	4.224	A

Main results: (16:30-16:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	269.75	67.44	269.28	179.47	1486.85	0.00	1117.79	717.32	0.241	0.20	0.32	4.280	A
West	1704.38	426.09	1692.54	1522.16	233.98	0.00	2023.56	1828.61	0.842	2.10	5.06	10.701	B
South	431.60	107.90	428.18	224.62	1701.89	0.00	714.14	506.39	0.604	0.62	1.48	12.444	B
East	1476.47	369.12	1471.80	1935.56	194.52	0.00	2052.08	2033.03	0.720	1.40	2.57	6.321	A

Main results: (16:45-17:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	269.75	67.44	269.74	180.51	1491.72	0.00	1114.27	717.32	0.242	0.32	0.32	4.301	A
West	1704.38	426.09	1703.67	1526.96	234.50	0.00	2023.18	1828.61	0.842	5.06	5.24	11.398	B
South	431.60	107.90	431.38	225.65	1712.52	0.00	707.27	506.39	0.610	1.48	1.53	13.027	B
East	1476.47	369.12	1476.33	1948.01	195.89	0.00	2051.09	2033.03	0.720	2.57	2.61	6.428	A

Main results: (17:00-17:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS

North	220.25	55.06	220.71	148.56	1223.17	0.00	1308.42	717.32	0.168	0.32	0.21	3.343	A
West	1391.62	347.91	1403.85	1251.86	192.02	0.00	2053.89	1828.61	0.678	5.24	2.18	5.739	A
South	352.40	88.10	355.93	185.40	1410.47	0.00	902.57	506.39	0.390	1.53	0.65	6.628	A
East	1205.53	301.38	1210.20	1604.87	161.53	0.00	2075.93	2033.03	0.581	2.61	1.44	4.292	A

Main results: (17:15-17:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	184.45	46.11	184.68	123.81	1022.11	0.00	1453.77	717.32	0.127	0.21	0.15	2.862	A
West	1165.42	291.35	1168.87	1046.19	160.60	0.00	2076.60	1828.61	0.561	2.18	1.31	4.050	A
South	295.12	73.78	296.15	154.70	1174.77	0.00	1054.96	506.39	0.280	0.65	0.39	4.752	A
East	1009.58	252.39	1011.48	1336.48	134.44	0.00	2095.52	2033.03	0.482	1.44	0.96	3.418	A

Queueing Delay Results for each time segment

Queueing Delay results: (16:00-16:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.15	0.14	2.849	A	A
West	18.65	1.24	3.973	A	A
South	5.58	0.37	4.685	A	A
East	13.82	0.92	3.380	A	A

Queueing Delay results: (16:15-16:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.99	0.20	3.322	A	A
West	30.20	2.01	5.472	A	A
South	9.06	0.60	6.410	A	A
East	20.49	1.37	4.224	A	A

Queueing Delay results: (16:30-16:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	4.69	0.31	4.280	A	A
West	68.16	4.54	10.701	B	B
South	20.64	1.38	12.444	B	B
East	36.61	2.44	6.321	A	A

Queueing Delay results: (16:45-17:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	4.81	0.32	4.301	A	A
West	77.48	5.17	11.398	B	B
South	22.67	1.51	13.027	B	B
East	38.88	2.59	6.428	A	A

Queueing Delay results: (17:00-17:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	3.13	0.21	3.343	A	A
West	34.76	2.32	5.739	A	A
South	10.15	0.68	6.628	A	A
East	22.33	1.49	4.292	A	A

Queueing Delay results: (17:15-17:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.24	0.15	2.862	A	A
West	20.34	1.36	4.050	A	A
South	6.02	0.40	4.752	A	A

East	14.76	0.98	3.418	A	A

Queue Variation Results for each time segment

Queue Variation results: (16:00-16:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.15	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	1.29	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.38	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.95	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:15-16:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.20	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	2.10	0.00	0.00	4.07	7.12			N/A	N/A
South	0.62	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.40	0.00	0.00	2.05	4.11			N/A	N/A

Queue Variation results: (16:30-16:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.32	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	5.06	0.00	0.00	4.07	16.28			N/A	N/A
South	1.48	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	2.57	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:45-17:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.32	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	5.24	0.00	0.00	0.00	8.14			N/A	N/A
South	1.53	0.00	0.00	0.00	3.00			N/A	N/A
East	2.61	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:00-17:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.21	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	2.18	0.00	0.00	4.07	7.12			N/A	N/A
South	0.65	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.44	0.00	0.00	2.05	3.08			N/A	N/A

Queue Variation results: (17:15-17:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.15	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	1.31	0.00	0.00	2.04	4.07			N/A	N/A
South	0.39	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.96	0.00	0.00	1.03	2.05			N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Erb Street & Commercial Entrance 1,Boardwalk Extension.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Option A Extension
Report generation date: 2019-07-26 11:39:46 AM

Summary of intersection performance

	Sat					
	Queue (PCE)	**Delay (s)**	**V/C Ratio**	**LOS**	**Intersection Delay (s)**	**Intersection LOS**
	Option A - Total 2031					
Leg North	0.54	5.93	0.35	A	15.84	C
Leg West	10.82	23.28	0.93	C		
Leg South	0.52	7.47	0.35	A		
Leg East	5.23	11.29	0.84	B		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D4 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Total 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Total 2031, Sat " model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-26 11:39:45 AM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-24
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Option A - Total 2031, Sat

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Pedestrian Crossing	Leg North - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default settings only. Is this correct?
Warning	Pedestrian Crossing	Leg North - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg West - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default settings only. Is this correct?
Warning	Pedestrian Crossing	Leg West - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg South - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default settings only. Is this correct?
Warning	Pedestrian Crossing	Leg South - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg East - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default settings only. Is this correct?
Warning	Pedestrian Crossing	Leg East - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Option A	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, Sat	Total 2031	Sat		ONE HOUR	12:00	13:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Erb Street & Commercial Entrance 1/Boardwalk Extension	Roundabout	North,West,South,East				15.84	C

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	(untitled)	
West	West	(untitled)	
South	South	(untitled)	
East	East	(untitled)	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	3.50	8.00	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Pedestrian Crossings

Leg	Crossing Type
North	Unsignalled Pedestrian Crossing
West	Unsignalled Pedestrian Crossing
South	Unsignalled Pedestrian Crossing
East	Unsignalled Pedestrian Crossing

Unsignalled Pedestrian Crossing Crossings

Leg	Space between crossing and intersection entry (PCE)	Vehicles queueing on exit (PCE)	Central Refuge	Crossing Data Type	Crossing length (m)	Crossing time (s)	Crossing length (entry side) (m)	Crossing time (entry side) (s)	Crossing length (exit side) (m)	Crossing time (exit side) (s)
North	0.00	0.00		Distance	0.00	0.00				
West	0.00	0.00		Distance	0.00	0.00				
South	0.00	0.00		Distance	0.00	0.00				
East	0.00	0.00		Distance	0.00	0.00				

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.647	1814.551
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	301.00	100.000
West	ONE HOUR	✓	1616.00	100.000
South	ONE HOUR	✓	231.00	100.000
East	ONE HOUR	✓	1562.00	100.000

Pedestrian Flows

General Flows Data

Leg	Profile Type	Average Pedestrian Flow (Ped/hr)
North	ONE HOUR	0.00
West	ONE HOUR	0.00
South	ONE HOUR	0.00
East	ONE HOUR	0.00

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	126.000	27.000	148.000
	West	114.000	0.000	246.000	1256.000
	South	21.000	59.000	0.000	151.000
	East	51.000	1345.000	166.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.42	0.09	0.49
	West	0.07	0.00	0.15	0.78
	South	0.09	0.26	0.00	0.65
	East	0.03	0.86	0.11	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.010	1.000	1.010
	West	1.000	1.000	1.000	1.010
	South	1.000	1.000	1.000	1.000
	East	1.000	1.010	1.000	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
	North	0.0	1.0	0.0	1.0
From	West	0.0	0.0	0.0	1.0
	South	0.0	0.0	0.0	0.0
	East	0.0	1.0	0.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.35	5.93	0.54	1.01	A	276.20	414.30	31.18	4.52	0.35	31.18	4.52
West	0.93	23.28	10.82	41.32	C	1482.87	2224.30	409.75	11.05	4.55	409.79	11.05
South	0.35	7.47	0.52	1.00	A	211.97	317.95	29.64	5.59	0.33	29.64	5.59
East	0.84	11.29	5.23	16.14	B	1433.32	2149.98	249.47	6.96	2.77	249.49	6.96

Main Results for each time segment

Main results: (12:00-12:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	226.61	56.65	225.79	139.36	1176.80	0.00	1341.94	715.36	0.169	0.00	0.20	3.253	A
West	1216.61	304.15	1210.49	1146.89	255.70	0.00	2007.85	1742.55	0.606	0.00	1.53	4.516	A
South	173.91	43.48	173.14	328.95	1137.24	0.00	1079.23	631.94	0.161	0.00	0.19	3.969	A
East	1175.96	293.99	1170.80	1165.03	145.36	0.00	2087.62	1945.62	0.563	0.00	1.29	3.938	A

Main results: (12:15-12:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	270.59	67.65	270.21	166.73	1408.17	0.00	1174.68	715.36	0.230	0.20	0.30	4.014	A
West	1452.75	363.19	1447.89	1372.39	305.98	0.00	1971.50	1742.55	0.737	1.53	2.74	6.864	A
South	207.66	51.92	207.29	393.53	1360.34	0.00	934.98	631.94	0.222	0.19	0.28	4.945	A
East	1404.21	351.05	1400.96	1393.71	173.93	0.00	2066.97	1945.62	0.679	1.29	2.10	5.424	A

Main results: (12:30-12:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	331.41	82.85	330.47	202.36	1716.97	0.00	951.43	715.36	0.348	0.30	0.53	5.842	A
West	1779.25	444.81	1751.44	1673.79	373.65	0.00	1922.58	1742.55	0.925	2.74	9.70	18.755	C
South	254.34	63.58	253.44	477.78	1647.32	0.00	749.43	631.94	0.339	0.28	0.51	7.244	A
East	1719.79	429.95	1708.00	1689.43	211.33	0.00	2039.93	1945.62	0.843	2.10	5.05	10.579	B

Main results: (12:45-13:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	331.41	82.85	331.37	204.44	1727.86	0.00	943.55	715.36	0.351	0.53	0.54	5.933	A
West	1779.25	444.81	1774.76	1683.88	375.35	0.00	1921.35	1742.55	0.926	9.70	10.82	23.278	C
South	254.34	63.58	254.28	482.58	1667.53	0.00	736.36	631.94	0.345	0.51	0.52	7.467	A
East	1719.79	429.95	1719.04	1708.55	213.26	0.00	2038.53	1945.62	0.844	5.05	5.23	11.295	B

Main results: (13:00-13:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS

North	270.59	67.65	271.53	169.92	1423.43	0.00	1163.64	715.36	0.233	0.54	0.31	4.077	A
West	1452.75	363.19	1484.35	1386.57	308.39	0.00	1969.76	1742.55	0.738	10.82	2.92	7.935	A
South	207.66	51.92	208.57	400.84	1391.91	0.00	914.57	631.94	0.227	0.52	0.30	5.105	A
East	1404.21	351.05	1416.40	1423.53	176.95	0.00	2064.79	1945.62	0.680	5.23	2.18	5.703	A

Main results: (13:15-13:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	226.61	56.65	227.01	140.56	1185.44	0.00	1335.69	715.36	0.170	0.31	0.21	3.279	A
West	1216.61	304.15	1221.99	1155.13	257.33	0.00	2006.68	1742.55	0.606	2.92	1.57	4.655	A
South	173.91	43.48	174.31	331.73	1147.59	0.00	1072.54	631.94	0.162	0.30	0.19	4.010	A
East	1175.96	293.99	1179.43	1175.33	146.57	0.00	2086.75	1945.62	0.564	2.18	1.32	4.018	A

Queueing Delay Results for each time segment

Queueing Delay results: (12:00-12:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	3.00	0.20	3.253	A	A
West	22.02	1.47	4.516	A	A
South	2.80	0.19	3.969	A	A
East	18.66	1.24	3.938	A	A

Queueing Delay results: (12:15-12:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	4.42	0.29	4.014	A	A
West	38.91	2.59	6.864	A	A
South	4.17	0.28	4.945	A	A
East	30.20	2.01	5.424	A	A

Queueing Delay results: (12:30-12:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	7.78	0.52	5.842	A	A
West	117.86	7.86	18.755	C	B
South	7.37	0.49	7.244	A	A
East	68.02	4.53	10.579	B	B

Queueing Delay results: (12:45-13:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	8.10	0.54	5.933	A	A
West	155.24	10.35	23.278	C	C
South	7.78	0.52	7.467	A	A
East	77.39	5.16	11.295	B	B

Queueing Delay results: (13:00-13:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	4.72	0.31	4.077	A	A
West	51.23	3.42	7.935	A	A
South	4.56	0.30	5.105	A	A
East	34.85	2.32	5.703	A	A

Queueing Delay results: (13:15-13:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	3.16	0.21	3.279	A	A
West	24.49	1.63	4.655	A	A
South	2.97	0.20	4.010	A	A

East	20.34	1.36	4.018	A	A

Queue Variation Results for each time segment

Queue Variation results: (12:00-12:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.20	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	1.53	0.00	0.00	1.01	2.02			N/A	N/A
South	0.19	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.29	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (12:15-12:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.30	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	2.74	0.00	0.00	6.05	9.07			N/A	N/A
South	0.28	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	2.10	0.00	0.00	4.03	7.06			N/A	N/A

Queue Variation results: (12:30-12:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.53	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	9.70	0.00	0.00	22.17	39.30			N/A	N/A
South	0.51	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	5.05	0.00	0.00	4.03	16.14			N/A	N/A

Queue Variation results: (12:45-13:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.54	0.00	0.00	0.00	1.01			N/A	N/A
West	10.82	0.00	0.00	18.14	41.32			N/A	N/A
South	0.52	0.00	0.00	0.00	1.00			N/A	N/A
East	5.23	0.00	0.00	0.00	8.07			N/A	N/A

Queue Variation results: (13:00-13:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.31	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	2.92	0.00	0.00	6.05	10.08			N/A	N/A
South	0.30	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	2.18	0.00	0.00	5.04	7.06			N/A	N/A

Queue Variation results: (13:15-13:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.21	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	1.57	0.00	0.00	1.01	5.04			N/A	N/A

South	0.19	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.32	0.00	0.00	2.02	4.03			N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Erb Street & Waterloo Waste Road 1Platinum Drive.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Option A Extension
Report generation date: 2019-07-31 10:12:04 PM

Summary of intersection performance

	AM					
	Queue (PCE)	**Delay (s)**	**V/C Ratio**	**LOS**	**Intersection Delay (s)**	**Intersection LOS**
	Default - Total 2031					
Leg North	0.27	3.51	0.14	A	2.94	A
Leg West	0.89	3.51	0.46	A		
Leg South	0.08	7.09	0.06	A		
Leg East	0.19	2.17	0.15	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - Existing, Sat" model duration: 12:00 PM - 1:30 PM
"D4 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D7 - Total 2031, AM " model duration: 8:00 AM - 9:30 AM
"D8 - Total 2031, PM" model duration: 4:00 PM - 5:30 PM
"D9 - Total 2031, Sat" model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 10:12:03 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-22
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Default - Total 2031, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Default	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, AM	Total 2031	AM		ONE HOUR	08:00	09:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Erbsville Road/Ira-Needles Boulavard & Erb Street	Roundabout	North,West,South,East				2.94	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	(untitled)	
West	West	(untitled)	
South	South	(untitled)	
East	East	(untitled)	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	3.50	4.50	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Bypass

Leg	Leg Has Bypass	Bypass Utilisation (%)
North		
West		
South		
East	✓	100

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.527	1221.701
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	252.00	100.000
West	ONE HOUR	✓	831.00	100.000
South	ONE HOUR	✓	35.00	100.000
East	ONE HOUR	✓	991.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	29.000	0.000	223.000
	West	173.000	0.000	7.000	651.000
	South	1.000	4.000	0.000	30.000
	East	709.000	229.000	53.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.12	0.00	0.88
	West	0.21	0.00	0.01	0.78
	South	0.03	0.11	0.00	0.86
	East	0.72	0.23	0.05	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.000	1.000	1.800
	West	1.040	1.000	1.000	1.030
	South	1.000	1.000	1.000	1.160
	East	1.000	1.040	1.080	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	0.0	0.0	80.0
	West	4.0	0.0	0.0	3.0
	South	0.0	0.0	0.0	16.0
	East	0.0	4.0	8.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.14	3.51	0.27	~1	A	231.24	346.86	19.41	3.36	0.22	19.41	3.36
West	0.46	3.51	0.89	~1	A	762.54	1143.81	58.26	3.06	0.65	58.26	3.06
South	0.06	7.09	0.08	~1	A	32.12	48.17	4.92	6.13	0.05	4.92	6.13
East	0.15	2.17	0.19	~1	A	909.36	388.15	13.47	2.08	0.15	13.47	2.08

Main Results for each time segment

Main results: (08:00-08:15)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	189.72	189.72	47.43	0.00	533.77	189.04	130.61	214.83	0.00	2037.40	763.01	0.093	0.00	0.17	3.210	A
West	625.62	625.62	156.41	0.00	0.00	623.81	196.77	207.10	0.00	2042.99	1437.66	0.306	0.00	0.45	2.614	A
South	26.35	26.35	6.59	0.00	0.00	26.20	45.07	785.84	0.00	807.67	114.90	0.033	0.00	0.04	5.224	A
East	746.08	212.30	53.08	533.77	0.00	211.83	678.43	133.61	0.00	2096.12	1964.47	0.101	0.00	0.12	2.001	A

Main results: (08:15-08:30)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	226.54	226.54	56.64	0.00	637.38	226.38	156.29	256.99	0.00	2006.92	763.01	0.113	0.17	0.21	3.332	A
West	747.05	747.05	186.76	0.00	0.00	746.44	235.42	247.96	0.00	2013.45	1437.66	0.371	0.45	0.61	2.930	A
South	31.46	31.46	7.87	0.00	0.00	31.41	53.91	940.49	0.00	726.20	114.90	0.043	0.04	0.05	5.875	A
East	890.89	253.51	63.38	637.38	0.00	253.40	812.01	159.88	0.00	2077.12	1964.47	0.122	0.12	0.15	2.067	A

Main results: (08:30-08:45)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	277.46	277.46	69.36	0.00	780.62	277.21	191.34	314.72	0.00	1965.19	763.01	0.141	0.21	0.27	3.514	A
West	914.95	914.95	228.74	0.00	0.00	913.83	288.29	303.64	0.00	1973.20	1437.66	0.464	0.61	0.89	3.503	A
South	38.54	38.54	9.63	0.00	0.00	38.44	66.02	1151.44	0.00	615.05	114.90	0.063	0.05	0.08	7.080	A
East	1091.11	310.49	77.62	780.62	0.00	310.32	994.15	195.73	0.00	2051.20	1964.47	0.151	0.15	0.19	2.165	A

Main results: (08:45-09:00)

Leg	Total Demand	Intersection Demand	Intersection Arrivals	Bypass Demand	Bypass Exit	Entry Flow	Exit Flow	Circulating Flow	Pedestrian Demand	Capacity	Saturation Capacity	V/C	Start Queue	End Queue	Delay	LOS

	(PCE/hr)	(PCE/hr)	(PCE)	(PCE/hr)	Flow (PCE/hr)	(PCE/hr)	(PCE/hr)	(PCE/hr)	(Ped/hr)	(PCE/hr)	(PCE/hr)	Ratio	(PCE)	(PCE)	(s)	
North	277.46	277.46	69.36	0.00	780.62	277.45	191.57	314.89	0.00	1965.06	763.01	0.141	0.27	0.27	3.515	A
West	914.95	914.95	228.74	0.00	0.00	914.94	288.47	303.88	0.00	1973.02	1437.66	0.464	0.89	0.89	3.509	A
South	38.54	38.54	9.63	0.00	0.00	38.53	66.06	1152.75	0.00	614.36	114.90	0.063	0.08	0.08	7.089	A
East	1091.11	310.49	77.62	780.62	0.00	310.49	995.31	195.98	0.00	2051.03	1964.47	0.151	0.19	0.19	2.165	A

Main results: (09:00-09:15)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	226.54	226.54	56.64	0.00	637.38	226.78	156.66	257.28	0.00	2006.71	763.01	0.113	0.27	0.21	3.335	A
West	747.05	747.05	186.76	0.00	0.00	748.16	235.70	248.36	0.00	2013.16	1437.66	0.371	0.89	0.61	2.938	A
South	31.46	31.46	7.87	0.00	0.00	31.56	53.98	942.54	0.00	725.11	114.90	0.043	0.08	0.05	5.889	A
East	890.89	253.51	63.38	637.38	0.00	253.67	813.84	160.26	0.00	2076.85	1964.47	0.122	0.19	0.15	2.069	A

Main results: (09:15-09:30)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	189.72	189.72	47.43	0.00	533.77	189.88	131.13	215.43	0.00	2036.96	763.01	0.093	0.21	0.17	3.214	A
West	625.62	625.62	156.41	0.00	0.00	626.24	197.36	207.95	0.00	2042.37	1437.66	0.306	0.61	0.46	2.623	A
South	26.35	26.35	6.59	0.00	0.00	26.40	45.20	788.99	0.00	806.01	114.90	0.033	0.05	0.04	5.238	A
East	746.08	212.30	53.08	533.77	0.00	212.41	681.25	134.14	0.00	2095.73	1964.47	0.101	0.15	0.12	2.003	A

Queueing Delay Results for each time segment

Queueing Delay results: (08:00-08:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.48	0.17	3.210	A	A
West	6.68	0.45	2.614	A	A
South	0.56	0.04	5.224	A	A
East	1.74	0.12	2.001	A	A

Queueing Delay results: (08:15-08:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	3.10	0.21	3.332	A	A
West	8.95	0.60	2.930	A	A
South	0.75	0.05	5.875	A	A
East	2.16	0.14	2.067	A	A

Queueing Delay results: (08:30-08:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	3.99	0.27	3.514	A	A
West	13.01	0.87	3.503	A	A
South	1.10	0.07	7.080	A	A
East	2.77	0.18	2.165	A	A

Queueing Delay results: (08:45-09:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	4.05	0.27	3.515	A	A
West	13.32	0.89	3.509	A	A
South	1.13	0.08	7.089	A	A
East	2.80	0.19	2.165	A	A

Queueing Delay results: (09:00-09:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	3.20	0.21	3.335	A	A
West	9.34	0.62	2.938	A	A
South	0.79	0.05	5.889	A	A

East	2.21	0.15	2.069	A	A

Queueing Delay results: (09:15-09:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.58	0.17	3.214	A	A
West	6.96	0.46	2.623	A	A
South	0.59	0.04	5.238	A	A
East	1.79	0.12	2.003	A	A

Queue Variation Results for each time segment

Queue Variation results: (08:00-08:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.17	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.45	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.04	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.12	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:15-08:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.21	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.61	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.05	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.15	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:30-08:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.27	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.89	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.08	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.19	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:45-09:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.27	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.89	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.08	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.19	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:00-09:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.21	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.61	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.05	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.15	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:15-09:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.17	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.46	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.04	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.12	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Erb Street & Waterloo Waste Road 1Platinum Drive.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Option A Extension
Report generation date: 2019-07-31 10:12:32 PM

Summary of intersection performance

	PM					
	Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	Default - Total 2031					
Leg North	3.38	9.54	0.78	A	6.10	A
Leg West	0.51	3.88	0.34	A		
Leg South	0.29	10.73	0.22	B		
Leg East	0.52	2.66	0.34	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - Existing, Sat" model duration: 12:00 PM - 1:30 PM
"D4 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D7 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM
"D8 - Total 2031, PM " model duration: 4:00 PM - 5:30 PM
"D9 - Total 2031, Sat" model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 10:12:31 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-22
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Default - Total 2031, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Default	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, PM	Total 2031	PM		ONE HOUR	16:00	17:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Erbsville Road/Ira-Needles Boulavard & Erb Street	Roundabout	North,West,South,East				6.10	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	(untitled)	
West	West	(untitled)	
South	South	(untitled)	
East	East	(untitled)	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	3.50	4.50	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Bypass

Leg	Leg Has Bypass	Bypass Utilisation (%)
North		
West		
South		
East	✓	100

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.527	1221.701
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	1180.00	100.000
West	ONE HOUR	✓	431.00	100.000
South	ONE HOUR	✓	89.00	100.000
East	ONE HOUR	✓	1026.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	248.000	7.000	925.000
	West	118.000	0.000	7.000	306.000
	South	7.000	6.000	0.000	76.000
	East	382.000	592.000	52.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.21	0.01	0.78
	West	0.27	0.00	0.02	0.71
	South	0.08	0.07	0.00	0.85
	East	0.37	0.58	0.05	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.000	1.000	1.000
	West	1.000	1.000	1.000	1.010
	South	1.000	1.000	1.000	1.020
	East	1.000	1.020	1.030	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	0.0	0.0	0.0
	West	0.0	0.0	0.0	1.0
	South	0.0	0.0	0.0	2.0
	East	0.0	2.0	3.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.78	9.54	3.38	7.00	A	1082.79	1624.18	169.13	6.25	1.88	169.14	6.25
West	0.34	3.88	0.51	1.01	A	395.49	593.24	32.47	3.28	0.36	32.47	3.28
South	0.22	10.73	0.29	~1	B	81.67	122.50	16.61	8.13	0.18	16.61	8.13
East	0.34	2.66	0.52	1.02	A	941.48	886.42	36.24	2.45	0.40	36.24	2.45

Main Results for each time segment

Main results: (16:00-16:15)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	888.37	888.37	222.09	0.00	287.59	884.66	93.81	488.12	0.00	1839.82	838.34	0.483	0.00	0.93	3.756	A
West	324.48	324.48	81.12	0.00	0.00	323.50	635.00	737.78	0.00	1659.33	1604.83	0.196	0.00	0.24	2.713	A
South	67.00	67.00	16.75	0.00	0.00	66.57	49.55	1011.73	0.00	688.66	43.68	0.097	0.00	0.11	5.882	A
East	772.43	484.84	121.21	287.59	0.00	483.63	980.01	98.29	0.00	2121.65	1870.45	0.229	0.00	0.30	2.243	A

Main results: (16:15-16:30)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1060.80	1060.80	265.20	0.00	343.41	1058.60	112.26	583.99	0.00	1770.52	838.34	0.599	0.93	1.47	5.042	A
West	387.46	387.46	96.87	0.00	0.00	387.10	759.75	882.84	0.00	1554.46	1604.83	0.249	0.24	0.33	3.105	A
South	80.01	80.01	20.00	0.00	0.00	79.80	59.29	1210.65	0.00	583.86	43.68	0.137	0.11	0.16	7.260	A
East	922.35	578.94	144.74	343.41	0.00	578.61	1172.82	117.64	0.00	2107.66	1870.45	0.275	0.30	0.39	2.403	A

Main results: (16:30-16:45)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1299.20	1299.20	324.80	0.00	420.59	1291.89	137.40	715.08	0.00	1675.74	838.34	0.775	1.47	3.30	9.207	A
West	474.54	474.54	118.63	0.00	0.00	473.85	929.39	1077.58	0.00	1413.67	1604.83	0.336	0.33	0.51	3.855	A
South	97.99	97.99	24.50	0.00	0.00	97.49	72.57	1478.87	0.00	442.55	43.68	0.221	0.16	0.29	10.596	B
East	1129.65	709.06	177.26	420.59	0.00	708.51	1432.38	143.97	0.00	2088.63	1870.45	0.339	0.39	0.52	2.661	A

Main results: (16:45-17:00)

Leg	Total Demand	Intersection Demand	Intersection Arrivals	Bypass Demand	Bypass Exit	Entry Flow	Exit Flow	Circulating Flow	Pedestrian Demand	Capacity	Saturation Capacity	V/C	Start Queue	End Queue	Delay	LOS

	(PCE/hr)	(PCE/hr)	(PCE)	(PCE/hr)	Flow (PCE/hr)	(PCE/hr)	(PCE/hr)	(PCE/hr)	(Ped/hr)	(PCE/hr)	(PCE/hr)	Ratio	(PCE)	(PCE)	(s)	
North	1299.20	1299.20	324.80	0.00	420.59	1298.91	137.62	715.66	0.00	1675.33	838.34	0.775	3.30	3.38	9.542	A
West	474.54	474.54	118.63	0.00	0.00	474.53	931.40	1083.17	0.00	1409.63	1604.83	0.337	0.51	0.51	3.876	A
South	97.99	97.99	24.50	0.00	0.00	97.97	72.67	1485.03	0.00	439.30	43.68	0.223	0.29	0.29	10.726	B
East	1129.65	709.06	177.26	420.59	0.00	709.05	1438.78	144.23	0.00	2088.44	1870.45	0.340	0.52	0.52	2.663	A

Main results: (17:00-17:15)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1060.80	1060.80	265.20	0.00	343.41	1068.23	112.60	584.91	0.00	1769.85	838.34	0.599	3.38	1.52	5.185	A
West	387.46	387.46	96.87	0.00	0.00	388.15	762.63	890.51	0.00	1548.91	1604.83	0.250	0.51	0.34	3.124	A
South	80.01	80.01	20.00	0.00	0.00	80.51	59.43	1219.23	0.00	579.34	43.68	0.138	0.29	0.16	7.346	A
East	922.35	578.94	144.74	343.41	0.00	579.48	1181.71	118.03	0.00	2107.38	1870.45	0.275	0.52	0.39	2.405	A

Main results: (17:15-17:30)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	888.37	888.37	222.09	0.00	287.59	890.66	94.22	489.71	0.00	1838.68	838.34	0.483	1.52	0.94	3.808	A
West	324.48	324.48	81.12	0.00	0.00	324.84	637.72	742.65	0.00	1655.81	1604.83	0.196	0.34	0.25	2.726	A
South	67.00	67.00	16.75	0.00	0.00	67.22	49.74	1017.76	0.00	685.48	43.68	0.098	0.16	0.11	5.925	A
East	772.43	484.84	121.21	287.59	0.00	485.18	986.22	98.75	0.00	2121.32	1870.45	0.229	0.39	0.30	2.246	A

Queueing Delay Results for each time segment

Queueing Delay results: (16:00-16:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	13.48	0.90	3.756	A	A
West	3.60	0.24	2.713	A	A
South	1.59	0.11	5.882	A	A
East	4.45	0.30	2.243	A	A

Queueing Delay results: (16:15-16:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	21.38	1.43	5.042	A	A
West	4.92	0.33	3.105	A	A
South	2.34	0.16	7.260	A	A
East	5.71	0.38	2.403	A	A

Queueing Delay results: (16:30-16:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	45.72	3.05	9.207	A	A
West	7.44	0.50	3.855	A	A
South	4.12	0.27	10.596	B	B
East	7.73	0.52	2.661	A	A

Queueing Delay results: (16:45-17:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	50.20	3.35	9.542	A	A
West	7.62	0.51	3.876	A	A
South	4.32	0.29	10.726	B	B
East	7.85	0.52	2.663	A	A

Queueing Delay results: (17:00-17:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	23.83	1.59	5.185	A	A
West	5.15	0.34	3.124	A	A
South	2.55	0.17	7.346	A	A

East	5.90	0.39	2.405	A	A

Queueing Delay results: (17:15-17:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	14.51	0.97	3.808	A	A
West	3.75	0.25	2.726	A	A
South	1.70	0.11	5.925	A	A
East	4.60	0.31	2.246	A	A

Queue Variation Results for each time segment

Queue Variation results: (16:00-16:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.93	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.24	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.11	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.30	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:15-16:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.47	0.00	0.00	3.00	4.00			N/A	N/A
West	0.33	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.16	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.39	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:30-16:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	3.30	0.00	0.00	0.00	7.00			N/A	N/A
West	0.51	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.29	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.52	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:45-17:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	3.38	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.51	0.00	0.00	0.00	1.01			N/A	N/A
South	0.29	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.52	0.00	0.00	0.00	1.02			N/A	N/A

Queue Variation results: (17:00-17:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.52	0.00	0.00	3.00	4.00			N/A	N/A
West	0.34	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.16	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.39	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:15-17:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker

North	0.94	0.00	0.00	1.00	2.00			N/A	N/A
West	0.25	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.11	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.30	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Erb Street & Waterloo Waste Road 1Platinum Drive.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Option A Extension
Report generation date: 2019-07-31 10:13:17 PM

Summary of intersection performance

	Sat					
	Queue (PCE)	**Delay (s)**	**V/C Ratio**	**LOS**	**Intersection Delay (s)**	**Intersection LOS**
	Default - Total 2031					
Leg North	1.04	3.84	0.51	A	3.21	A
Leg West	0.35	3.20	0.26	A		
Leg South	0.21	7.32	0.17	A		
Leg East	0.22	2.12	0.18	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - Existing, Sat" model duration: 12:00 PM - 1:30 PM
"D4 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D7 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM
"D8 - Total 2031, PM" model duration: 4:00 PM - 5:30 PM
"D9 - Total 2031, Sat " model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 10:13:16 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-22
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Default - Total 2031, Sat

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Default	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, Sat	Total 2031	Sat		ONE HOUR	12:00	13:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Erbsville Road/Ira-Needles Boulavard & Erb Street	Roundabout	North,West,South,East				3.21	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	(untitled)	
West	West	(untitled)	
South	South	(untitled)	
East	East	(untitled)	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	3.50	4.50	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Bypass

Leg	Leg Has Bypass	Bypass Utilisation (%)
North		
West		
South		
East	✓	100

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.527	1221.701
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	888.00	100.000
West	ONE HOUR	✓	357.00	100.000
South	ONE HOUR	✓	93.00	100.000
East	ONE HOUR	✓	866.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	146.000	2.000	740.000
	West	135.000	0.000	15.000	207.000
	South	11.000	13.000	0.000	69.000
	East	530.000	230.000	106.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.16	0.00	0.83
	West	0.38	0.00	0.04	0.58
	South	0.12	0.14	0.00	0.74
	East	0.61	0.27	0.12	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

	To				
		North	West	South	East
From	North	1.000	1.000	1.000	1.000
	West	1.000	1.000	1.000	1.000
	South	1.000	1.000	1.000	1.000
	East	1.000	1.000	1.000	1.000

Truck Percentages - Intersection 1 (for whole period)

	To				
		North	West	South	East
From	North	0.0	0.0	0.0	0.0
	West	0.0	0.0	0.0	0.0
	South	0.0	0.0	0.0	0.0
	East	0.0	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.51	3.84	1.04	?	A	814.84	1222.27	66.25	3.25	0.74	66.25	3.25
West	0.26	3.20	0.35	~1	A	327.59	491.38	23.16	2.83	0.26	23.16	2.83
South	0.17	7.32	0.21	~1	A	85.34	128.01	13.03	6.11	0.14	13.03	6.11
East	0.18	2.12	0.22	~1	A	794.66	462.48	15.66	2.03	0.17	15.66	2.03

Main Results for each time segment

Main results: (12:00-12:15)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	668.53	668.53	167.13	0.00	399.01	666.54	109.59	262.15	0.00	2003.19	863.23	0.334	0.00	0.50	2.690	A
West	268.77	268.77	67.19	0.00	0.00	268.04	292.11	636.58	0.00	1732.49	1258.44	0.155	0.00	0.18	2.457	A
South	70.02	70.02	17.50	0.00	0.00	69.63	92.39	812.22	0.00	793.77	207.53	0.088	0.00	0.10	4.969	A
East	651.97	252.96	63.24	399.01	0.00	252.41	762.53	119.33	0.00	2106.44	1809.95	0.120	0.00	0.14	1.942	A

Main results: (12:15-12:30)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	798.29	798.29	199.57	0.00	476.46	797.57	131.14	313.59	0.00	1966.00	863.23	0.406	0.50	0.68	3.079	A
West	320.94	320.94	80.23	0.00	0.00	320.70	349.47	761.69	0.00	1642.05	1258.44	0.195	0.18	0.24	2.724	A
South	83.61	83.61	20.90	0.00	0.00	83.46	110.52	971.87	0.00	709.66	207.53	0.118	0.10	0.13	5.747	A
East	778.52	302.06	75.51	476.46	0.00	301.93	912.51	142.81	0.00	2089.47	1809.95	0.145	0.14	0.17	2.013	A

Main results: (12:30-12:45)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	977.71	977.71	244.43	0.00	583.54	976.29	160.55	384.02	0.00	1915.08	863.23	0.511	0.68	1.03	3.829	A
West	393.06	393.06	98.27	0.00	0.00	392.64	427.89	932.42	0.00	1518.62	1258.44	0.259	0.24	0.35	3.197	A
South	102.39	102.39	25.60	0.00	0.00	102.10	135.34	1189.72	0.00	594.89	207.53	0.172	0.13	0.21	7.300	A
East	953.48	369.94	92.49	583.54	0.00	369.75	1116.99	174.83	0.00	2066.32	1809.95	0.179	0.17	0.22	2.121	A

Main results: (12:45-13:00)

Leg	Total Demand	Intersection Demand	Intersection Arrivals	Bypass Demand	Bypass Exit	Entry Flow	Exit Flow	Circulating Flow	Pedestrian Demand	Capacity	Saturation Capacity	V/C	Start Queue	End Queue	Delay	LOS

	(PCE/hr)	(PCE/hr)	(PCE)	(PCE/hr)	Flow (PCE/hr)	(PCE/hr)	(PCE/hr)	(PCE/hr)	(Ped/hr)	(PCE/hr)	(PCE/hr)	Ratio	(PCE)	(PCE)	(s)	
North	977.71	977.71	244.43	0.00	583.54	977.69	160.75	384.25	0.00	1914.91	863.23	0.511	1.03	1.04	3.840	A
West	393.06	393.06	98.27	0.00	0.00	393.06	428.29	933.65	0.00	1517.73	1258.44	0.259	0.35	0.35	3.200	A
South	102.39	102.39	25.60	0.00	0.00	102.39	135.42	1191.29	0.00	594.06	207.53	0.172	0.21	0.21	7.321	A
East	953.48	369.94	92.49	583.54	0.00	369.94	1118.62	175.06	0.00	2066.15	1809.95	0.179	0.22	0.22	2.122	A

Main results: (13:00-13:15)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	798.29	798.29	199.57	0.00	476.46	799.70	131.44	313.98	0.00	1965.72	863.23	0.406	1.04	0.69	3.090	A
West	320.94	320.94	80.23	0.00	0.00	321.35	350.11	763.57	0.00	1640.69	1258.44	0.196	0.35	0.24	2.731	A
South	83.61	83.61	20.90	0.00	0.00	83.89	110.66	974.27	0.00	708.40	207.53	0.118	0.21	0.13	5.768	A
East	778.52	302.06	75.51	476.46	0.00	302.25	914.99	143.17	0.00	2089.21	1809.95	0.145	0.22	0.17	2.014	A

Main results: (13:15-13:30)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	668.53	668.53	167.13	0.00	399.01	669.27	110.02	262.90	0.00	2002.65	863.23	0.334	0.69	0.50	2.702	A
West	268.77	268.77	67.19	0.00	0.00	269.01	293.09	639.08	0.00	1730.69	1258.44	0.155	0.24	0.18	2.464	A
South	70.02	70.02	17.50	0.00	0.00	70.16	92.65	815.43	0.00	792.08	207.53	0.088	0.13	0.10	4.987	A
East	651.97	252.96	63.24	399.01	0.00	253.09	765.76	119.83	0.00	2106.08	1809.95	0.120	0.17	0.14	1.944	A

Queueing Delay Results for each time segment

Queueing Delay results: (12:00-12:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	7.34	0.49	2.690	A	A
West	2.70	0.18	2.457	A	A
South	1.41	0.09	4.969	A	A
East	2.02	0.13	1.942	A	A

Queueing Delay results: (12:15-12:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	10.03	0.67	3.079	A	A
West	3.59	0.24	2.724	A	A
South	1.95	0.13	5.747	A	A
East	2.51	0.17	2.013	A	A

Queueing Delay results: (12:30-12:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	15.14	1.01	3.829	A	A
West	5.13	0.34	3.197	A	A
South	3.01	0.20	7.300	A	A
East	3.23	0.22	2.121	A	A

Queueing Delay results: (12:45-13:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	15.55	1.04	3.840	A	A
West	5.22	0.35	3.200	A	A
South	3.10	0.21	7.321	A	A
East	3.26	0.22	2.122	A	A

Queueing Delay results: (13:00-13:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	10.52	0.70	3.090	A	A
West	3.71	0.25	2.731	A	A
South	2.07	0.14	5.768	A	A

East	2.57	0.17	2.014	A	A

Queueing Delay results: (13:15-13:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	7.67	0.51	2.702	A	A
West	2.80	0.19	2.464	A	A
South	1.49	0.10	4.987	A	A
East	2.07	0.14	1.944	A	A

Queue Variation Results for each time segment

Queue Variation results: (12:00-12:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.50	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.18	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.10	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.14	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (12:15-12:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.68	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.24	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.13	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.17	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (12:30-12:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.03	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.35	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.21	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.22	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (12:45-13:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.04	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.35	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.21	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.22	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (13:00-13:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.69	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.24	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.13	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.17	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (13:15-13:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.50	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.18	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.10	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.14	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Erb Street & Waterloo Waste Road 2Costco Entrance.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Option A Extension
Report generation date: 2019-07-31 10:09:38 PM

Summary of intersection performance

	AM					
	Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	Default - Total 2031					
Leg North	0.24	3.18	0.19	A	5.54	A
Leg West	0.54	2.87	0.34	A		
Leg South	0.09	8.95	0.05	A		
Leg East	3.12	6.96	0.75	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - Existing, Sat" model duration: 12:00 PM - 1:30 PM
"D4 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D7 - Total 2031, AM " model duration: 8:00 AM - 9:30 AM
"D8 - Total 2031, PM" model duration: 4:00 PM - 5:30 PM
"D9 - Total 2031, Sat" model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 10:09:38 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-22
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Default - Total 2031, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Default	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, AM	Total 2031	AM		ONE HOUR	08:00	09:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Erbsville Road/Ira-Needles Boulavard & Erb Street	Roundabout	North,West,South,East				5.54	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	(untitled)	
West	West	(untitled)	
South	South	(untitled)	
East	East	(untitled)	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	3.50	4.50	30.00	20.00	55.00	25.00	

East	7.00	8.00	30.00	20.00	55.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.527	1221.701
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	245.00	100.000
West	ONE HOUR	✓	616.00	100.000
South	ONE HOUR	✓	32.00	100.000
East	ONE HOUR	✓	1485.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	15.000	0.000	230.000
	West	18.000	0.000	5.000	593.000
	South	2.000	5.000	0.000	25.000
	East	495.000	959.000	31.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.06	0.00	0.94
	West	0.03	0.00	0.01	0.96
	South	0.06	0.16	0.00	0.78
	East	0.33	0.65	0.02	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.000	1.000	1.000
	West	1.000	1.000	1.800	1.040
	South	1.000	1.600	1.000	1.880
	East	1.000	1.050	1.770	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	0.0	0.0	0.0
	West	0.0	0.0	80.0	4.0
	South	0.0	60.0	0.0	88.0
	East	0.0	5.0	77.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.19	3.18	0.24	~1	A	224.82	337.22	15.82	2.82	0.18	15.82	2.82
West	0.34	2.87	0.54	1.04	A	565.25	847.88	36.96	2.62	0.41	36.96	2.62
South	0.05	8.95	0.09	~1	A	29.36	44.05	5.91	8.05	0.07	5.91	8.05
East	0.75	6.96	3.12	5.21	A	1362.66	2043.99	172.62	5.07	1.92	172.64	5.07

Main Results for each time segment

Main results: (08:00-08:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	184.45	46.11	183.95	386.22	746.16	0.00	1653.28	1149.94	0.112	0.00	0.13	2.450	A
West	463.76	115.94	462.54	734.17	195.93	0.00	2051.06	1379.61	0.226	0.00	0.30	2.361	A
South	24.09	6.02	23.90	27.00	631.47	0.00	889.00	0.00	0.027	0.00	0.05	7.226	A
East	1117.99	279.50	1113.63	636.63	18.74	0.00	2179.16	2163.57	0.513	0.00	1.09	3.504	A

Main results: (08:15-08:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	220.25	55.06	220.09	462.24	893.03	0.00	1547.10	1149.94	0.142	0.13	0.17	2.712	A
West	553.77	138.44	553.42	878.68	234.44	0.00	2023.22	1379.61	0.274	0.30	0.39	2.553	A
South	28.77	7.19	28.71	32.32	755.54	0.00	823.64	0.00	0.035	0.05	0.06	7.866	A
East	1334.98	333.75	1332.81	761.80	22.45	0.00	2176.48	2163.57	0.613	1.09	1.63	4.432	A

Main results: (08:30-08:45)

	Total	Intersection	Entry	Exit Flow	Circulating	Pedestrian	Capacity	Saturation	V/C	Start	End	Delay	

Leg	Demand (PCE/hr)	Arrivals (PCE)	Flow (PCE/hr)	(PCE/hr)	Flow (PCE/hr)	Demand (Ped/hr)	(PCE/hr)	Capacity (PCE/hr)	Ratio	Queue (PCE)	Queue (PCE)	(s)	LOS
North	269.75	67.44	269.46	565.08	1091.65	0.00	1403.50	1149.94	0.192	0.17	0.24	3.174	A
West	678.23	169.56	677.64	1074.14	286.98	0.00	1985.24	1379.61	0.342	0.39	0.54	2.868	A
South	35.23	8.81	35.14	39.51	925.11	0.00	734.30	0.00	0.048	0.06	0.09	8.942	A
East	1635.02	408.75	1629.25	932.75	27.49	0.00	2172.84	2163.57	0.752	1.63	3.07	6.826	A

Main results: (08:45-09:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	269.75	67.44	269.75	566.97	1095.40	0.00	1400.79	1149.94	0.193	0.24	0.24	3.182	A
West	678.23	169.56	678.22	1077.78	287.36	0.00	1984.96	1379.61	0.342	0.54	0.54	2.871	A
South	35.23	8.81	35.23	39.63	925.95	0.00	733.86	0.00	0.048	0.09	0.09	8.950	A
East	1635.02	408.75	1634.84	933.66	27.52	0.00	2172.81	2163.57	0.752	3.07	3.12	6.962	A

Main results: (09:00-09:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	220.25	55.06	220.53	464.92	898.35	0.00	1543.25	1149.94	0.143	0.24	0.17	2.723	A
West	553.77	138.44	554.35	883.87	235.02	0.00	2022.80	1379.61	0.274	0.54	0.39	2.555	A
South	28.77	7.19	28.86	32.49	756.88	0.00	822.93	0.00	0.035	0.09	0.06	7.875	A
East	1334.98	333.75	1340.77	763.23	22.51	0.00	2176.44	2163.57	0.613	3.12	1.67	4.516	A

Main results: (09:15-09:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	184.45	46.11	184.61	388.49	750.61	0.00	1650.06	1149.94	0.112	0.17	0.13	2.456	A
West	463.76	115.94	464.11	738.53	196.70	0.00	2050.51	1379.61	0.226	0.39	0.31	2.365	A
South	24.09	6.02	24.15	27.15	633.65	0.00	887.85	0.00	0.027	0.06	0.05	7.242	A
East	1117.99	279.50	1120.25	638.96	18.84	0.00	2179.09	2163.57	0.513	1.67	1.11	3.547	A

Queueing Delay Results for each time segment

Queueing Delay results: (08:00-08:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	1.85	0.12	2.450	A	A
West	4.48	0.30	2.361	A	A
South	0.70	0.05	7.226	A	A
East	15.85	1.06	3.504	A	A

Queueing Delay results: (08:15-08:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.45	0.16	2.712	A	A
West	5.80	0.39	2.553	A	A
South	0.91	0.06	7.866	A	A
East	23.74	1.58	4.432	A	A

Queueing Delay results: (08:30-08:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	3.50	0.23	3.174	A	A
West	7.95	0.53	2.868	A	A
South	1.27	0.08	8.942	A	A
East	43.44	2.90	6.826	A	A

Queueing Delay results: (08:45-09:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	3.56	0.24	3.182	A	A
West	8.09	0.54	2.871	A	A
South	1.30	0.09	8.950	A	A
East	46.52	3.10	6.962	A	A

Queueing Delay results: (09:00-09:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.54	0.17	2.723	A	A
West	6.00	0.40	2.555	A	A
South	0.98	0.07	7.875	A	A
East	26.06	1.74	4.516	A	A

Queueing Delay results: (09:15-09:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	1.91	0.13	2.456	A	A
West	4.64	0.31	2.365	A	A
South	0.75	0.05	7.242	A	A
East	17.01	1.13	3.547	A	A

Queue Variation Results for each time segment

Queue Variation results: (08:00-08:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.13	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.30	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.05	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.09	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:15-08:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.17	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.39	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.63	0.00	0.00	3.12	5.21			N/A	N/A

Queue Variation results: (08:30-08:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.24	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.54	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.09	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	3.07	0.00	0.00	0.00	3.12			N/A	N/A

Queue Variation results: (08:45-09:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.24	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.54	0.00	0.00	0.00	1.04			N/A	N/A
South	0.09	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	3.12	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:00-09:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.17	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.39	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.67	0.00	0.00	3.12	4.17			N/A	N/A

Queue Variation results: (09:15-09:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.13	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.31	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.05	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.11	0.00	0.00	2.08	3.12			N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Erb Street & Waterloo Waste Road 2Costco Entrance.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Option A Extension
Report generation date: 2019-07-31 10:10:02 PM

Summary of intersection performance

	PM					
	Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	Default - Total 2031					
Leg North	0.37	3.59	0.27	A	8.06	A
Leg West	2.92	7.42	0.75	A		
Leg South	0.20	19.96	0.13	C		
Leg East	4.46	9.26	0.82	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - Existing, Sat" model duration: 12:00 PM - 1:30 PM
"D4 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D7 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM
"D8 - Total 2031, PM " model duration: 4:00 PM - 5:30 PM
"D9 - Total 2031, Sat" model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 10:10:01 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-22
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Default - Total 2031, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Default	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, PM	Total 2031	PM		ONE HOUR	16:00	17:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Erbsville Road/Ira-Needles Boulavard & Erb Street	Roundabout	North,West,South,East				8.06	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	(untitled)	
West	West	(untitled)	
South	South	(untitled)	
East	East	(untitled)	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	3.50	4.50	30.00	20.00	55.00	25.00	

East	7.00	8.00	30.00	20.00	55.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.527	1221.701
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	339.00	100.000
West	ONE HOUR	✓	1307.00	100.000
South	ONE HOUR	✓	34.00	100.000
East	ONE HOUR	✓	1610.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	29.000	0.000	310.000
	West	30.000	0.000	2.000	1275.000
	South	1.000	4.000	0.000	29.000
	East	588.000	994.000	28.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.09	0.00	0.91
	West	0.02	0.00	0.00	0.98
	South	0.03	0.12	0.00	0.85

	East	0.37	0.62	0.02	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.000	1.000	1.000
	West	1.000	1.000	1.500	1.000
	South	1.000	1.250	1.000	1.410
	East	1.000	1.010	1.680	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	0.0	0.0	0.0
	West	0.0	0.0	50.0	0.0
	South	0.0	25.0	0.0	41.0
	East	0.0	1.0	68.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.27	3.59	0.37	~1	A	311.07	466.61	24.03	3.09	0.27	24.03	3.09
West	0.75	7.42	2.92	4.00	A	1199.33	1798.99	157.32	5.25	1.75	157.33	5.25
South	0.13	19.96	0.20	~1	C	31.20	46.80	10.76	13.79	0.12	10.76	13.79
East	0.82	9.26	4.46	11.15	A	1477.36	2216.05	225.61	6.11	2.51	225.63	6.11

Main Results for each time segment

Main results: (16:00-16:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	255.22	63.80	254.48	464.07	769.18	0.00	1636.63	1196.90	0.156	0.00	0.18	2.603	A
West	983.98	245.99	980.17	769.96	253.70	0.00	2009.30	1374.15	0.490	0.00	0.95	3.487	A
South	25.60	6.40	25.35	22.49	1211.38	0.00	583.47	0.00	0.044	0.00	0.06	8.851	A
East	1212.09	303.02	1207.03	1210.50	26.23	0.00	2173.75	2169.91	0.558	0.00	1.27	3.753	A

Main results: (16:15-16:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	304.75	76.19	304.50	555.35	920.48	0.00	1527.25	1196.90	0.200	0.18	0.25	2.944	A
West	1174.97	293.74	1172.96	921.41	303.57	0.00	1973.24	1374.15	0.595	0.95	1.46	4.490	A
South	30.57	7.64	30.43	26.92	1449.61	0.00	457.96	0.00	0.067	0.06	0.10	11.555	B
East	1447.36	361.84	1444.43	1448.64	31.40	0.00	2170.01	2169.91	0.667	1.27	2.00	5.008	A

Main results: (16:30-16:45)

Leg	Total	Intersection	Entry	Exit Flow	Circulating	Pedestrian	Capacity	Saturation	V/C	Start	End	Delay	

Leg	Demand (PCE/hr)	Arrivals (PCE)	Flow (PCE/hr)	(PCE/hr)	Flow (PCE/hr)	Demand (Ped/hr)	(PCE/hr)	Capacity (PCE/hr)	Ratio	Queue (PCE)	Queue (PCE)	(s)	LOS
North	373.25	93.31	372.76	677.96	1123.63	0.00	1380.38	1196.90	0.270	0.25	0.37	3.570	A
West	1439.03	359.76	1433.34	1124.86	371.54	0.00	1924.10	1374.15	0.748	1.46	2.88	7.256	A
South	37.43	9.36	37.02	32.86	1772.03	0.00	288.09	0.00	0.130	0.10	0.20	19.652	C
East	1772.64	443.16	1763.25	1770.70	38.34	0.00	2164.99	2169.91	0.819	2.00	4.35	8.876	A

Main results: (16:45-17:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	373.25	93.31	373.24	681.37	1129.36	0.00	1376.24	1196.90	0.271	0.37	0.37	3.588	A
West	1439.03	359.76	1438.85	1130.47	372.13	0.00	1923.68	1374.15	0.748	2.88	2.92	7.422	A
South	37.43	9.36	37.42	33.02	1777.96	0.00	284.97	0.00	0.131	0.20	0.20	19.960	C
East	1772.64	443.16	1772.20	1776.85	38.53	0.00	2164.86	2169.91	0.819	4.35	4.46	9.262	A

Main results: (17:00-17:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	304.75	76.19	305.23	560.11	928.48	0.00	1521.47	1196.90	0.200	0.37	0.25	2.960	A
West	1174.97	293.74	1180.69	929.25	304.46	0.00	1972.60	1374.15	0.596	2.92	1.49	4.580	A
South	30.57	7.64	30.98	27.14	1458.01	0.00	453.54	0.00	0.067	0.20	0.10	11.708	B
East	1447.36	361.84	1456.93	1457.33	31.66	0.00	2169.82	2169.91	0.667	4.46	2.06	5.183	A

Main results: (17:15-17:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	255.22	63.80	255.48	467.20	774.41	0.00	1632.85	1196.90	0.156	0.25	0.19	2.615	A
West	983.98	245.99	986.07	775.13	254.76	0.00	2008.53	1374.15	0.490	1.49	0.97	3.531	A
South	25.60	6.40	25.74	22.64	1218.19	0.00	579.89	0.00	0.044	0.10	0.06	8.920	A
East	1212.09	303.02	1215.19	1217.51	26.42	0.00	2173.61	2169.91	0.558	2.06	1.29	3.820	A

Queueing Delay Results for each time segment

Queueing Delay results: (16:00-16:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.72	0.18	2.603	A	A
West	13.89	0.93	3.487	A	A
South	0.90	0.06	8.851	A	A
East	18.36	1.22	3.753	A	A

Queueing Delay results: (16:15-16:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	3.68	0.25	2.944	A	A
West	21.17	1.41	4.490	A	A
South	1.41	0.09	11.555	B	B
East	28.85	1.92	5.008	A	A

Queueing Delay results: (16:30-16:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	5.43	0.36	3.570	A	A
West	40.56	2.70	7.256	A	A
South	2.84	0.19	19.652	C	B
East	59.75	3.98	8.876	A	A

Queueing Delay results: (16:45-17:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service

North	5.55	0.37	3.588	A	A
West	43.58	2.91	7.422	A	A
South	3.04	0.20	19.960	C	B
East	66.20	4.41	9.262	A	A

Queueing Delay results: (17:00-17:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	3.83	0.26	2.960	A	A
West	23.23	1.55	4.580	A	A
South	1.58	0.11	11.708	B	B
East	32.55	2.17	5.183	A	A

Queueing Delay results: (17:15-17:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.82	0.19	2.615	A	A
West	14.88	0.99	3.531	A	A
South	0.99	0.07	8.920	A	A
East	19.91	1.33	3.820	A	A

Queue Variation Results for each time segment

Queue Variation results: (16:00-16:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.18	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.95	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.27	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:15-16:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.25	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	1.46	0.00	0.00	3.00	4.00			N/A	N/A
South	0.10	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	2.00	0.00	0.00	4.05	6.08			N/A	N/A

Queue Variation results: (16:30-16:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.37	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	2.88	0.00	0.00	0.00	4.00			N/A	N/A
South	0.20	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	4.35	0.00	0.00	2.03	11.15			N/A	N/A

Queue Variation results: (16:45-17:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.37	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or		N/A	N/A

						very big.			
West	2.92	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.20	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	4.46	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:00-17:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.25	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	1.49	0.00	0.00	3.00	4.00			N/A	N/A
South	0.10	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	2.06	0.00	0.00	4.05	6.08			N/A	N/A

Queue Variation results: (17:15-17:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.19	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.97	0.00	0.00	1.00	2.00			N/A	N/A
South	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.29	0.00	0.00	2.03	4.05			N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Erb Street & Waterloo Waste Road 2Costco Entrance.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Option A Extension
Report generation date: 2019-07-31 10:10:50 PM

Summary of intersection performance

	Sat					
	Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	Default - Total 2031					
Leg North	1.02	4.77	0.51	A	7.65	A
Leg West	2.28	7.21	0.70	A		
Leg South	0.09	23.16	0.06	C		
Leg East	4.37	9.08	0.82	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - Existing, Sat" model duration: 12:00 PM - 1:30 PM
"D4 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D7 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM
"D8 - Total 2031, PM" model duration: 4:00 PM - 5:30 PM
"D9 - Total 2031, Sat " model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 10:10:50 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-22
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Default - Total 2031, Sat

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Default	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, Sat	Total 2031	Sat		ONE HOUR	12:00	13:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Erbsville Road/Ira-Needles Boulavard & Erb Street	Roundabout	North,West,South,East				7.65	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	(untitled)	
West	West	(untitled)	
South	South	(untitled)	
East	East	(untitled)	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	3.50	4.50	30.00	20.00	55.00	25.00	

East	7.00	8.00	30.00	20.00	55.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.527	1221.701
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	706.00	100.000
West	ONE HOUR	✓	1048.00	100.000
South	ONE HOUR	✓	13.00	100.000
East	ONE HOUR	✓	1609.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	43.000	1.000	662.000
	West	24.000	0.000	1.000	1023.000
	South	3.000	5.000	0.000	5.000
	East	784.000	816.000	9.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.06	0.00	0.94
	West	0.02	0.00	0.00	0.98
	South	0.23	0.38	0.00	0.38

	East	0.49	0.51	0.01	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.000	1.000	1.000
	West	1.000	1.000	1.000	1.010
	South	1.000	1.400	1.000	1.800
	East	1.000	1.000	1.670	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	0.0	0.0	0.0
	West	0.0	0.0	0.0	1.0
	South	0.0	40.0	0.0	80.0
	East	0.0	0.0	67.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.51	4.77	1.02	?	A	647.84	971.76	62.01	3.83	0.69	62.01	3.83
West	0.70	7.21	2.28	3.03	A	961.66	1442.49	124.20	5.17	1.38	124.21	5.17
South	0.06	23.16	0.09	~1	C	11.93	17.89	4.59	15.39	0.05	4.59	15.39
East	0.82	9.08	4.37	11.02	A	1476.45	2214.67	221.77	6.01	2.46	221.79	6.01

Main Results for each time segment

Main results: (12:00-12:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	531.51	132.88	529.77	608.04	622.27	0.00	1742.84	1387.53	0.305	0.00	0.44	2.964	A
West	788.99	197.25	785.94	647.79	504.25	0.00	1828.16	1241.91	0.432	0.00	0.76	3.478	A
South	9.79	2.45	9.69	8.25	1281.94	0.00	546.30	0.00	0.018	0.00	0.03	9.328	A
East	1211.34	302.83	1206.35	1267.67	23.96	0.00	2175.39	2172.15	0.557	0.00	1.25	3.706	A

Main results: (12:15-12:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	634.68	158.67	633.95	727.62	744.66	0.00	1654.36	1387.53	0.384	0.44	0.62	3.526	A
West	942.13	235.53	940.55	775.19	603.42	0.00	1756.47	1241.91	0.536	0.76	1.16	4.448	A
South	11.69	2.92	11.63	9.87	1534.10	0.00	413.45	0.00	0.028	0.03	0.04	12.456	B
East	1446.46	361.61	1443.58	1517.03	28.69	0.00	2171.97	2172.15	0.666	1.25	1.97	4.933	A

Main results: (12:30-12:45)

	Total	Intersection	Entry	Exit Flow	Circulating	Pedestrian	Capacity	Saturation	V/C	Start	End	Delay	

Leg	Demand (PCE/hr)	Arrivals (PCE)	Flow (PCE/hr)	(PCE/hr)	Flow (PCE/hr)	Demand (Ped/hr)	(PCE/hr)	Capacity (PCE/hr)	Ratio	Queue (PCE)	Queue (PCE)	(s)	LOS
North	777.32	194.33	775.74	888.31	909.06	0.00	1535.50	1387.53	0.506	0.62	1.01	4.729	A
West	1153.87	288.47	1149.49	946.45	738.35	0.00	1658.92	1241.91	0.696	1.16	2.25	7.075	A
South	14.31	3.58	14.12	12.05	1875.79	0.00	233.42	0.00	0.061	0.04	0.09	22.804	C
East	1771.54	442.89	1762.35	1854.89	35.01	0.00	2167.40	2172.15	0.817	1.97	4.26	8.713	A

Main results: (12:45-13:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	777.32	194.33	777.29	892.72	913.63	0.00	1532.20	1387.53	0.507	1.01	1.02	4.768	A
West	1153.87	288.47	1153.74	951.06	739.85	0.00	1657.84	1241.91	0.696	2.25	2.28	7.206	A
South	14.31	3.58	14.30	12.11	1881.49	0.00	230.42	0.00	0.062	0.09	0.09	23.160	C
East	1771.54	442.89	1771.12	1860.57	35.22	0.00	2167.24	2172.15	0.817	4.26	4.37	9.082	A

Main results: (13:00-13:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	634.68	158.67	636.26	733.78	751.02	0.00	1649.76	1387.53	0.385	1.02	0.63	3.556	A
West	942.13	235.53	946.52	781.63	605.65	0.00	1754.86	1241.91	0.537	2.28	1.18	4.522	A
South	11.69	2.92	11.88	9.95	1542.22	0.00	409.17	0.00	0.029	0.09	0.04	12.607	B
East	1446.46	361.61	1455.81	1525.12	28.99	0.00	2171.75	2172.15	0.666	4.37	2.03	5.105	A

Main results: (13:15-13:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	531.51	132.88	532.26	612.10	626.45	0.00	1739.82	1387.53	0.306	0.63	0.44	2.982	A
West	788.99	197.25	790.63	652.08	506.64	0.00	1826.44	1241.91	0.432	1.18	0.77	3.516	A
South	9.79	2.45	9.85	8.30	1288.96	0.00	542.60	0.00	0.018	0.04	0.03	9.396	A
East	1211.34	302.83	1214.38	1274.65	24.17	0.00	2175.24	2172.15	0.557	2.03	1.27	3.765	A

Queueing Delay Results for each time segment

Queueing Delay results: (12:00-12:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	6.42	0.43	2.964	A	A
West	11.12	0.74	3.478	A	A
South	0.36	0.02	9.328	A	A
East	18.11	1.21	3.706	A	A

Queueing Delay results: (12:15-12:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	9.11	0.61	3.526	A	A
West	16.87	1.12	4.448	A	A
South	0.58	0.04	12.456	B	B
East	28.42	1.89	4.933	A	A

Queueing Delay results: (12:30-12:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	14.79	0.99	4.729	A	A
West	31.95	2.13	7.075	A	A
South	1.25	0.08	22.804	C	C
East	58.69	3.91	8.713	A	A

Queueing Delay results: (12:45-13:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service

North	15.30	1.02	4.768	A	A
West	34.04	2.27	7.206	A	A
South	1.35	0.09	23.160	C	C
East	64.91	4.33	9.082	A	A

Queueing Delay results: (13:00-13:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	9.65	0.64	3.556	A	A
West	18.36	1.22	4.522	A	A
South	0.65	0.04	12.607	B	B
East	32.02	2.13	5.105	A	A

Queueing Delay results: (13:15-13:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	6.74	0.45	2.982	A	A
West	11.86	0.79	3.516	A	A
South	0.40	0.03	9.396	A	A
East	19.62	1.31	3.765	A	A

Queue Variation Results for each time segment

Queue Variation results: (12:00-12:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.44	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.76	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.03	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.25	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (12:15-12:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.62	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	1.16	0.00	0.00	2.02	3.03			N/A	N/A
South	0.04	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.97	0.00	0.00	4.01	6.01			N/A	N/A

Queue Variation results: (12:30-12:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.01	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	2.25	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.09	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	4.26	0.00	0.00	1.00	11.02			N/A	N/A

Queue Variation results: (12:45-13:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker

North	1.02	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	2.28	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.09	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	4.37	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (13:00-13:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.63	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	1.18	0.00	0.00	1.01	2.02			N/A	N/A
South	0.04	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	2.03	0.00	0.00	4.01	6.01			N/A	N/A

Queue Variation results: (13:15-13:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.44	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.77	0.00	0.00	1.01	1.01			N/A	N/A
South	0.03	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.27	0.00	0.00	2.00	4.01			N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Erbsville Road & Keatsway Drive.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Option A Extension
Report generation date: 2019-07-31 10:06:58 PM

Summary of intersection performance

	AM					
	Queue (PCE)	**Delay (s)**	**V/C Ratio**	**LOS**	**Intersection Delay (s)**	**Intersection LOS**
	Default - Total 2031					
Leg North	1.05	3.71	0.50	A	4.11	A
Leg West	0.24	3.38	0.19	A		
Leg South	1.58	4.71	0.60	A		
Leg East	0.24	3.61	0.18	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D4 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D7 - Total 2031, AM " model duration: 8:00 AM - 9:30 AM
"D8 - Total 2031, PM" model duration: 4:00 PM - 5:30 PM
"D9 - Total 2031, Sat" model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 10:06:57 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-22
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Default - Total 2031, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Default	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, AM	Total 2031	AM		ONE HOUR	08:00	09:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Ira-Needles Boulavard & University Avenue West	Roundabout	North,West,South,East				4.11	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	(untitled)	
West	West	(untitled)	
South	South	(untitled)	
East	East	(untitled)	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	7.00	8.00	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.723	2192.710
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	931.00	100.000
West	ONE HOUR	✓	237.00	100.000
South	ONE HOUR	✓	1106.00	100.000
East	ONE HOUR	✓	218.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	20.000	865.000	46.000
	West	84.000	0.000	59.000	94.000
	South	999.000	30.000	0.000	77.000
	East	59.000	34.000	125.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.02	0.93	0.05
	West	0.35	0.00	0.25	0.40
	South	0.90	0.03	0.00	0.07
	East	0.85	0.10	0.05	0.00

	East	0.27	0.16	0.57	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.000	1.050	1.020
	West	1.030	1.000	1.050	1.040
	South	1.040	1.110	1.000	1.060
	East	1.120	1.140	1.030	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	0.0	5.0	2.0
	West	3.0	0.0	5.0	4.0
	South	4.0	11.0	0.0	6.0
	East	12.0	14.0	3.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.50	3.71	1.05	?	A	854.30	1281.45	68.27	3.20	0.76	68.28	3.20
West	0.19	3.38	0.24	~1	A	217.48	326.21	16.17	2.97	0.18	16.17	2.97
South	0.60	4.71	1.58	2.09	A	1014.88	1522.33	97.18	3.83	1.08	97.18	3.83
East	0.18	3.61	0.24	~1	A	200.04	300.06	15.76	3.15	0.18	15.76	3.15

Main Results for each time segment

Main results: (08:00-08:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	700.91	175.23	698.80	856.92	141.86	0.00	2090.16	1721.01	0.335	0.00	0.53	2.707	A
West	178.43	44.61	177.92	63.04	777.61	0.00	1630.53	631.97	0.109	0.00	0.13	2.575	A
South	832.65	208.16	829.87	787.38	168.15	0.00	2071.14	1788.09	0.402	0.00	0.70	3.019	A
East	164.12	41.03	163.63	162.87	835.15	0.00	1588.94	828.08	0.103	0.00	0.12	2.701	A

Main results: (08:15-08:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	836.95	209.24	836.23	1025.52	169.76	0.00	2069.98	1721.01	0.404	0.53	0.71	3.054	A
West	213.06	53.26	212.89	75.44	930.54	0.00	1519.98	631.97	0.140	0.13	0.17	2.861	A
South	994.27	248.57	993.15	942.22	201.21	0.00	2047.24	1788.09	0.486	0.70	0.98	3.559	A
East	195.98	48.99	195.81	194.90	999.46	0.00	1470.15	828.08	0.133	0.12	0.16	3.020	A

Main results: (08:30-08:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1025.05	256.26	1023.69	1255.02	207.81	0.00	2042.48	1721.01	0.502	0.71	1.05	3.696	A
West	260.94	65.24	260.64	92.34	1139.15	0.00	1369.16	631.97	0.191	0.17	0.24	3.373	A
South	1217.73	304.43	1215.34	1153.46	246.34	0.00	2014.62	1788.09	0.604	0.98	1.57	4.684	A
East	240.02	60.01	239.72	238.57	1223.11	0.00	1308.46	828.08	0.183	0.16	0.24	3.602	A

Main results: (08:45-09:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1025.05	256.26	1025.03	1257.33	208.09	0.00	2042.27	1721.01	0.502	1.05	1.05	3.705	A
West	260.94	65.24	260.94	92.48	1140.64	0.00	1368.09	631.97	0.191	0.24	0.24	3.377	A
South	1217.73	304.43	1217.69	1154.95	246.63	0.00	2014.41	1788.09	0.605	1.57	1.58	4.713	A
East	240.02	60.01	240.02	238.92	1225.40	0.00	1306.81	828.08	0.184	0.24	0.24	3.607	A

Main results: (09:00-09:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	836.95	209.24	838.29	1028.96	170.19	0.00	2069.67	1721.01	0.404	1.05	0.72	3.064	A
West	213.06	53.26	213.35	75.65	932.83	0.00	1518.32	631.97	0.140	0.24	0.17	2.868	A
South	994.27	248.57	996.64	944.52	201.66	0.00	2046.92	1788.09	0.486	1.58	0.99	3.582	A
East	195.98	48.99	196.28	195.43	1002.87	0.00	1467.69	828.08	0.134	0.24	0.17	3.027	A

Main results: (09:15-09:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	700.91	175.23	701.64	860.90	142.44	0.00	2089.73	1721.01	0.335	0.72	0.53	2.719	A
West	178.43	44.61	178.59	63.31	780.77	0.00	1628.25	631.97	0.110	0.17	0.13	2.579	A
South	832.65	208.16	833.80	790.56	168.80	0.00	2070.68	1788.09	0.402	0.99	0.71	3.040	A
East	164.12	41.03	164.29	163.55	839.05	0.00	1586.12	828.08	0.103	0.17	0.12	2.707	A

Queueing Delay Results for each time segment

Queueing Delay results: (08:00-08:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	7.74	0.52	2.707	A	A
West	1.88	0.13	2.575	A	A
South	10.22	0.68	3.019	A	A
East	1.81	0.12	2.701	A	A

Queueing Delay results: (08:15-08:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	10.43	0.70	3.054	A	A
West	2.50	0.17	2.861	A	A
South	14.36	0.96	3.559	A	A
East	2.43	0.16	3.020	A	A

Queueing Delay results: (08:30-08:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	15.35	1.02	3.696	A	A
West	3.60	0.24	3.373	A	A
South	22.85	1.52	4.684	A	A
East	3.53	0.24	3.602	A	A

Queueing Delay results: (08:45-09:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service

North	15.74	1.05	3.705	A	A
West	3.66	0.24	3.377	A	A
South	23.70	1.58	4.713	A	A
East	3.59	0.24	3.607	A	A

Queueing Delay results: (09:00-09:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	10.93	0.73	3.064	A	A
West	2.59	0.17	2.868	A	A
South	15.27	1.02	3.582	A	A
East	2.52	0.17	3.027	A	A

Queueing Delay results: (09:15-09:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	8.08	0.54	2.719	A	A
West	1.95	0.13	2.579	A	A
South	10.78	0.72	3.040	A	A
East	1.88	0.13	2.707	A	A

Queue Variation Results for each time segment

Queue Variation results: (08:00-08:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.53	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.13	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.70	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.12	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:15-08:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.71	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.17	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.98	0.00	0.00	1.04	2.09			N/A	N/A
East	0.16	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:30-08:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.05	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.24	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.57	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.24	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:45-09:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.05	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.24	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.58	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.24	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:00-09:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.72	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.17	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.99	0.00	0.00	0.00	1.04			N/A	N/A
East	0.17	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:15-09:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.53	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.13	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.71	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.12	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Erbsville Road & Keatsway Drive.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Option A Extension
Report generation date: 2019-07-31 10:07:22 PM

Summary of intersection performance

	PM					
	Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	Default - Total 2031					
Leg North	2.82	7.09	0.74	A	5.86	A
Leg West	0.29	4.47	0.23	A		
Leg South	1.93	5.28	0.66	A		
Leg East	0.33	3.69	0.25	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D4 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D7 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM
"D8 - Total 2031, PM " model duration: 4:00 PM - 5:30 PM
"D9 - Total 2031, Sat" model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 10:07:22 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-22
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Default - Total 2031, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Default	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, PM	Total 2031	PM		ONE HOUR	16:00	17:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Ira-Needles Boulavard & University Avenue West	Roundabout	North,West,South,East				5.86	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	(untitled)	
West	West	(untitled)	
South	South	(untitled)	
East	East	(untitled)	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	7.00	8.00	30.00	20.00	55.00	25.00	

East	7.00	8.00	30.00	20.00	55.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.723	2192.710
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	1320.00	100.000
West	ONE HOUR	✓	213.00	100.000
South	ONE HOUR	✓	1206.00	100.000
East	ONE HOUR	✓	295.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	24.000	1233.000	63.000
	West	64.000	0.000	56.000	93.000
	South	993.000	38.000	0.000	175.000
	East	53.000	89.000	153.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.02	0.93	0.05
	West	0.30	0.00	0.26	0.44
	South	0.82	0.03	0.00	0.15
	East	0.18	0.30	0.52	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.000	1.020	1.000
	West	1.000	1.000	1.000	1.000
	South	1.010	1.000	1.000	1.030
	East	1.000	1.000	1.040	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	0.0	2.0	0.0
	West	0.0	0.0	0.0	0.0
	South	1.0	0.0	0.0	3.0
	East	0.0	0.0	4.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.74	7.09	2.82	4.07	A	1211.26	1816.88	154.69	5.11	1.72	154.70	5.11
West	0.23	4.47	0.29	~1	A	195.45	293.18	17.88	3.66	0.20	17.88	3.66
South	0.66	5.28	1.93	3.04	A	1106.65	1659.97	114.36	4.13	1.27	114.37	4.13
East	0.25	3.69	0.33	~1	A	270.70	406.05	21.46	3.17	0.24	21.46	3.17

Main Results for each time segment

Main results: (16:00-16:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	993.77	248.44	989.93	832.81	210.16	0.00	2040.77	1588.70	0.487	0.00	0.96	3.477	A
West	160.36	40.09	159.84	113.31	1086.77	0.00	1407.03	708.52	0.114	0.00	0.13	2.884	A
South	907.94	226.99	904.80	1081.55	165.07	0.00	2073.38	1760.34	0.438	0.00	0.78	3.112	A
East	222.09	55.52	221.44	248.33	821.54	0.00	1598.78	950.84	0.139	0.00	0.16	2.665	A

Main results: (16:15-16:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1186.65	296.66	1184.69	996.63	251.48	0.00	2010.90	1588.74	0.590	0.96	1.45	4.427	A
West	191.48	47.87	191.28	135.60	1300.58	0.00	1252.46	708.52	0.153	0.13	0.18	3.392	A
South	1084.17	271.04	1082.80	1294.32	197.53	0.00	2049.91	1760.34	0.529	0.78	1.13	3.764	A
East	265.20	66.30	264.97	297.18	983.15	0.00	1481.94	950.84	0.179	0.16	0.22	3.018	A

Main results: (16:30-16:45)

	Total	Intersection	Entry	Exit Flow	Circulating	Pedestrian	Capacity	Saturation	V/C	Start	End	Delay	

Leg	Demand (PCE/hr)	Arrivals (PCE)	Flow (PCE/hr)	(PCE/hr)	Flow (PCE/hr)	Demand (Ped/hr)	(PCE/hr)	Capacity (PCE/hr)	Ratio	Queue (PCE)	Queue (PCE)	(s)	LOS
North	1453.35	363.34	1448.01	1219.33	307.83	0.00	1970.16	1588.71	0.738	1.45	2.78	6.953	A
West	234.52	58.63	234.08	165.93	1589.91	0.00	1043.28	708.52	0.225	0.18	0.29	4.447	A
South	1327.83	331.96	1324.67	1582.35	241.65	0.00	2018.01	1760.34	0.658	1.13	1.92	5.233	A
East	324.80	81.20	324.37	363.54	1202.79	0.00	1323.15	950.84	0.245	0.22	0.33	3.675	A

Main results: (16:45-17:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1453.35	363.34	1453.19	1222.08	308.28	0.00	1969.84	1588.71	0.738	2.78	2.82	7.090	A
West	234.52	58.63	234.51	166.25	1595.22	0.00	1039.45	708.52	0.226	0.29	0.29	4.472	A
South	1327.83	331.96	1327.76	1587.52	242.21	0.00	2017.60	1760.34	0.658	1.92	1.93	5.283	A
East	324.80	81.20	324.80	364.42	1205.56	0.00	1321.15	950.84	0.246	0.33	0.33	3.685	A

Main results: (17:00-17:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1186.65	296.66	1192.01	1000.66	252.17	0.00	2010.41	1588.74	0.590	2.82	1.48	4.509	A
West	191.48	47.87	191.91	136.07	1308.11	0.00	1247.02	708.52	0.154	0.29	0.18	3.412	A
South	1084.17	271.04	1087.31	1301.67	198.35	0.00	2049.31	1760.34	0.529	1.93	1.15	3.803	A
East	265.20	66.30	265.63	298.46	987.20	0.00	1479.02	950.84	0.179	0.33	0.22	3.030	A

Main results: (17:15-17:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	993.77	248.44	995.81	836.94	211.03	0.00	2040.14	1588.70	0.487	1.48	0.97	3.520	A
West	160.36	40.09	160.57	113.83	1093.01	0.00	1402.52	708.52	0.114	0.18	0.13	2.898	A
South	907.94	226.99	909.35	1087.70	165.88	0.00	2072.79	1760.34	0.438	1.15	0.79	3.138	A
East	222.09	55.52	222.32	249.59	825.64	0.00	1595.81	950.84	0.139	0.22	0.17	2.674	A

Queueing Delay Results for each time segment

Queueing Delay results: (16:00-16:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	13.99	0.93	3.477	A	A
West	1.89	0.13	2.884	A	A
South	11.48	0.77	3.112	A	A
East	2.42	0.16	2.665	A	A

Queueing Delay results: (16:15-16:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	21.11	1.41	4.427	A	A
West	2.66	0.18	3.392	A	A
South	16.51	1.10	3.764	A	A
East	3.28	0.22	3.018	A	A

Queueing Delay results: (16:30-16:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	39.38	2.63	6.953	A	A
West	4.24	0.28	4.447	A	A
South	27.62	1.84	5.233	A	A
East	4.87	0.32	3.675	A	A

Queueing Delay results: (16:45-17:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service

North	42.13	2.81	7.090	A	A
West	4.34	0.29	4.472	A	A
South	28.89	1.93	5.283	A	A
East	4.97	0.33	3.685	A	A

Queueing Delay results: (17:00-17:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	23.10	1.54	4.509	A	A
West	2.78	0.19	3.412	A	A
South	17.71	1.18	3.803	A	A
East	3.41	0.23	3.030	A	A

Queueing Delay results: (17:15-17:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	14.97	1.00	3.520	A	A
West	1.97	0.13	2.898	A	A
South	12.15	0.81	3.138	A	A
East	2.51	0.17	2.674	A	A

Queue Variation Results for each time segment

Queue Variation results: (16:00-16:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.96	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.13	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.78	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.16	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:15-16:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.45	0.00	0.00	3.06	4.07			N/A	N/A
West	0.18	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.13	0.00	0.00	2.03	3.04			N/A	N/A
East	0.22	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:30-16:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	2.78	0.00	0.00	0.00	3.06			N/A	N/A
West	0.29	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.92	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.33	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:45-17:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker

North	2.82	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.29	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.93	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.33	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:00-17:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.48	0.00	0.00	2.04	3.06			N/A	N/A
West	0.18	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.15	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.22	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:15-17:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.97	0.00	0.00	1.02	2.04			N/A	N/A
West	0.13	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.79	0.00	0.00	1.01	1.01			N/A	N/A
East	0.17	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Erbsville Road & Keatsway Drive.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Option A Extension
Report generation date: 2019-07-31 10:07:48 PM

Summary of intersection performance

	Sat					
	Queue (PCE)	**Delay (s)**	**V/C Ratio**	**LOS**	**Intersection Delay (s)**	**Intersection LOS**
	Default - Total 2031					
Leg North	1.20	3.97	0.54	A	3.80	A
Leg West	0.10	3.07	0.09	A		
Leg South	1.26	3.88	0.55	A		
Leg East	0.22	3.08	0.18	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D4 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D7 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM
"D8 - Total 2031, PM" model duration: 4:00 PM - 5:30 PM
"D9 - Total 2031, Sat " model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 10:07:48 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-22
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Default - Total 2031, Sat

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Default	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, Sat	Total 2031	Sat		ONE HOUR	12:00	13:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Ira-Needles Boulavard & University Avenue West	Roundabout	North,West,South,East				3.80	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	(untitled)	
West	West	(untitled)	
South	South	(untitled)	
East	East	(untitled)	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	7.00	8.00	30.00	20.00	55.00	25.00	

East	7.00	8.00	30.00	20.00	55.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.723	2192.710
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	991.00	100.000
West	ONE HOUR	✓	105.00	100.000
South	ONE HOUR	✓	1062.00	100.000
East	ONE HOUR	✓	235.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	16.000	934.000	41.000
	West	29.000	0.000	43.000	33.000
	South	865.000	40.000	0.000	157.000
	East	41.000	34.000	160.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.02	0.94	0.04
	West	0.28	0.00	0.41	0.31
	South	0.81	0.04	0.00	0.15

	East	0.17	0.14	0.68	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.000	1.010	1.000
	West	1.000	1.000	1.000	1.000
	South	1.010	1.000	1.000	1.050
	East	1.030	1.000	1.020	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	0.0	1.0	0.0
	West	0.0	0.0	0.0	0.0
	South	1.0	0.0	0.0	5.0
	East	3.0	0.0	2.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.54	3.97	1.20	1.01	A	909.36	1364.04	75.95	3.34	0.84	75.95	3.34
West	0.09	3.07	0.10	~1	A	96.35	144.52	6.59	2.74	0.07	6.59	2.74
South	0.55	3.88	1.26	1.02	A	974.51	1461.76	80.11	3.29	0.89	80.11	3.29
East	0.18	3.08	0.22	~1	A	215.64	323.46	14.85	2.76	0.17	14.85	2.76

Main Results for each time segment

Main results: (12:00-12:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	746.08	186.52	743.80	701.81	175.68	0.00	2065.70	1598.39	0.361	0.00	0.57	2.744	A
West	79.05	19.76	78.84	67.56	851.93	0.00	1576.81	607.99	0.050	0.00	0.05	2.403	A
South	799.53	199.88	797.11	853.44	77.33	0.00	2136.81	1885.36	0.374	0.00	0.60	2.724	A
East	176.92	44.23	176.44	173.39	701.05	0.00	1685.89	909.79	0.105	0.00	0.12	2.430	A

Main results: (12:15-12:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	890.89	222.72	890.05	839.79	210.21	0.00	2040.74	1598.39	0.437	0.57	0.78	3.157	A
West	94.39	23.60	94.33	80.84	1019.42	0.00	1455.72	607.99	0.065	0.05	0.07	2.643	A
South	954.72	238.68	953.84	1021.22	92.52	0.00	2125.82	1885.36	0.449	0.60	0.82	3.118	A
East	211.26	52.82	211.11	207.48	838.88	0.00	1586.24	909.79	0.133	0.12	0.16	2.666	A

Main results: (12:30-12:45)

Leg	Total	Intersection	Entry	Exit Flow	Circulating	Pedestrian	Capacity	Saturation	V/C	Start	End	Delay	

Leg	Demand (PCE/hr)	Arrivals (PCE)	Flow (PCE/hr)	(PCE/hr)	Flow (PCE/hr)	Demand (Ped/hr)	(PCE/hr)	Capacity (PCE/hr)	Ratio	Queue (PCE)	Queue (PCE)	(s)	LOS
North	1091.11	272.78	1089.45	1027.99	257.36	0.00	2006.65	1598.39	0.544	0.78	1.19	3.954	A
West	115.61	28.90	115.49	98.96	1247.85	0.00	1290.58	607.99	0.090	0.07	0.10	3.063	A
South	1169.28	292.32	1167.58	1250.08	113.27	0.00	2110.82	1885.36	0.554	0.82	1.25	3.868	A
East	258.74	64.68	258.48	253.98	1026.87	0.00	1450.34	909.79	0.178	0.16	0.22	3.077	A

Main results: (12:45-13:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1091.11	272.78	1091.09	1029.43	257.64	0.00	2006.45	1598.39	0.544	1.19	1.20	3.969	A
West	115.61	28.90	115.61	99.09	1249.63	0.00	1289.29	607.99	0.090	0.10	0.10	3.066	A
South	1169.28	292.32	1169.26	1251.84	113.40	0.00	2110.73	1885.36	0.554	1.25	1.26	3.882	A
East	258.74	64.68	258.74	254.33	1028.33	0.00	1449.28	909.79	0.179	0.22	0.22	3.079	A

Main results: (13:00-13:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	890.89	222.72	892.53	842.00	210.64	0.00	2040.43	1598.39	0.437	1.20	0.79	3.171	A
West	94.39	23.60	94.51	81.04	1022.13	0.00	1453.76	607.99	0.065	0.10	0.07	2.648	A
South	954.72	238.68	956.40	1023.91	92.73	0.00	2125.67	1885.36	0.449	1.26	0.83	3.132	A
East	211.26	52.82	211.51	208.02	841.12	0.00	1584.62	909.79	0.133	0.22	0.16	2.670	A

Main results: (13:15-13:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	746.08	186.52	746.93	704.69	176.32	0.00	2065.24	1598.39	0.361	0.79	0.57	2.759	A
West	79.05	19.76	79.12	67.83	855.43	0.00	1574.28	607.99	0.050	0.07	0.05	2.407	A
South	799.53	199.88	800.42	856.93	77.62	0.00	2136.60	1885.36	0.374	0.83	0.61	2.738	A
East	176.92	44.23	177.07	174.10	703.94	0.00	1683.80	909.79	0.105	0.16	0.12	2.435	A

Queueing Delay Results for each time segment

Queueing Delay results: (12:00-12:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	8.35	0.56	2.744	A	A
West	0.78	0.05	2.403	A	A
South	8.88	0.59	2.724	A	A
East	1.76	0.12	2.430	A	A

Queueing Delay results: (12:15-12:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	11.45	0.76	3.157	A	A
West	1.03	0.07	2.643	A	A
South	12.12	0.81	3.118	A	A
East	2.31	0.15	2.666	A	A

Queueing Delay results: (12:30-12:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	17.42	1.16	3.954	A	A
West	1.45	0.10	3.063	A	A
South	18.26	1.22	3.868	A	A
East	3.26	0.22	3.077	A	A

Queueing Delay results: (12:45-13:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service

North	17.93	1.20	3.969	A	A
West	1.47	0.10	3.066	A	A
South	18.79	1.25	3.882	A	A
East	3.31	0.22	3.079	A	A

Queueing Delay results: (13:00-13:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	12.06	0.80	3.171	A	A
West	1.06	0.07	2.648	A	A
South	12.76	0.85	3.132	A	A
East	2.39	0.16	2.670	A	A

Queueing Delay results: (13:15-13:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	8.74	0.58	2.759	A	A
West	0.80	0.05	2.407	A	A
South	9.30	0.62	2.738	A	A
East	1.82	0.12	2.435	A	A

Queue Variation Results for each time segment

Queue Variation results: (12:00-12:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.57	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.05	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.60	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.12	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (12:15-12:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.78	0.00	0.00	0.00	1.01			N/A	N/A
West	0.07	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.82	0.00	0.00	1.02	1.02			N/A	N/A
East	0.16	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (12:30-12:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.19	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.10	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.25	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.22	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (12:45-13:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.20	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.10	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.26	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.22	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (13:00-13:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.79	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.07	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.83	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.16	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (13:15-13:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.57	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.05	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.61	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.12	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

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Filename: Erbsville Road-Ira-Needles Boulavard & Erb Street.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Option A Extension
Report generation date: 2019-07-31 10:04:53 PM

Summary of intersection performance

There are warnings associated with this model run - see the 'Data Errors and Warnings' tables.

	AM					
	Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	Default - Total 2031					
Leg North	4.54	15.12	0.82	C	531.05	F
Leg West	240.69	1000.51	1.57	F		
Leg South	144.19	404.23	1.19	F		
Leg East	189.19	1045.42	1.40	F		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - Existing, Sat" model duration: 12:00 PM - 1:30 PM
"D4 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D7 - Total 2031, AM " model duration: 8:00 AM - 9:30 AM
"D8 - Total 2031, PM" model duration: 4:00 PM - 5:30 PM
"D9 - Total 2031, Sat" model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 10:04:52 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-22
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Default - Total 2031, AM

Data Errors and Warnings

Severity	Area	Item	Description
Last Run	Last Run	Leg North - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment(s).
Last Run	Last Run	Leg South - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment(s).
Last Run	Last Run	Leg East - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment(s).
Warning	Pedestrian Crossing	Leg West - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Default	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, AM	Total 2031	AM		ONE HOUR	08:00	09:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Erbsville Road/Ira-Needles Boulavard & Erb Street	Roundabout	North,West,South,East				531.05	F

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	(untitled)	
West	West	(untitled)	
South	South	(untitled)	
East	East	(untitled)	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	7.00	8.00	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Bypass

Leg	Leg Has Bypass	Bypass Utilisation (%)
North	✓	100
West		
South	✓	100
East		

Pedestrian Crossings

Leg	Crossing Type
North	Unsignalled Pedestrian Crossing
West	Unsignalled Pedestrian Crossing
South	Unsignalled Pedestrian Crossing
East	Unsignalled Pedestrian Crossing

Unsignalled Pedestrian Crossing Crossings

Leg	Space between crossing and intersection entry (PCE)	Vehicles queueing on exit (PCE)	Central Refuge	Crossing Data Type	Crossing length (m)	Crossing time (s)	Crossing length (entry side) (m)	Crossing time (entry side) (s)	Crossing length (exit side) (m)	Crossing time (exit side) (s)
North	1.00	1.00	✓	Distance			9.00	6.43	9.00	6.43
West	1.00	1.00	✓	Distance			9.00	6.43	9.50	6.79
South	1.00	1.00	✓	Distance			8.50	6.07	8.25	5.89
East	1.00	1.00	✓	Distance			7.50	5.36	8.50	6.07

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.723	2192.710
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	1366.00	100.000
West	ONE HOUR	✓	1000.00	100.000
South	ONE HOUR	✓	1649.00	100.000
East	ONE HOUR	✓	864.00	100.000

Pedestrian Flows

General Flows Data

Leg	Profile Type	Average Pedestrian Flow (Ped/hr)
North	ONE HOUR	5.00
West	ONE HOUR	4.00
South	ONE HOUR	6.00
East	ONE HOUR	8.00

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	350.000	769.000	247.000
	West	340.000	0.000	298.000	362.000
	South	819.000	609.000	0.000	221.000
	East	118.000	451.000	295.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.26	0.56	0.18
	West	0.34	0.00	0.30	0.36
	South	0.50	0.37	0.00	0.13
	East	0.14	0.52	0.34	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.040	1.040	1.020
	West	1.040	1.000	1.110	1.020
	South	1.030	1.100	1.000	1.030
	East	1.060	1.070	1.040	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	4.0	4.0	2.0
	West	4.0	0.0	11.0	2.0
	South	3.0	10.0	0.0	3.0
	East	6.0	7.0	4.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.82	15.12	4.54	14.49	C	1253.47	1398.45	222.66	9.55	2.47	222.69	9.55
West	1.57	1000.51	240.69	210.46	F	917.62	1376.43	10742.65	468.28	119.36	11964.54	521.55
South	1.19	404.23	144.19	211.75	F	1513.15	1965.54	6580.06	200.86	73.11	6798.55	207.53
East	1.40	1045.42	189.19	211.64	F	792.82	1189.23	8580.59	432.91	95.34	10219.61	515.61

Main Results for each time segment

Main results: (08:00-08:15)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1028.40	764.90	191.22	263.50	0.00	760.45	947.30	1002.96	3.76	1467.56	1342.44	0.521	0.00	1.11	5.238	A
West	752.85	752.85	188.21	0.00	263.50	739.52	785.37	978.03	0.00	972.91	568.96	0.774	0.00	3.33	15.459	C
South	1241.45	1075.07	268.77	166.38	0.00	1061.55	1013.54	704.01	4.52	1394.07	1338.75	0.771	0.00	3.38	11.056	B
East	650.46	650.46	162.62	0.00	166.38	637.28	452.58	1312.99	6.02	841.81	700.83	0.773	0.00	3.30	17.645	C

Main results: (08:15-08:30)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1228.01	913.36	228.34	314.64	0.00	909.99	1078.00	1117.69	4.49	1384.61	1342.56	0.660	1.11	1.96	7.795	A
West	898.98	898.98	224.74	0.00	314.64	811.20	884.12	1143.56	0.00	836.15	568.38	1.075	3.33	25.28	79.896	F
South	1482.42	1283.74	320.94	198.67	0.00	1235.80	1164.07	790.69	5.39	1309.45	1338.49	0.980	3.38	15.37	37.916	E
East	776.72	776.72	194.18	0.00	198.67	684.09	514.88	1511.60	7.19	703.38	700.72	1.104	3.30	26.45	95.238	F

Main results: (08:30-08:45)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1503.99	1118.64	279.66	385.36	0.00	1109.03	1086.19	1147.11	5.51	1363.31	1342.74	0.821	1.96	4.36	14.139	B
West	1101.02	1101.02	275.26	0.00	385.36	707.69	914.81	1341.33	0.00	708.31	567.57	1.554	25.28	123.61	390.593	F
South	1815.58	1572.26	393.06	243.33	0.00	1312.31	1282.60	766.41	6.61	1317.19	1338.11	1.194	15.37	80.35	141.242	F
East	951.28	951.28	237.82	0.00	243.33	680.37	525.80	1552.93	8.81	681.28	700.59	1.396	26.45	94.18	331.569	F

Main results: (08:45-09:00)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1503.99	1118.64	279.66	385.36	0.00	1117.92	1087.10	1148.29	5.51	1362.46	1342.74	0.821	4.36	4.54	15.120	C
West	1101.02	1101.02	275.26	0.00	385.36	702.99	916.30	1349.91	0.00	703.06	567.57	1.566	123.61	223.12	824.324	F
South	1815.58	1572.26	393.06	243.33	0.00	1316.92	1287.62	765.27	6.61	1317.62	1338.11	1.193	80.35	144.19	314.821	F
East	951.28	951.28	237.82	0.00	243.33	679.46	526.26	1555.93	8.81	679.62	700.59	1.400	94.18	162.14	692.923	F

Main results: (09:00-09:15)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1228.01	913.36	228.34	314.64	0.00	923.20	1109.77	1125.02	4.49	1379.35	1342.56	0.662	4.54	2.08	8.338	A
West	898.98	898.98	224.74	0.00	314.64	828.69	896.77	1151.46	0.00	828.89	568.38	1.085	223.12	240.69	1000.509	F
South	1482.42	1283.74	320.94	198.67	0.00	1284.53	1173.97	806.18	5.39	1295.55	1338.49	0.991	144.19	143.99	404.232	F
East	776.72	776.72	194.18	0.00	198.67	668.51	524.43	1566.29	7.19	668.67	700.72	1.162	162.14	189.19	964.652	F

Main results: (09:15-09:30)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1028.40	764.90	191.22	263.50	0.00	768.13	1132.22	1101.53	3.76	1396.32	1342.43	0.548	2.08	1.27	5.963	A
West	752.85	752.85	188.21	0.00	263.50	933.82	879.37	990.29	0.00	937.91	568.96	0.803	240.69	195.45	841.270	F
South	1241.45	1075.07	268.77	166.38	0.00	1265.60	1081.83	842.29	4.52	1274.90	1338.75	0.843	143.99	96.36	342.968	F
East	650.46	650.46	162.62	0.00	166.38	650.65	524.79	1583.10	6.02	654.83	700.82	0.993	189.19	189.15	1045.418	F

Queueing Delay Results for each time segment

Queueing Delay results: (08:00-08:15)

Leg	Queueing Total Delay (PCE-	Queueing Rate Of Delay (PCE-	Average Delay Per Arriving Vehicle	Unsignalised Level Of	Signalised Level Of

	min)	min/min)	(s)	Service	Service
North	16.04	1.07	5.238	A	A
West	43.86	2.92	15.459	C	B
South	45.58	3.04	11.056	B	B
East	42.93	2.86	17.645	C	B

Queueing Delay results: (08:15-08:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	27.88	1.86	7.795	A	A
West	231.37	15.42	79.896	F	E
South	164.35	10.96	37.916	E	D
East	237.23	15.82	95.238	F	F

Queueing Delay results: (08:30-08:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	58.46	3.90	14.139	B	B
West	1117.23	74.48	390.593	F	F
South	721.92	48.13	141.242	F	F
East	905.42	60.36	331.569	F	F

Queueing Delay results: (08:45-09:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	67.04	4.47	15.120	C	B
West	2600.52	173.37	824.324	F	F
South	1684.28	112.29	314.821	F	F
East	1922.47	128.16	692.923	F	F

Queueing Delay results: (09:00-09:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	33.42	2.23	8.338	A	A
West	3478.61	231.91	1000.509	F	F
South	2161.32	144.09	404.232	F	F
East	2634.99	175.67	964.652	F	F

Queueing Delay results: (09:15-09:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	19.82	1.32	5.963	A	A
West	3271.07	218.07	841.270	F	F
South	1802.61	120.17	342.968	F	F
East	2837.53	189.17	1045.418	F	F

Queue Variation Results for each time segment

Queue Variation results: (08:00-08:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.11	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	3.33	0.00	0.00	0.00	4.21			N/A	N/A
South	3.38	0.00	0.00	5.29	11.65			N/A	N/A
East	3.30	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:15-08:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.96	0.00	0.00	4.14	6.21			N/A	N/A
West	25.28	0.00	14.73	61.03	82.08			N/A	N/A
South	15.37	0.00	7.41	38.11	51.88			N/A	N/A
East	26.45	0.00	0.00	38.10	101.59			N/A	N/A

Queue Variation results: (08:30-08:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	4.36	0.00	0.00	4.14	14.49			N/A	N/A
West	123.61	70.50	118.91	170.47	186.26			N/A	N/A
South	80.35	36.00	75.17	120.70	135.52			N/A	N/A
East	94.18	2.12	59.26	>199	>199			N/A	N/A

Queue Variation results: (08:45-09:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	4.54	0.00	0.00	0.00	9.32			N/A	N/A
West	223.12	157.85	>199	>199	>199			N/A	N/A
South	144.19	82.58	138.69	197.98	>199			N/A	N/A
East	162.14	34.92	139.68	>199	>199			N/A	N/A

Queue Variation results: (09:00-09:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	2.08	0.00	0.00	4.14	6.21			N/A	N/A
West	240.69	168.37	>199	>199	>199			N/A	N/A
South	143.99	73.05	137.63	>199	>199			N/A	N/A
East	189.19	52.91	168.26	>199	>199			N/A	N/A

Queue Variation results: (09:15-09:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.27	0.00	0.00	2.07	4.14			N/A	N/A
West	195.45	119.96	190.47	>199	>199			N/A	N/A
South	96.36	32.82	87.87	158.81	184.22			N/A	N/A
East	189.15	51.85	168.26	>199	>199			N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Erbsville Road-Ira-Needles Boulavard & Erb Street.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Option A Extension
Report generation date: 2019-07-31 10:05:30 PM

Summary of intersection performance

There are warnings associated with this model run - see the 'Data Errors and Warnings' tables.

	PM					
	Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	Default - Total 2031					
Leg North	252.50	940.35	1.38	F	2468.79	F
Leg West	1434.39	6462.72	2.67	F		
Leg South	17.55	44.53	0.97	E		
Leg East	258.80	1198.00	1.73	F		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - Existing, Sat" model duration: 12:00 PM - 1:30 PM
"D4 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D7 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM
"D8 - Total 2031, PM " model duration: 4:00 PM - 5:30 PM
"D9 - Total 2031, Sat" model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 10:05:29 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-22
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Default - Total 2031, PM

Data Errors and Warnings

Severity	Area	Item	Description
Last Run	Last Run	Leg North - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment(s).
Last Run	Last Run	Leg West - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment(s).
Last Run	Last Run	Leg South - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment(s).
Last Run	Last Run	Leg East - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment(s).

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Default	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, PM	Total 2031	PM		ONE HOUR	16:00	17:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Erbsville Road/Ira-Needles Boulavard & Erb Street	Roundabout	North,West,South,East				2468.79	F

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	(untitled)	
West	West	(untitled)	
South	South	(untitled)	
East	East	(untitled)	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	7.00	8.00	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Bypass

Leg	Leg Has Bypass	Bypass Utilisation (%)
North	✓	100
West		
South	✓	100
East		

Pedestrian Crossings

Leg	Crossing Type
North	Unsignalled Pedestrian Crossing
West	Unsignalled Pedestrian Crossing
South	Unsignalled Pedestrian Crossing
East	Unsignalled Pedestrian Crossing

Unsignalled Pedestrian Crossing Crossings

Leg	Space between crossing and intersection entry (PCE)	Vehicles queueing on exit (PCE)	Central Refuge	Crossing Data Type	Crossing length (m)	Crossing time (s)	Crossing length (entry side) (m)	Crossing time (entry side) (s)	Crossing length (exit side) (m)	Crossing time (exit side) (s)
North	1.00	1.00	✓	Distance			9.00	6.43	9.00	6.43
West	1.00	1.00	✓	Distance			9.00	6.43	9.50	6.79
South	1.00	1.00	✓	Distance			8.50	6.07	8.25	5.89
East	1.00	1.00	✓	Distance			7.50	5.36	8.50	6.07

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.723	2192.710
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	1622.00	100.000
West	ONE HOUR	✓	1888.00	100.000
South	ONE HOUR	✓	1615.00	100.000
East	ONE HOUR	✓	902.00	100.000

Pedestrian Flows

General Flows Data

Leg	Profile Type	Average Pedestrian Flow (Ped/hr)
North	ONE HOUR	8.00
West	ONE HOUR	15.00
South	ONE HOUR	16.00
East	ONE HOUR	14.00

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	404.000	1076.000	142.000
	West	552.000	0.000	791.000	545.000
	South	829.000	526.000	0.000	260.000
	East	152.000	529.000	221.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.25	0.66	0.09
	West	0.29	0.00	0.42	0.29
	South	0.51	0.33	0.00	0.16
	East	0.17	0.59	0.25	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.020	1.030	1.000
	West	1.000	1.000	1.040	1.000
	South	1.010	1.040	1.000	1.060
	East	1.010	1.020	1.030	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	2.0	3.0	0.0
	West	0.0	0.0	4.0	0.0
	South	1.0	4.0	0.0	6.0
	East	1.0	2.0	3.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	1.38	940.35	252.50	205.28	F	1488.38	1676.49	11556.88	413.61	128.41	13429.34	480.62
West	2.67	6462.72	1434.39	?	F	1732.46	2598.69	63980.42	1477.21	710.89	145942.13	3369.59
South	0.97	44.53	17.55	71.50	E	1481.95	1865.06	588.05	18.92	6.53	588.12	18.92
East	1.73	1198.00	258.80	204.15	F	827.69	1241.54	11335.04	547.79	125.94	12934.85	625.11

Main Results for each time segment

Main results: (16:00-16:15)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1221.13	916.97	229.24	304.15	0.00	897.74	969.55	946.44	6.02	1089.35	980.32	0.842	0.00	4.81	17.824	C
West	1421.39	1421.39	355.35	0.00	304.15	814.31	783.34	1060.84	11.29	819.77	786.55	1.734	0.00	151.77	350.502	F
South	1215.86	1020.12	255.03	195.74	0.00	1012.23	1297.34	577.81	12.05	1536.90	1540.01	0.664	0.00	1.97	6.908	A
East	679.07	679.07	169.77	0.00	195.74	665.68	339.73	1250.32	10.54	868.60	540.37	0.782	0.00	3.35	17.136	C

Main results: (16:15-16:30)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1458.14	1094.96	273.74	363.19	0.00	962.17	1086.81	1068.50	7.19	978.15	979.04	1.119	4.81	38.00	93.444	F
West	1697.27	1697.27	424.32	0.00	363.19	766.75	892.27	1138.41	13.48	766.77	785.74	2.214	151.77	384.40	1253.027	F
South	1451.85	1218.12	304.53	233.73	0.00	1211.85	1347.47	557.69	14.38	1552.30	1539.70	0.785	1.97	3.54	10.603	B
East	810.88	810.88	202.72	0.00	233.73	719.28	333.51	1436.03	12.59	739.00	540.06	1.097	3.35	26.25	92.276	F

Main results: (16:30-16:45)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1785.86	1341.04	335.26	444.81	0.00	974.60	1214.12	1054.42	8.81	975.28	977.25	1.375	38.00	129.62	318.144	F
West	2078.73	2078.73	519.68	0.00	444.81	777.72	909.58	1119.44	16.52	777.73	784.60	2.673	384.40	709.65	2545.613	F
South	1778.15	1491.88	372.97	286.27	0.00	1449.99	1331.65	565.51	17.62	1543.28	1539.21	0.967	3.54	14.01	30.643	D
East	993.12	993.12	248.28	0.00	286.27	591.16	338.12	1677.38	15.41	591.57	539.66	1.679	26.25	126.74	482.966	F

Main results: (16:45-17:00)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1785.86	1341.04	335.26	444.81	0.00	975.72	1228.98	1051.94	8.81	975.85	977.25	1.374	129.62	220.95	654.918	F
West	2078.73	2078.73	519.68	0.00	444.81	779.66	911.00	1116.66	16.52	779.66	784.60	2.666	709.65	1034.42	4127.183	F
South	1778.15	1491.88	372.97	286.27	0.00	1477.74	1329.55	566.76	17.62	1542.08	1539.21	0.967	14.01	17.55	44.531	E
East	993.12	993.12	248.28	0.00	286.27	575.23	338.81	1705.69	15.41	575.27	539.66	1.726	126.74	231.21	1000.689	F

Main results: (17:00-17:15)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1458.14	1094.96	273.74	363.19	0.00	968.76	1120.43	1076.44	7.19	968.90	979.04	1.130	220.95	252.50	891.826	F
West	1697.27	1697.27	424.32	0.00	363.19	765.68	904.81	1140.39	13.48	765.68	785.74	2.217	1034.42	1267.31	5491.720	F
South	1451.85	1218.12	304.53	233.73	0.00	1272.49	1348.24	557.83	14.38	1551.93	1539.70	0.785	17.55	3.95	15.422	C
East	810.88	810.88	202.72	0.00	233.73	700.52	333.97	1496.35	12.59	700.61	540.06	1.157	231.21	258.80	1198.005	F

Main results: (17:15-17:30)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1221.13	916.97	229.24	304.15	0.00	950.64	993.64	1111.94	6.02	954.50	980.32	0.961	252.50	244.08	940.350	F
West	1421.39	1421.39	355.35	0.00	304.15	753.09	901.89	1160.69	11.29	753.09	786.55	1.887	1267.31	1434.39	6462.717	F
South	1215.86	1020.12	255.03	195.74	0.00	1028.08	1365.37	548.40	12.05	1562.24	1540.01	0.653	3.95	1.96	6.982	A
East	679.07	679.07	169.77	0.00	195.74	857.32	328.22	1248.26	10.54	860.70	540.37	0.789	258.80	214.24	993.715	F

Queueing Delay Results for each time segment

Queueing Delay results: (16:00-16:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	60.80	4.05	17.824	C	B
West	1147.52	76.50	350.502	F	F
South	27.79	1.85	6.908	A	A
East	43.57	2.90	17.136	C	B

Queueing Delay results: (16:15-16:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	334.04	22.27	93.444	F	F
West	4021.26	268.08	1253.027	F	F
South	49.00	3.27	10.603	B	B
East	236.21	15.75	92.276	F	F

Queueing Delay results: (16:30-16:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	1257.62	83.84	318.144	F	F
West	8205.36	547.02	2545.613	F	F
South	155.76	10.38	30.643	D	C
East	1147.75	76.52	482.966	F	F

Queueing Delay results: (16:45-17:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2629.25	175.28	654.918	F	F
West	13080.50	872.03	4127.183	F	F
South	239.44	15.96	44.531	E	D
East	2684.63	178.98	1000.689	F	F

Queueing Delay results: (17:00-17:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	3550.83	236.72	891.826	F	F
West	17262.99	1150.87	5491.720	F	F
South	84.96	5.66	15.422	C	B
East	3675.09	245.01	1198.005	F	F

Queueing Delay results: (17:15-17:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	3724.33	248.29	940.350	F	F
West	20262.78	1350.85	6462.717	F	F
South	31.10	2.07	6.982	A	A
East	3547.80	236.52	993.715	F	F

Queue Variation Results for each time segment

Queue Variation results: (16:00-16:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	4.81	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	151.77	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
South	1.97	0.00	1.02	2.04	3.06			N/A	N/A
East	3.35	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:15-16:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	38.00	0.00	1.03	94.43	163.20			N/A	N/A
West	384.40	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
South	3.54	0.00	0.00	8.17	12.26			N/A	N/A
East	26.25	0.00	14.29	64.31	86.76			N/A	N/A

Queue Variation results: (16:30-16:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	129.62	18.48	105.72	>199	>199			N/A	N/A
West	709.65	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
South	14.01	0.00	4.09	36.77	53.11			N/A	N/A
East	126.74	72.47	122.49	173.52	190.88			N/A	N/A

Queue Variation results: (16:45-17:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	220.95	85.19	>199	>199	>199			N/A	N/A
West	1034.42	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
South	17.55	0.00	2.04	45.96	71.50			N/A	N/A
East	231.21	166.38	>199	>199	>199			N/A	N/A

Queue Variation results: (17:00-17:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	252.50	110.85	>199	>199	>199			N/A	N/A
West	1267.31	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
South	3.95	0.00	0.00	8.17	14.30			N/A	N/A
East	258.80	187.81	>199	>199	>199			N/A	N/A

Queue Variation results: (17:15-17:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	244.08	100.59	>199	>199	>199			N/A	N/A
West	1434.39	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
South	1.96	0.00	0.00	1.02	6.13			N/A	N/A
East	214.24	140.86	>199	>199	>199			N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Erbsville Road-Ira-Needles Boulavard & Erb Street.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Option A Extension
Report generation date: 2019-07-31 10:05:56 PM

Summary of intersection performance

There are warnings associated with this model run - see the 'Data Errors and Warnings' tables.

	Sat					
	Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	Default - Total 2031					
Leg North	207.91	808.61	1.50	F	994.63	F
Leg West	614.44	2785.90	1.71	F		
Leg South	38.11	84.48	1.02	F		
Leg East	26.79	96.56	1.03	F		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - Existing, Sat" model duration: 12:00 PM - 1:30 PM
"D4 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D7 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM
"D8 - Total 2031, PM" model duration: 4:00 PM - 5:30 PM
"D9 - Total 2031, Sat " model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 10:05:55 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-22
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Default - Total 2031, Sat

Data Errors and Warnings

Severity	Area	Item	Description
Last Run	Last Run	Leg West - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment(s).
Last Run	Last Run	Leg South - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment(s).
Last Run	Last Run	Leg East - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment(s).
Warning	Pedestrian Crossing	Leg North - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Default	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, Sat	Total 2031	Sat		ONE HOUR	12:00	13:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Erbsville Road/Ira-Needles Boulavard & Erb Street	Roundabout	North,West,South,East				994.63	F

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	(untitled)	
West	West	(untitled)	
South	South	(untitled)	
East	East	(untitled)	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	7.00	8.00	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Bypass

Leg	Leg Has Bypass	Bypass Utilisation (%)
North	✓	100
West		
South	✓	100
East		

Pedestrian Crossings

Leg	Crossing Type
North	Unsignalled Pedestrian Crossing
West	Unsignalled Pedestrian Crossing
South	Unsignalled Pedestrian Crossing
East	Unsignalled Pedestrian Crossing

Unsignalled Pedestrian Crossing Crossings

Leg	Space between crossing and intersection entry (PCE)	Vehicles queueing on exit (PCE)	Central Refuge	Crossing Data Type	Crossing length (m)	Crossing time (s)	Crossing length (entry side) (m)	Crossing time (entry side) (s)	Crossing length (exit side) (m)	Crossing time (exit side) (s)
North	1.00	1.00	✓	Distance			9.00	6.43	9.00	6.43
West	1.00	1.00	✓	Distance			9.00	6.43	9.50	6.79
South	1.00	1.00	✓	Distance			8.50	6.07	8.25	5.89
East	1.00	1.00	✓	Distance			7.50	5.36	8.50	6.07

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.723	2192.710
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	1322.00	100.000
West	ONE HOUR	✓	1389.00	100.000
South	ONE HOUR	✓	1611.00	100.000
East	ONE HOUR	✓	864.00	100.000

Pedestrian Flows

General Flows Data

Leg	Profile Type	Average Pedestrian Flow (Ped/hr)
North	ONE HOUR	4.00
West	ONE HOUR	26.00
South	ONE HOUR	10.00
East	ONE HOUR	9.00

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	364.000	831.000	127.000
	West	396.000	0.000	600.000	393.000
	South	765.000	643.000	0.000	203.000
	East	170.000	470.000	224.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.28	0.63	0.10
	West	0.29	0.00	0.43	0.28
	South	0.47	0.40	0.00	0.13
	East	0.20	0.54	0.26	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.000	1.010	1.000
	West	1.000	1.000	1.000	1.000
	South	1.010	1.000	1.000	1.020
	East	1.000	1.010	1.020	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	0.0	1.0	0.0
	West	0.0	0.0	0.0	0.0
	South	1.0	0.0	0.0	2.0
	East	0.0	1.0	2.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	1.50	808.61	207.91	201.73	F	1213.09	1318.62	8601.38	391.38	95.57	9129.44	415.41
West	1.71	2785.90	614.44	?	F	1274.57	1911.86	26138.86	820.32	290.43	41295.19	1295.97
South	1.02	84.48	38.11	108.58	F	1478.28	1938.01	1081.40	33.48	12.02	1081.49	33.48
East	1.03	96.56	26.79	79.84	F	792.82	1189.23	690.73	34.85	7.67	690.75	34.85

Main Results for each time segment

Main results: (12:00-12:15)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	995.27	721.23	180.31	274.04	0.00	712.49	961.29	998.78	0.00	1041.32	703.66	0.693	0.00	2.19	10.776	B
West	1045.71	1045.71	261.43	0.00	274.04	923.57	831.28	879.99	19.57	953.82	904.94	1.096	0.00	30.53	71.848	F
South	1212.85	1060.02	265.00	152.83	0.00	1050.68	1184.49	619.07	7.53	1503.38	1514.45	0.705	0.00	2.33	7.842	A
East	650.46	650.46	162.62	0.00	152.83	646.09	355.77	1313.99	6.78	1242.69	911.30	0.523	0.00	1.09	6.056	A

Main results: (12:15-12:30)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1188.45	861.22	215.31	327.23	0.00	818.48	1077.84	1194.04	0.00	874.98	700.93	0.984	2.19	12.87	46.354	E
West	1248.68	1248.68	312.17	0.00	327.23	852.68	993.89	1018.62	23.37	853.28	905.59	1.463	30.53	129.54	341.669	F
South	1448.26	1265.76	316.44	182.49	0.00	1256.80	1278.44	592.85	8.99	1522.68	1514.01	0.831	2.33	4.57	13.173	B
East	776.72	776.72	194.18	0.00	182.49	771.98	349.76	1499.90	8.09	1108.29	911.46	0.701	1.09	2.28	10.669	B

Main results: (12:30-12:45)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1455.55	1054.78	263.69	400.77	0.00	719.20	1229.90	1391.36	0.00	720.65	697.14	1.464	12.87	96.77	287.955	F
West	1529.32	1529.32	382.33	0.00	400.77	894.43	1158.90	951.66	28.63	894.48	906.48	1.710	129.54	288.26	844.028	F
South	1773.74	1550.24	387.56	223.51	0.00	1469.62	1242.68	603.41	11.01	1516.12	1513.40	1.023	4.57	24.73	46.487	E
East	951.28	951.28	237.82	0.00	223.51	896.64	348.41	1724.62	9.91	945.83	911.70	1.006	2.28	15.94	49.895	E

Main results: (12:45-13:00)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1455.55	1054.78	263.69	400.77	0.00	704.92	1248.96	1412.75	0.00	705.03	697.14	1.496	96.77	184.23	698.849	F
West	1529.32	1529.32	382.33	0.00	400.77	901.95	1177.38	940.30	28.63	901.96	906.48	1.696	288.26	445.10	1468.735	F
South	1773.74	1550.24	387.56	223.51	0.00	1496.69	1236.46	605.79	11.01	1514.50	1513.40	1.024	24.73	38.11	84.483	F
East	951.28	951.28	237.82	0.00	223.51	907.89	348.64	1753.83	9.91	924.72	911.70	1.029	15.94	26.79	96.564	F

Main results: (13:00-13:15)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1188.45	861.22	215.31	327.23	0.00	766.52	1177.06	1334.96	0.00	766.69	700.93	1.123	184.23	207.91	808.609	F
West	1248.68	1248.68	312.17	0.00	327.23	869.75	1109.77	991.71	23.37	869.76	905.59	1.436	445.10	539.84	2230.704	F
South	1448.26	1265.76	316.44	182.49	0.00	1395.48	1265.79	595.66	8.99	1522.13	1514.01	0.832	38.11	5.69	42.130	E
East	776.72	776.72	194.18	0.00	182.49	868.58	347.70	1643.44	8.09	1004.53	911.46	0.773	26.79	3.82	39.170	E

Main results: (13:15-13:30)

Leg	Total Demand (PCE/hr)	Intersection Demand (PCE/hr)	Intersection Arrivals (PCE)	Bypass Demand (PCE/hr)	Bypass Exit Flow (PCE/hr)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	995.27	721.23	180.31	274.04	0.00	1016.51	926.59	1021.63	0.00	1021.45	703.66	0.706	207.91	134.09	606.683	F
West	1045.71	1045.71	261.43	0.00	274.04	747.28	850.15	1187.99	19.57	747.29	904.94	1.399	539.84	614.44	2785.902	F
South	1212.85	1060.02	265.00	152.83	0.00	1073.77	1376.03	559.24	7.53	1546.31	1514.45	0.686	5.69	2.25	7.872	A
East	650.46	650.46	162.62	0.00	152.83	661.40	346.19	1286.82	6.78	1262.33	911.30	0.515	3.82	1.09	6.160	A

Queueing Delay Results for each time segment

Queueing Delay results: (12:00-12:15)

Leg	Queueing Total Delay (PCE-	Queueing Rate Of Delay (PCE-	Average Delay Per Arriving Vehicle	Unsignalised Level Of	Signalised Level Of

	min)	min/min)	(s)	Service	Service
North	30.02	2.00	10.776	B	B
West	260.02	17.33	71.848	F	E
South	32.53	2.17	7.842	A	A
East	15.69	1.05	6.056	A	A

Queueing Delay results: (12:15-12:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	134.05	8.94	46.354	E	D
West	1201.02	80.07	341.669	F	F
South	61.77	4.12	13.173	B	B
East	31.80	2.12	10.669	B	B

Queueing Delay results: (12:30-12:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	823.78	54.92	287.955	F	F
West	3133.50	208.90	844.028	F	F
South	242.82	16.19	46.487	E	D
East	159.33	10.62	49.895	E	D

Queueing Delay results: (12:45-13:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2107.53	140.50	698.849	F	F
West	5500.21	366.68	1468.735	F	F
South	474.30	31.62	84.483	F	F
East	323.68	21.58	96.564	F	F

Queueing Delay results: (13:00-13:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2941.05	196.07	808.609	F	F
West	7387.03	492.47	2230.704	F	F
South	233.36	15.56	42.130	E	D
East	142.67	9.51	39.170	E	D

Queueing Delay results: (13:15-13:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2564.95	171.00	606.683	F	F
West	8657.08	577.14	2785.902	F	F
South	36.62	2.44	7.872	A	A
East	17.55	1.17	6.160	A	A

Queue Variation Results for each time segment

Queue Variation results: (12:00-12:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	2.19	0.00	0.00	1.01	6.05			N/A	N/A
West	30.53	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
South	2.33	0.00	1.01	3.02	4.02			N/A	N/A
East	1.09	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (12:15-12:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	12.87	0.00	5.04	33.29	46.40			N/A	N/A
West	129.54	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
South	4.57	0.00	0.00	11.06	16.09			N/A	N/A
East	2.28	0.00	0.00	5.05	8.08			N/A	N/A

Queue Variation results: (12:30-12:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	96.77	57.49	93.81	130.12	142.22			N/A	N/A
West	288.26	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
South	24.73	1.01	17.09	54.29	69.37			N/A	N/A
East	15.94	0.00	9.10	36.38	48.51			N/A	N/A

Queue Variation results: (12:45-13:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	184.23	131.13	181.56	>199	>199			N/A	N/A
West	445.10	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
South	38.11	2.01	26.14	84.45	108.58			N/A	N/A
East	26.79	0.00	17.18	60.63	79.84			N/A	N/A

Queue Variation results: (13:00-13:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	207.91	147.26	>199	>199	>199			N/A	N/A
West	539.84	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
South	5.69	0.00	0.00	13.07	22.12			N/A	N/A
East	3.82	0.00	0.00	9.10	14.15			N/A	N/A

Queue Variation results: (13:15-13:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	134.09	77.67	129.11	183.58	>199			N/A	N/A
West	614.44	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
South	2.25	0.00	0.00	1.01	6.03			N/A	N/A
East	1.09	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Ira-Needles Boulavard & The BoardwalkThorndale Drive.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Option A Extension
Report generation date: 2019-07-31 9:58:27 PM

Summary of intersection performance

	AM					
	Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	Default - Total 2031					
Leg North	3.01	8.01	0.74	A	160.33	F
Leg West	0.18	3.45	0.14	A		
Leg South	50.47	81.16	1.03	F		
Leg East	82.42	1554.15	2.15	F		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - Existing, Sat" model duration: 12:00 PM - 1:30 PM
"D4 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D7 - Total 2031, AM " model duration: 8:00 AM - 9:30 AM
"D8 - Total 2031, PM" model duration: 4:00 PM - 5:30 PM
"D9 - Total 2031, Sat" model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 9:58:26 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-22
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Default - Total 2031, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Pedestrian Crossing	Leg North - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg West - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg South - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Default	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, AM	Total 2031	AM		ONE HOUR	08:00	09:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Ira Needles Boulevard & The BoardwalkThorndale Drive	Roundabout	North,West,South,East				160.33	F

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Ira Needles Boulevard	
West	West	The Boardwalk	
South	South	Ira Needles Boulevard	
East	East	Thorndale Drive	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	7.00	8.00	30.00	20.00	55.00	25.00	
East	3.50	4.50	30.00	20.00	55.00	25.00	

Pedestrian Crossings

Leg	Crossing Type
North	Unsignalled Pedestrian Crossing
West	Unsignalled Pedestrian Crossing
South	Unsignalled Pedestrian Crossing
East	Unsignalled Pedestrian Crossing

Unsignalled Pedestrian Crossing Crossings

Leg	Space between crossing and intersection entry (PCE)	Vehicles queueing on exit (PCE)	Central Refuge	Crossing Data Type	Crossing length (m)	Crossing time (s)	Crossing length (entry side) (m)	Crossing time (entry side) (s)	Crossing length (exit side) (m)	Crossing time (exit side) (s)
North	1.00	1.00	✓	Distance			8.00	5.71	8.00	5.71
West	1.00	1.00	✓	Distance			7.50	5.36	6.50	4.64
South	1.00	1.00	✓	Distance			7.75	5.54	8.00	5.71
East	1.00	1.00	✓	Distance			5.50	3.93	5.25	3.75

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.723	2192.710
East		(calculated)	(calculated)	0.527	1221.701

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	1246.00	100.000

West	ONE HOUR	✓	170.00	100.000
South	ONE HOUR	✓	1896.00	100.000
East	ONE HOUR	✓	263.00	100.000

Pedestrian Flows

General Flows Data

Leg	Profile Type	Average Pedestrian Flow (Ped/hr)
North	ONE HOUR	3.00
West	ONE HOUR	2.00
South	ONE HOUR	2.00
East	ONE HOUR	5.00

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	194.000	1011.000	41.000
	West	116.000	0.000	33.000	21.000
	South	1450.000	373.000	0.000	73.000
	East	102.000	68.000	93.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.16	0.81	0.03
	West	0.68	0.00	0.19	0.12
	South	0.76	0.20	0.00	0.04
	East	0.39	0.26	0.35	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.040	1.060	1.110
	West	1.130	1.000	1.000	1.000
	South	1.040	1.000	1.000	1.020
	East	1.010	1.000	1.010	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	4.0	6.0	11.0
	West	13.0	0.0	0.0	0.0
	South	4.0	0.0	0.0	2.0
	East	1.0	0.0	1.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.74	8.01	3.01	4.23	A	1143.35	1715.03	169.34	5.92	1.88	169.36	5.93
West	0.14	3.45	0.18	~1	A	155.99	233.99	12.10	3.10	0.13	12.10	3.10
South	1.03	81.16	50.47	134.04	F	1739.80	2609.70	1332.37	30.63	14.80	1332.45	30.63
East	2.15	1554.15	82.42	113.84	F	241.33	362.00	3175.10	526.26	35.28	3206.96	531.54

Main Results for each time segment

Main results: (08:00-08:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	938.05	234.51	933.98	1247.61	398.46	0.00	1904.64	1934.54	0.493	0.00	1.02	3.909	A
West	127.98	32.00	127.60	474.92	857.52	0.00	1572.77	988.32	0.081	0.00	0.10	2.703	A
South	1427.41	356.85	1418.62	851.55	133.56	0.00	2084.41	1528.34	0.685	0.00	2.20	5.505	A
East	198.00	49.50	195.00	101.12	1451.07	3.76	457.19	92.17	0.433	0.00	0.75	13.685	B

Main results: (08:15-08:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1120.13	280.03	1117.80	1488.83	473.23	0.00	1850.59	1934.53	0.605	1.02	1.60	5.183	A
West	152.83	38.21	152.70	566.49	1024.53	0.00	1452.02	988.32	0.105	0.10	0.13	3.006	A
South	1704.47	426.12	1694.69	1017.39	159.84	0.00	2061.20	1528.29	0.827	2.20	4.64	9.870	A
East	236.43	59.11	228.42	120.89	1733.64	4.49	308.31	92.20	0.767	0.75	2.75	41.908	E

Main results: (08:30-08:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1371.87	342.97	1366.39	1699.42	481.31	0.00	1844.75	1934.54	0.744	1.60	2.97	7.874	A
West	187.17	46.79	186.97	640.94	1206.76	0.00	1320.29	988.31	0.142	0.13	0.18	3.446	A
South	2087.53	521.88	1979.15	1198.09	195.64	0.00	2029.75	1528.22	1.028	4.64	31.74	42.318	E
East	289.57	72.39	150.20	144.26	2030.52	5.51	151.90	92.24	1.906	2.75	37.59	546.227	F

Main results: (08:45-09:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1371.87	342.97	1371.72	1719.16	478.46	0.00	1846.81	1934.54	0.743	2.97	3.01	8.012	A
West	187.17	46.79	187.17	644.36	1205.81	0.00	1320.97	988.31	0.142	0.18	0.18	3.444	A
South	2087.53	521.88	2012.59	1197.01	195.98	0.00	2029.10	1528.22	1.029	31.74	50.47	81.155	F
East	289.57	72.39	134.80	145.75	2062.82	5.51	134.88	92.24	2.147	37.59	76.29	1554.149	F

Main results: (09:00-09:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1120.13	280.03	1125.40	1627.64	500.41	0.00	1830.94	1934.53	0.612	3.01	1.69	5.439	A
West	152.83	38.21	153.03	600.70	1025.10	0.00	1451.61	988.32	0.105	0.18	0.13	3.010	A
South	1704.47	426.12	1884.29	1017.77	160.35	0.00	2058.98	1528.29	0.828	50.47	5.52	35.452	E
East	236.43	59.11	211.89	128.48	1916.16	4.49	212.15	92.20	1.114	76.29	82.42	1123.539	F

Main results: (09:15-09:30)

Leg	Total Demand	Intersection Arrivals (PCE)	Entry Flow	Exit Flow (PCE/hr)	Circulating Flow	Pedestrian Demand	Capacity (PCE/hr)	Saturation Capacity	V/C Ratio	Start Queue	End Queue	Delay (s)	LOS

	(PCE/hr)		(PCE/hr)		(PCE/hr)	(Ped/hr)		(PCE/hr)		(PCE)	(PCE)		
North	938.05	234.51	940.13	1359.81	553.09	0.00	1792.85	1934.54	0.523	1.69	1.17	4.480	A
West	127.98	32.00	128.09	543.66	949.57	0.00	1506.22	988.32	0.085	0.13	0.10	2.836	A
South	1427.41	356.85	1440.33	943.50	134.16	0.00	2083.76	1528.34	0.685	5.52	2.29	5.882	A
East	198.00	49.50	440.63	102.21	1472.28	3.76	446.01	92.17	0.444	82.42	21.77	431.660	F

Queueing Delay Results for each time segment

Queueing Delay results: (08:00-08:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	14.81	0.99	3.909	A	A
West	1.42	0.09	2.703	A	A
South	31.19	2.08	5.505	A	A
East	10.46	0.70	13.685	B	B

Queueing Delay results: (08:15-08:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	23.19	1.55	5.183	A	A
West	1.88	0.13	3.006	A	A
South	63.39	4.23	9.870	A	A
East	34.14	2.28	41.908	E	D

Queueing Delay results: (08:30-08:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	41.85	2.79	7.874	A	A
West	2.64	0.18	3.446	A	A
South	302.18	20.15	42.318	E	D
East	304.58	20.31	546.227	F	F

Queueing Delay results: (08:45-09:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	44.92	2.99	8.012	A	A
West	2.68	0.18	3.444	A	A
South	619.76	41.32	81.155	F	F
East	854.15	56.94	1554.149	F	F

Queueing Delay results: (09:00-09:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	26.47	1.76	5.439	A	A
West	1.95	0.13	3.010	A	A
South	279.29	18.62	35.452	E	D
East	1190.34	79.36	1123.539	F	F

Queueing Delay results: (09:15-09:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	18.10	1.21	4.480	A	A
West	1.53	0.10	2.836	A	A
South	36.57	2.44	5.882	A	A
East	781.43	52.10	431.660	F	F

Queue Variation Results for each time segment

Queue Variation results: (08:00-08:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.02	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.10	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	2.20	0.00	1.03	3.09	4.12			N/A	N/A
East	0.75	0.00	0.00	0.00	1.01			N/A	N/A

Queue Variation results: (08:15-08:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.60	0.00	0.00	3.18	4.23			N/A	N/A
West	0.13	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	4.64	0.00	0.00	10.31	17.53			N/A	N/A
East	2.75	0.00	0.00	4.03	10.07			N/A	N/A

Queue Variation results: (08:30-08:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	2.97	0.00	0.00	0.00	4.23			N/A	N/A
West	0.18	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	31.74	2.06	22.68	67.02	85.58			N/A	N/A
East	37.59	18.13	35.26	53.39	60.44			N/A	N/A

Queue Variation results: (08:45-09:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	3.01	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.18	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	50.47	4.12	38.15	106.20	134.04			N/A	N/A
East	76.29	49.36	74.55	97.72	104.77			N/A	N/A

Queue Variation results: (09:00-09:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.69	0.00	0.00	3.18	4.23			N/A	N/A
West	0.13	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	5.52	0.00	0.00	11.34	20.62			N/A	N/A
East	82.42	53.39	79.58	105.78	113.84			N/A	N/A

Queue Variation results: (09:15-09:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.17	0.00	0.00	2.12	3.18			N/A	N/A
West	0.10	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	2.29	0.00	0.00	0.00	6.19			N/A	N/A
East	21.77	2.01	17.13	42.31	52.38			N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Ira-Needles Boulavard & The BoardwalkThorndale Drive.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Option A Extension
Report generation date: 2019-07-31 9:58:52 PM

Summary of intersection performance

	PM					
	Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	Default - Total 2031					
Leg North	469.35	791.59	1.36	F	448.96	F
Leg West	46.02	183.83	1.09	F		
Leg South	8.30	21.20	0.90	C		
Leg East	14.30	199.19	1.08	F		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - Existing, Sat" model duration: 12:00 PM - 1:30 PM
"D4 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D7 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM
"D8 - Total 2031, PM " model duration: 4:00 PM - 5:30 PM
"D9 - Total 2031, Sat" model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 9:58:51 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-22
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Default - Total 2031, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Pedestrian Crossing	Leg North - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg West - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg South - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Default	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, PM	Total 2031	PM		ONE HOUR	16:00	17:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Ira Needles Boulevard & The BoardwalkThorndale Drive	Roundabout	North,West,South,East				448.96	F

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Ira Needles Boulevard	
West	West	The Boardwalk	
South	South	Ira Needles Boulevard	
East	East	Thorndale Drive	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	7.00	8.00	30.00	20.00	55.00	25.00	
East	3.50	4.50	30.00	20.00	55.00	25.00	

Pedestrian Crossings

Leg	Crossing Type
North	Unsignalled Pedestrian Crossing
West	Unsignalled Pedestrian Crossing
South	Unsignalled Pedestrian Crossing
East	Unsignalled Pedestrian Crossing

Unsignalled Pedestrian Crossing Crossings

Leg	Space between crossing and intersection entry (PCE)	Vehicles queueing on exit (PCE)	Central Refuge	Crossing Data Type	Crossing length (m)	Crossing time (s)	Crossing length (entry side) (m)	Crossing time (entry side) (s)	Crossing length (exit side) (m)	Crossing time (exit side) (s)
North	1.00	1.00	✓	Distance			8.00	5.71	8.00	5.71
West	1.00	1.00	✓	Distance			7.50	5.36	6.50	4.64
South	1.00	1.00	✓	Distance			7.75	5.54	8.00	5.71
East	1.00	1.00	✓	Distance			5.50	3.93	5.25	3.75

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.723	2192.710
East		(calculated)	(calculated)	0.527	1221.701

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	2460.00	100.000
West	ONE HOUR	✓	782.00	100.000
South	ONE HOUR	✓	1355.00	100.000
East	ONE HOUR	✓	224.00	100.000

Pedestrian Flows

General Flows Data

Leg	Profile Type	Average Pedestrian Flow (Ped/hr)
North	ONE HOUR	3.00
West	ONE HOUR	4.00
South	ONE HOUR	3.00
East	ONE HOUR	6.00

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	170.000	2165.000	125.000
	West	486.000	0.000	224.000	72.000
	South	1134.000	135.000	0.000	86.000
	East	97.000	46.000	81.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.07	0.88	0.05
	West	0.62	0.00	0.29	0.09
	South	0.84	0.10	0.00	0.06
	East	0.43	0.21	0.36	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.020	1.040	1.010
	West	1.050	1.000	1.000	1.000
	South	1.030	1.000	1.000	1.000
	East	1.000	1.030	1.000	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	2.0	4.0	1.0
	West	5.0	0.0	0.0	0.0
	South	3.0	0.0	0.0	0.0
	East	0.0	3.0	0.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	1.36	791.59	469.35	207.41	F	2257.34	3386.01	21090.87	373.73	234.34	23691.56	419.81
West	1.09	183.83	46.02	95.84	F	717.58	1076.37	1691.02	94.26	18.79	1691.61	94.30
South	0.90	21.20	8.30	29.72	C	1243.37	1865.06	339.48	10.92	3.77	339.52	10.92
East	1.08	199.19	14.30	38.23	F	205.55	308.32	337.25	65.63	3.75	337.27	65.63

Main Results for each time segment

Main results: (16:00-16:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1852.02	463.00	1819.46	1282.99	195.66	0.00	2051.26	2013.45	0.903	0.00	8.14	14.519	B
West	588.73	147.18	581.74	261.08	1754.04	0.00	924.63	798.94	0.637	0.00	1.75	10.616	B
South	1020.12	255.03	1014.72	1828.22	507.55	0.00	1786.16	1645.49	0.571	0.00	1.35	4.750	A
East	168.64	42.16	166.79	210.42	1311.86	4.52	530.53	148.18	0.318	0.00	0.46	9.909	A

Main results: (16:15-16:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	2211.49	552.87	2004.37	1527.90	233.90	0.00	2023.61	2013.44	1.093	8.14	59.92	70.055	F
West	703.00	175.75	685.16	300.36	1937.91	0.00	791.70	798.94	0.888	1.75	6.21	30.764	D
South	1218.12	304.53	1213.76	2032.32	590.75	0.00	1716.67	1645.40	0.710	1.35	2.44	7.273	A
East	201.37	50.34	199.26	241.97	1562.54	5.39	398.46	148.23	0.505	0.46	0.99	17.993	C

Main results: (16:30-16:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	2708.51	677.13	1996.78	1807.75	270.28	0.00	1997.31	2013.43	1.356	59.92	237.85	273.293	F
West	861.00	215.25	775.00	329.40	1937.66	0.00	791.88	798.93	1.087	6.21	27.71	94.486	F
South	1491.88	372.97	1471.69	2058.19	654.47	0.00	1663.08	1645.27	0.897	2.44	7.49	17.671	C
East	246.63	61.66	218.10	266.22	1859.93	6.61	241.78	148.29	1.020	0.99	8.12	104.228	F

Main results: (16:45-17:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	2708.51	677.13	1994.44	1831.52	274.14	0.00	1994.52	2013.43	1.358	237.85	416.37	593.091	F
West	861.00	215.25	787.74	331.72	1936.86	0.00	792.45	798.93	1.087	27.71	46.02	181.479	F
South	1491.88	372.97	1488.64	2061.17	663.44	0.00	1656.02	1645.27	0.901	7.49	8.30	21.200	C
East	246.63	61.66	221.93	268.35	1883.73	6.61	229.24	148.29	1.076	8.12	14.30	199.190	F

Main results: (17:00-17:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	2211.49	552.87	1999.57	1622.00	267.01	0.00	1999.68	2013.44	1.106	416.37	469.35	791.595	F
West	703.00	175.75	763.77	313.69	1952.89	0.00	780.87	798.94	0.900	46.02	30.83	183.828	F
South	1218.12	304.53	1240.00	2070.06	646.59	0.00	1674.38	1645.40	0.728	8.30	2.83	8.895	A
East	201.37	50.34	253.04	250.63	1635.97	5.39	359.77	148.23	0.560	14.30	1.38	48.461	E

Main results: (17:15-17:30)

Leg	Total Demand	Intersection Arrivals (PCE)	Entry Flow	Exit Flow (PCE/hr)	Circulating Flow	Pedestrian Demand	Capacity (PCE/hr)	Saturation Capacity	V/C Ratio	Start Queue	End Queue	Delay (s)	LOS

	(PCE/hr)		(PCE/hr)		(PCE/hr)	(Ped/hr)		(PCE/hr)		(PCE)	(PCE)		
North	1852.02	463.00	2043.85	1365.42	199.66	0.00	2048.37	2013.45	0.904	469.35	421.39	784.616	F
West	588.73	147.18	696.53	278.71	1964.80	0.00	772.26	798.94	0.762	30.83	3.88	71.719	F
South	1020.12	255.03	1025.29	2060.46	600.86	0.00	1712.73	1645.49	0.596	2.83	1.53	5.406	A
East	168.64	42.16	171.99	233.06	1393.10	4.52	487.73	148.18	0.346	1.38	0.54	11.588	B

Queueing Delay Results for each time segment

Queueing Delay results: (16:00-16:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	100.58	6.71	14.519	B	B
West	24.23	1.62	10.616	B	B
South	19.42	1.29	4.750	A	A
East	6.58	0.44	9.909	A	A

Queueing Delay results: (16:15-16:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	526.38	35.09	70.055	F	E
West	74.85	4.99	30.764	D	C
South	34.60	2.31	7.273	A	A
East	13.77	0.92	17.993	C	B

Queueing Delay results: (16:30-16:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2233.71	148.91	273.293	F	F
West	264.10	17.61	94.486	F	F
South	94.17	6.28	17.671	C	B
East	79.48	5.30	104.228	F	F

Queueing Delay results: (16:45-17:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	4906.70	327.11	593.091	F	F
West	554.13	36.94	181.479	F	F
South	119.57	7.97	21.200	C	C
East	169.70	11.31	199.190	F	F

Queueing Delay results: (17:00-17:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	6642.92	442.86	791.595	F	F
West	576.38	38.43	183.828	F	F
South	47.78	3.19	8.895	A	A
East	59.06	3.94	48.461	E	D

Queueing Delay results: (17:15-17:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	6680.57	445.37	784.616	F	F
West	197.32	13.15	71.719	F	E
South	23.93	1.60	5.406	A	A
East	8.67	0.58	11.588	B	B

Queue Variation Results for each time segment

Queue Variation results: (16:00-16:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker

North	8.14	0.00	0.00	0.00	13.48			N/A	N/A
West	1.75	0.00	0.00	3.09	4.12			N/A	N/A
South	1.35	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.46	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:15-16:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	59.92	1.04	38.37	140.00	184.59			N/A	N/A
West	6.21	0.00	3.09	14.43	19.58			N/A	N/A
South	2.44	0.00	0.00	5.12	8.20			N/A	N/A
East	0.99	0.00	0.00	1.01	2.01			N/A	N/A

Queue Variation results: (16:30-16:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	237.85	131.70	>199	>199	>199			N/A	N/A
West	27.71	5.15	22.67	50.49	60.80			N/A	N/A
South	7.49	0.00	0.00	15.37	29.72			N/A	N/A
East	8.12	0.00	5.03	17.10	23.14			N/A	N/A

Queue Variation results: (16:45-17:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	416.37	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	46.02	11.34	40.19	80.38	95.84			N/A	N/A
South	8.30	0.00	0.00	9.22	28.70			N/A	N/A
East	14.30	0.00	10.06	30.18	38.23			N/A	N/A

Queue Variation results: (17:00-17:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	469.35	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	30.83	5.15	25.76	57.71	69.04			N/A	N/A
South	2.83	0.00	0.00	6.15	10.25			N/A	N/A
East	1.38	0.00	0.00	2.01	4.02			N/A	N/A

Queue Variation results: (17:15-17:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	421.39	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	3.88	0.00	0.00	6.18	13.40			N/A	N/A
South	1.53	0.00	0.00	2.05	5.12			N/A	N/A
East	0.54	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Ira-Needles Boulavard & The BoardwalkThorndale Drive.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Option A Extension
Report generation date: 2019-07-31 10:00:56 PM

Summary of intersection performance

	Sat					
	Queue (PCE)	**Delay (s)**	**V/C Ratio**	**LOS**	**Intersection Delay (s)**	**Intersection LOS**
	Default - Total 2031					
Leg North	91.64	141.40	1.08	F	103.36	F
Leg West	1.86	10.77	0.65	B		
Leg South	20.20	43.26	0.97	E		
Leg East	32.46	570.94	1.61	F		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - Existing, Sat" model duration: 12:00 PM - 1:30 PM
"D4 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D7 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM
"D8 - Total 2031, PM" model duration: 4:00 PM - 5:30 PM
"D9 - Total 2031, Sat " model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 10:00:55 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-22
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Default - Total 2031, Sat

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Pedestrian Crossing	Leg North - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg West - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg South - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg East - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Default	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, Sat	Total 2031	Sat		ONE HOUR	12:00	13:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Ira Needles Boulevard & The BoardwalkThorndale Drive	Roundabout	North,West,South,East				103.36	F

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Ira Needles Boulevard	
West	West	The Boardwalk	
South	South	Ira Needles Boulevard	
East	East	Thorndale Drive	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	7.00	8.00	30.00	20.00	55.00	25.00	
East	3.50	4.50	30.00	20.00	55.00	25.00	

Pedestrian Crossings

Leg	Crossing Type
North	Unsignalled Pedestrian Crossing
West	Unsignalled Pedestrian Crossing
South	Unsignalled Pedestrian Crossing
East	Unsignalled Pedestrian Crossing

Unsignalled Pedestrian Crossing Crossings

Leg	Space between crossing and intersection entry (PCE)	Vehicles queueing on exit (PCE)	Central Refuge	Crossing Data Type	Crossing length (m)	Crossing time (s)	Crossing length (entry side) (m)	Crossing time (entry side) (s)	Crossing length (exit side) (m)	Crossing time (exit side) (s)
North	1.00	1.00	✓	Distance			8.00	5.71	8.00	5.71
West	1.00	1.00	✓	Distance			7.50	5.36	6.50	4.64
South	1.00	1.00	✓	Distance			7.75	5.54	8.00	5.71
East	1.00	1.00	✓	Distance			5.50	3.93	5.25	3.75

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.723	2192.710
East		(calculated)	(calculated)	0.527	1221.701

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	1888.00	100.000
West	ONE HOUR	✓	576.00	100.000
South	ONE HOUR	✓	1591.00	100.000
East	ONE HOUR	✓	165.00	100.000

Pedestrian Flows

General Flows Data

Leg	Profile Type	Average Pedestrian Flow (Ped/hr)
North	ONE HOUR	2.00
West	ONE HOUR	3.00
South	ONE HOUR	0.00
East	ONE HOUR	0.00

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	259.000	1574.000	55.000
	West	394.000	0.000	129.000	53.000
	South	1254.000	279.000	0.000	58.000
	East	62.000	54.000	49.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.14	0.83	0.03
	West	0.68	0.00	0.22	0.09
	South	0.79	0.18	0.00	0.04
	East	0.38	0.33	0.30	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.000	1.010	1.000
	West	1.020	1.000	1.000	1.000
	South	1.010	1.000	1.000	1.000
	East	1.000	1.000	1.000	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	0.0	1.0	0.0
	West	2.0	0.0	0.0	0.0
	South	1.0	0.0	0.0	0.0
	East	0.0	0.0	0.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	1.08	141.40	91.64	170.41	F	1732.46	2598.69	2880.90	66.52	32.01	2881.01	66.52
West	0.65	10.77	1.86	2.03	B	528.55	792.82	100.72	7.62	1.12	100.73	7.62
South	0.97	43.26	20.20	82.65	E	1459.93	2189.89	618.69	16.95	6.87	618.74	16.95
East	1.61	570.94	32.46	54.00	F	151.41	227.11	774.40	204.59	8.60	774.41	204.59

Main Results for each time segment

Main results: (12:00-12:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1421.39	355.35	1411.48	1280.24	285.53	0.00	1986.29	1962.15	0.716	0.00	2.48	6.214	A
West	433.64	108.41	431.59	442.70	1254.31	0.00	1285.91	956.48	0.337	0.00	0.51	4.261	A
South	1197.79	299.45	1191.21	1309.85	376.05	0.00	1920.84	1614.77	0.624	0.00	1.65	4.929	A
East	124.22	31.06	122.77	124.26	1443.00	0.00	461.44	57.26	0.269	0.00	0.36	10.587	B

Main results: (12:15-12:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1697.27	424.32	1682.44	1530.68	341.08	0.00	1946.13	1962.16	0.872	2.48	6.18	13.078	B
West	517.81	129.45	516.37	528.43	1495.09	0.00	1111.83	956.48	0.466	0.51	0.87	6.113	A
South	1430.28	357.57	1424.15	1561.73	449.74	0.00	1867.57	1614.77	0.766	1.65	3.18	8.071	A
East	148.33	37.08	146.32	148.44	1725.44	0.00	312.63	57.26	0.474	0.36	0.86	21.394	C

Main results: (12:30-12:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	2078.73	519.68	1897.44	1819.11	376.03	0.00	1920.86	1962.16	1.082	6.18	51.51	63.790	F
West	634.19	158.55	630.52	599.38	1674.09	0.00	982.43	956.48	0.646	0.87	1.79	10.262	B
South	1751.72	437.93	1701.46	1760.02	544.59	0.00	1799.00	1614.77	0.974	3.18	15.74	28.450	D
East	181.67	45.42	124.41	175.32	2070.73	0.00	130.72	57.26	1.390	0.86	15.18	284.344	F

Main results: (12:45-13:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	2078.73	519.68	1918.20	1842.53	374.32	0.00	1922.10	1962.16	1.081	51.51	91.64	141.395	F
West	634.19	158.55	633.90	604.04	1688.48	0.00	972.03	956.48	0.652	1.79	1.86	10.775	B
South	1751.72	437.93	1733.91	1774.57	547.81	0.00	1796.67	1614.77	0.975	15.74	20.20	43.260	E
East	181.67	45.42	112.55	177.42	2104.31	0.00	113.03	57.26	1.607	15.18	32.46	570.943	F

Main results: (13:00-13:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1697.27	424.32	1862.42	1635.98	428.52	0.00	1882.91	1962.16	0.901	91.64	50.35	138.723	F
West	517.81	129.45	520.57	605.04	1685.89	0.00	973.89	956.48	0.532	1.86	1.17	8.099	A
South	1430.28	357.57	1497.10	1748.22	458.24	0.00	1861.43	1614.77	0.768	20.20	3.49	11.708	B

East	148.33	37.08	265.90	156.73	1798.60	0.00	274.09	57.26	0.541	32.46	3.07	254.284	F

Main results: (13:15-13:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1421.39	355.35	1612.13	1298.56	295.54	0.00	1979.05	1962.15	0.718	50.35	2.66	16.536	C
West	433.64	108.41	435.88	476.62	1431.06	0.00	1158.13	956.48	0.374	1.17	0.61	5.067	A
South	1197.79	299.45	1204.91	1481.71	385.23	0.00	1914.21	1614.77	0.626	3.49	1.71	5.167	A
East	124.22	31.06	134.96	131.00	1459.14	0.00	452.94	57.26	0.274	3.07	0.38	11.690	B

Queueing Delay Results for each time segment

Queueing Delay results: (12:00-12:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	34.84	2.32	6.214	A	A
West	7.47	0.50	4.261	A	A
South	23.59	1.57	4.929	A	A
East	5.17	0.34	10.587	B	B

Queueing Delay results: (12:15-12:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	81.27	5.42	13.078	B	B
West	12.66	0.84	6.113	A	A
South	44.51	2.97	8.071	A	A
East	11.94	0.80	21.394	C	C

Queueing Delay results: (12:30-12:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	451.97	30.13	63.790	F	E
West	25.18	1.68	10.262	B	B
South	171.41	11.43	28.450	D	C
East	126.31	8.42	284.344	F	F

Queueing Delay results: (12:45-13:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	1074.79	71.65	141.395	F	F
West	27.55	1.84	10.775	B	B
South	272.80	18.19	43.260	E	D
East	357.50	23.83	570.943	F	F

Queueing Delay results: (13:00-13:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	1064.94	71.00	138.723	F	F
West	18.38	1.23	8.099	A	A
South	79.57	5.30	11.708	B	B
East	266.47	17.76	254.284	F	F

Queueing Delay results: (13:15-13:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	173.10	11.54	16.536	C	B
West	9.47	0.63	5.067	A	A
South	26.80	1.79	5.167	A	A
East	7.02	0.47	11.690	B	B

Queue Variation Results for each time segment

Queue Variation results: (12:00-12:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	2.48	0.00	1.01	5.04	6.05			N/A	N/A
West	0.51	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.65	0.00	0.00	2.02	2.02			N/A	N/A
East	0.36	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (12:15-12:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	6.18	0.00	1.01	15.12	23.19			N/A	N/A
West	0.87	0.00	0.00	1.01	1.01			N/A	N/A
South	3.18	0.00	0.00	7.06	11.09			N/A	N/A
East	0.86	0.00	0.00	1.00	2.00			N/A	N/A

Queue Variation results: (12:30-12:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	51.51	14.12	45.37	88.73	103.86			N/A	N/A
West	1.79	0.00	0.00	0.00	2.03			N/A	N/A
South	15.74	0.00	5.04	41.32	59.46			N/A	N/A
East	15.18	4.00	13.00	25.00	29.00			N/A	N/A

Queue Variation results: (12:45-13:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	91.64	33.27	83.69	148.22	170.41			N/A	N/A
West	1.86	0.00	0.00	0.00	2.03			N/A	N/A
South	20.20	0.00	3.02	53.42	82.65			N/A	N/A
East	32.46	14.00	30.00	48.00	54.00			N/A	N/A

Queue Variation results: (13:00-13:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	50.35	23.19	47.39	73.61	82.68			N/A	N/A
West	1.17	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	3.49	0.00	0.00	7.06	13.10			N/A	N/A
East	3.07	0.00	0.00	6.00	11.00			N/A	N/A

Queue Variation results: (13:15-13:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	2.66	0.00	0.00	0.00	6.05			N/A	N/A
West	0.61	0.00	0.00	0.00	1.01			N/A	N/A
South	1.71	0.00	0.00	1.01	4.03			N/A	N/A
East	0.38	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Ira-Needles Boulavard & University Avenue West.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Option A Extension
Report generation date: 2019-07-31 9:55:14 PM

Summary of intersection performance

There are warnings associated with this model run - see the 'Data Errors and Warnings' tables.

	AM					
	Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	Default - Total 2031					
Leg North	2.60	7.58	0.72	A	1394.99	F
Leg West	0.35	10.15	0.22	B		
Leg South	1135.66	2466.50	1.83	F		
Leg East	1.36	6.37	0.57	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
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"D9 - Total 2031, Sat" model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 9:55:14 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-22
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Default - Total 2031, AM

Data Errors and Warnings

Severity	Area	Item	Description
Last Run	Last Run	Leg South - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment(s).
Last Run	Last Run	Leg East - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment(s).
Warning	Pedestrian Crossing	Leg North - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg West - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Default	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, AM	Total 2031	AM		ONE HOUR	08:00	09:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Ira-Needles Boulavard & University Avenue West	Roundabout	North,West,South,East				1394.99	F

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Ira Needles Boulevard	
West	West	University Avenue West	
South	South	Ira Needles Boulevard	
East	East	University Avenue West	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00

East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	7.00	8.00	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Pedestrian Crossings

Leg	Crossing Type
North	Unsignalled Pedestrian Crossing
West	Unsignalled Pedestrian Crossing
South	Unsignalled Pedestrian Crossing
East	Unsignalled Pedestrian Crossing

Unsignalled Pedestrian Crossing Crossings

Leg	Space between crossing and intersection entry (PCE)	Vehicles queueing on exit (PCE)	Central Refuge	Crossing Data Type	Crossing length (m)	Crossing time (s)	Crossing length (entry side) (m)	Crossing time (entry side) (s)	Crossing length (exit side) (m)	Crossing time (exit side) (s)
North	1.00	1.00	✓	Distance			7.50	5.36	7.50	5.36
West	1.00	1.00	✓	Distance			7.50	5.36	7.50	5.36
South	1.00	1.00	✓	Distance			7.50	5.36	7.50	5.36
East	1.00	1.00	✓	Distance			7.50	5.36	7.50	5.36

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.723	2192.710
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	1135.00	100.000
West	ONE HOUR	✓	113.00	100.000
South	ONE HOUR	✓	2528.00	100.000
East	ONE HOUR	✓	704.00	100.000

Pedestrian Flows

General Flows Data

Leg	Profile Type	Average Pedestrian Flow (Ped/hr)
North	ONE HOUR	3.00
West	ONE HOUR	2.00
South	ONE HOUR	7.00
East	ONE HOUR	7.00

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	36.000	923.000	176.000
	West	25.000	0.000	41.000	47.000
	South	1652.000	189.000	0.000	687.000
	East	240.000	126.000	338.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.03	0.81	0.16
	West	0.22	0.00	0.36	0.42
	South	0.65	0.07	0.00	0.27
	East	0.34	0.18	0.48	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.040	1.040	1.020
	West	1.470	1.000	1.330	1.090
	South	1.040	1.150	1.000	1.020
	East	1.070	1.070	1.040	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	4.0	4.0	2.0
	West	47.0	0.0	33.0	9.0
	South	4.0	15.0	0.0	2.0
	East	7.0	7.0	4.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.72	7.58	2.60	3.11	A	1041.50	1562.24	142.05	5.46	1.58	142.07	5.46
West	0.22	10.15	0.35	~1	B	103.69	155.54	19.56	7.55	0.22	19.56	7.55
South	1.83	2466.50	1135.66	?	F	2319.74	3479.61	51281.37	884.26	569.79	75389.29	1299.96
East	0.57	6.37	1.36	1.06	A	646.00	969.00	88.63	5.49	0.98	88.64	5.49

Main Results for each time segment

Main results: (08:00-08:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	854.49	213.62	850.97	1236.37	466.27	0.00	1855.62	1447.25	0.460	0.00	0.88	3.704	A
West	85.07	21.27	84.58	240.11	1077.14	0.00	942.63	279.49	0.090	0.00	0.12	5.210	A
South	1903.21	475.80	1588.27	975.87	185.85	5.27	1609.28	1412.42	1.183	0.00	78.74	95.868	F
East	530.01	132.50	527.28	598.76	1175.36	5.27	1342.92	1404.31	0.395	0.00	0.68	4.644	A

Main results: (08:15-08:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1020.34	255.09	1018.54	1263.84	533.88	0.00	1806.74	1447.15	0.565	0.88	1.33	4.725	A
West	101.58	25.40	101.33	262.79	1289.63	0.00	771.10	278.98	0.132	0.12	0.19	6.678	A
South	2272.62	568.16	1570.05	1168.45	222.50	6.29	1570.31	1412.14	1.447	78.74	254.38	391.099	F
East	632.88	158.22	631.92	626.76	1165.80	6.29	1349.80	1404.51	0.469	0.68	0.92	5.286	A

Main results: (08:30-08:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1249.66	312.41	1244.74	1285.92	623.56	0.00	1741.91	1447.03	0.717	1.33	2.56	7.433	A
West	124.42	31.10	123.79	291.72	1576.58	0.00	568.45	278.29	0.219	0.19	0.34	10.044	B
South	2783.38	695.84	1522.41	1428.48	271.89	7.71	1522.44	1411.71	1.828	254.38	569.62	976.327	F
East	775.12	193.78	773.40	658.23	1136.08	7.71	1371.23	1404.79	0.565	0.92	1.35	6.337	A

Main results: (08:45-09:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1249.66	312.41	1249.51	1285.94	624.59	0.00	1741.16	1447.03	0.718	2.56	2.60	7.584	A
West	124.42	31.10	124.40	292.10	1582.00	0.00	564.95	278.29	0.220	0.34	0.35	10.152	B
South	2783.38	695.84	1521.37	1433.38	273.02	7.71	1521.38	1411.71	1.830	569.62	885.12	1724.263	F
East	775.12	193.78	775.08	658.94	1135.45	7.71	1371.68	1404.79	0.565	1.35	1.36	6.368	A

Main results: (09:00-09:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1020.34	255.09	1025.28	1264.08	535.52	0.00	1805.56	1447.15	0.565	2.60	1.36	4.814	A
West	101.58	25.40	102.21	263.37	1297.42	0.00	765.18	278.98	0.133	0.35	0.19	6.754	A
South	2272.62	568.16	1568.74	1175.52	224.11	6.29	1568.75	1412.14	1.449	885.12	1061.09	2205.857	F
East	632.88	158.22	634.56	627.81	1165.04	6.29	1350.35	1404.51	0.469	1.36	0.94	5.319	A

Main results: (09:15-09:30)

Leg	Total Demand	Intersection Arrivals (PCE)	Entry Flow	Exit Flow (PCE/hr)	Circulating Flow	Pedestrian Demand	Capacity (PCE/hr)	Saturation Capacity	V/C Ratio	Start Queue	End Queue	Delay (s)	LOS

	(PCE/hr)		(PCE/hr)		(PCE/hr)	(Ped/hr)		(PCE/hr)		(PCE)	(PCE)		
North	854.49	213.62	856.36	1248.68	469.94	0.00	1852.96	1447.23	0.461	1.36	0.89	3.751	A
West	85.07	21.27	85.34	242.18	1084.13	0.00	936.67	279.48	0.091	0.19	0.12	5.254	A
South	1903.21	475.80	1604.93	982.30	187.17	5.27	1604.94	1412.44	1.186	1061.09	1135.66	2466.501	F
East	530.01	132.50	530.97	604.44	1187.66	5.27	1334.02	1404.30	0.397	0.94	0.70	4.736	A

Queueing Delay Results for each time segment

Queueing Delay results: (08:00-08:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	12.80	0.85	3.704	A	A
West	1.79	0.12	5.210	A	A
South	620.03	41.34	95.868	F	F
East	9.92	0.66	4.644	A	A

Queueing Delay results: (08:15-08:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	19.36	1.29	4.725	A	A
West	2.74	0.18	6.678	A	A
South	2498.54	166.57	391.099	F	F
East	13.48	0.90	5.286	A	A

Queueing Delay results: (08:30-08:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	36.20	2.41	7.433	A	A
West	4.96	0.33	10.044	B	B
South	6180.00	412.00	976.327	F	F
East	19.57	1.30	6.337	A	A

Queueing Delay results: (08:45-09:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	38.74	2.58	7.584	A	A
West	5.19	0.35	10.152	B	B
South	10910.56	727.37	1724.263	F	F
East	20.35	1.36	6.368	A	A

Queueing Delay results: (09:00-09:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	21.22	1.41	4.814	A	A
West	2.96	0.20	6.754	A	A
South	14596.59	973.11	2205.857	F	F
East	14.54	0.97	5.319	A	A

Queueing Delay results: (09:15-09:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	13.74	0.92	3.751	A	A
West	1.91	0.13	5.254	A	A
South	16475.64	1098.38	2466.501	F	F
East	10.77	0.72	4.736	A	A

Queue Variation Results for each time segment

Queue Variation results: (08:00-08:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker

North	0.88	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.12	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	78.74	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
East	0.68	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:15-08:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.33	0.00	0.00	2.07	3.11			N/A	N/A
West	0.19	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	254.38	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
East	0.92	0.00	0.00	1.06	1.06			N/A	N/A

Queue Variation results: (08:30-08:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	2.56	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.34	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	569.62	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
East	1.35	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:45-09:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	2.60	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.35	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	885.12	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
East	1.36	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:00-09:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.36	0.00	0.00	2.07	3.11			N/A	N/A
West	0.19	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1061.09	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
East	0.94	0.00	0.00	0.00	1.06			N/A	N/A

Queue Variation results: (09:15-09:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.89	0.00	0.00	1.04	2.07			N/A	N/A
West	0.12	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1135.66	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A

East	0.70	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Ira-Needles Boulavard & University Avenue West.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Option A Extension
Report generation date: 2019-07-31 9:56:13 PM

Summary of intersection performance

There are warnings associated with this model run - see the 'Data Errors and Warnings' tables.

	PM					
	Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	Default - Total 2031					
Leg North	1398.54	3578.67	2.06	F	1981.71	F
Leg West	29.23	223.92	1.09	F		
Leg South	431.42	1050.67	1.42	F		
Leg East	73.76	290.26	1.15	F		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - Existing, Sat" model duration: 12:00 PM - 1:30 PM
"D4 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D7 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM
"D8 - Total 2031, PM " model duration: 4:00 PM - 5:30 PM
"D9 - Total 2031, Sat" model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 9:56:13 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-22
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Default - Total 2031, PM

Data Errors and Warnings

Severity	Area	Item	Description
Last Run	Last Run	Leg North - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment(s).
Last Run	Last Run	Leg West - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment(s).
Last Run	Last Run	Leg South - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment(s).
Last Run	Last Run	Leg East - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment(s).

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Default	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, PM	Total 2031	PM		ONE HOUR	16:00	17:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Ira-Needles Boulavard & University Avenue West	Roundabout	North,West,South,East				1981.71	F

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Ira Needles Boulevard	
West	West	University Avenue West	
South	South	Ira Needles Boulevard	
East	East	University Avenue West	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	7.00	8.00	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Pedestrian Crossings

Leg	Crossing Type
North	Unsignalled Pedestrian Crossing
West	Unsignalled Pedestrian Crossing
South	Unsignalled Pedestrian Crossing
East	Unsignalled Pedestrian Crossing

Unsignalled Pedestrian Crossing Crossings

Leg	Space between crossing and intersection entry (PCE)	Vehicles queueing on exit (PCE)	Central Refuge	Crossing Data Type	Crossing length (m)	Crossing time (s)	Crossing length (entry side) (m)	Crossing time (entry side) (s)	Crossing length (exit side) (m)	Crossing time (exit side) (s)
North	1.00	1.00	✓	Distance			7.50	5.36	7.50	5.36
West	1.00	1.00	✓	Distance			7.50	5.36	7.50	5.36
South	1.00	1.00	✓	Distance			7.50	5.36	7.50	5.36
East	1.00	1.00	✓	Distance			7.50	5.36	7.50	5.36

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.723	2192.710
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	2500.00	100.000
West	ONE HOUR	✓	420.00	100.000
South	ONE HOUR	✓	1871.00	100.000
East	ONE HOUR	✓	894.00	100.000

Pedestrian Flows

General Flows Data

Leg	Profile Type	Average Pedestrian Flow (Ped/hr)
North	ONE HOUR	11.00
West	ONE HOUR	8.00
South	ONE HOUR	6.00
East	ONE HOUR	6.00

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	82.000	2085.000	333.000
	West	38.000	0.000	226.000	156.000
	South	1161.000	231.000	0.000	479.000
	East	222.000	209.000	463.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.03	0.83	0.13
	West	0.09	0.00	0.54	0.37
	South	0.62	0.12	0.00	0.26
	East	0.25	0.23	0.52	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.010	1.030	1.010
	West	1.090	1.000	1.060	1.030
	South	1.020	1.080	1.000	1.000
	East	1.010	1.020	1.010	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	1.0	3.0	1.0
	West	9.0	0.0	6.0	3.0
	South	2.0	8.0	0.0	0.0
	East	1.0	2.0	1.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	2.06	3578.67	1398.54	?	F	2294.04	3441.07	61757.84	1076.84	686.20	105551.78	1840.45
West	1.09	223.92	29.23	65.18	F	385.40	578.10	1165.59	120.97	12.95	1166.54	121.07
South	1.42	1050.67	431.42	204.36	F	1716.86	2575.29	19736.39	459.82	219.29	23345.52	543.91
East	1.15	290.26	73.76	126.54	F	820.35	1230.53	3020.78	147.29	33.56	3034.18	147.95

Main Results for each time segment

Main results: (16:00-16:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1882.13	470.53	1444.17	1039.93	667.16	8.28	1457.71	1332.49	1.291	0.00	109.49	143.475	F
West	316.20	79.05	306.47	371.05	1740.29	6.02	438.99	423.32	0.720	0.00	2.43	26.909	D
South	1408.59	352.15	1365.80	1712.84	333.93	4.52	1496.25	1445.96	0.941	0.00	10.70	23.391	C
East	673.05	168.26	663.23	655.86	1043.86	4.52	936.79	861.01	0.718	0.00	2.45	12.902	B

Main results: (16:15-16:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	2247.45	561.86	1376.41	1130.05	766.29	9.89	1376.51	1332.53	1.633	109.49	327.25	583.201	F
West	377.57	94.39	366.39	407.28	1735.43	7.19	431.24	422.99	0.876	2.43	5.23	50.808	F
South	1681.99	420.50	1455.40	1749.24	352.58	5.39	1464.18	1445.61	1.149	10.70	67.35	106.533	F
East	803.69	200.92	780.39	692.03	1115.95	5.39	866.63	860.25	0.927	2.45	8.28	35.312	E

Main results: (16:30-16:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	2752.55	688.14	1337.44	1147.33	817.53	12.11	1337.45	1332.58	2.058	327.25	681.03	1362.400	F
West	462.43	115.61	410.50	421.40	1733.57	8.81	424.48	422.57	1.089	5.23	18.21	125.499	F
South	2060.01	515.00	1449.13	1776.31	367.76	6.61	1449.45	1445.11	1.421	67.35	220.07	362.737	F
East	984.31	246.08	849.58	701.61	1115.27	6.61	858.73	859.19	1.146	8.28	41.96	120.591	F

Main results: (16:45-17:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	2752.55	688.14	1333.54	1148.37	822.88	12.11	1333.54	1332.58	2.064	681.03	1035.78	2314.712	F
West	462.43	115.61	418.36	422.72	1733.69	8.81	423.22	422.57	1.093	18.21	29.23	223.370	F
South	2060.01	515.00	1446.65	1781.18	370.87	6.61	1446.71	1445.11	1.424	220.07	373.41	741.692	F
East	984.31	246.08	857.11	703.38	1114.14	6.61	858.83	859.19	1.146	41.96	73.76	253.353	F

Main results: (17:00-17:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	2247.45	561.86	1338.71	1147.48	816.62	9.89	1338.72	1332.53	1.679	1035.78	1262.96	3092.141	F
West	377.57	94.39	410.26	421.23	1734.11	7.19	425.02	422.99	0.888	29.23	21.05	223.915	F
South	1681.99	420.50	1449.95	1776.55	367.82	5.39	1450.01	1445.61	1.160	373.41	431.42	1001.979	F
East	803.69	200.92	848.24	701.91	1115.86	5.39	859.88	860.25	0.935	73.76	62.62	290.256	F

Main results: (17:15-17:30)

Leg	Total Demand	Intersection Arrivals (PCE)	Entry Flow	Exit Flow (PCE/hr)	Circulating Flow	Pedestrian Demand	Capacity (PCE/hr)	Saturation Capacity	V/C Ratio	Start Queue	End Queue	Delay (s)	LOS

	(PCE/hr)		(PCE/hr)		(PCE/hr)	(Ped/hr)		(PCE/hr)		(PCE)	(PCE)		
North	1882.13	470.53	1339.84	1149.12	815.25	8.28	1339.85	1332.49	1.405	1262.96	1398.54	3578.668	F
West	316.20	79.05	385.69	421.47	1733.62	6.02	429.15	423.31	0.737	21.05	3.68	104.849	F
South	1408.59	352.15	1457.38	1762.69	356.62	4.52	1460.83	1445.96	0.964	431.42	419.22	1050.665	F
East	673.05	168.26	845.20	694.83	1119.17	4.52	858.86	861.02	0.784	62.62	19.59	179.983	F

Queueing Delay Results for each time segment

Queueing Delay results: (16:00-16:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	842.24	56.15	143.475	F	F
West	31.02	2.07	26.909	D	C
South	120.70	8.05	23.391	C	C
East	33.17	2.21	12.902	B	B

Queueing Delay results: (16:15-16:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	3275.61	218.37	583.201	F	F
West	64.27	4.28	50.808	F	D
South	592.82	39.52	106.533	F	F
East	96.35	6.42	35.312	E	D

Queueing Delay results: (16:30-16:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	7562.08	504.14	1362.400	F	F
West	182.19	12.15	125.499	F	F
South	2155.82	143.72	362.737	F	F
East	383.41	25.56	120.591	F	F

Queueing Delay results: (16:45-17:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	12876.06	858.40	2314.712	F	F
West	356.83	23.79	223.370	F	F
South	4451.08	296.74	741.692	F	F
East	868.44	57.90	253.353	F	F

Queueing Delay results: (17:00-17:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	17240.59	1149.37	3092.141	F	F
West	377.12	25.14	223.915	F	F
South	6036.20	402.41	1001.979	F	F
East	1022.86	68.19	290.256	F	F

Queueing Delay results: (17:15-17:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	19961.26	1330.75	3578.668	F	F
West	154.16	10.28	104.849	F	F
South	6379.78	425.32	1050.665	F	F
East	616.55	41.10	179.983	F	F

Queue Variation Results for each time segment

Queue Variation results: (16:00-16:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker

North	109.49	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
West	2.43	0.00	1.05	3.15	4.21			N/A	N/A
South	10.70	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	2.45	0.00	0.00	5.06	7.09			N/A	N/A

Queue Variation results: (16:15-16:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	327.25	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
West	5.23	0.00	2.10	11.56	14.72			N/A	N/A
South	67.35	0.00	11.24	185.96	>199			N/A	N/A
East	8.28	0.00	4.05	19.23	26.32			N/A	N/A

Queue Variation results: (16:30-16:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	681.03	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
West	18.21	2.10	14.72	33.64	41.00			N/A	N/A
South	220.07	53.13	192.09	>199	>199			N/A	N/A
East	41.96	14.17	37.46	67.83	77.95			N/A	N/A

Queue Variation results: (16:45-17:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1035.78	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
West	29.23	5.26	24.18	53.61	65.18			N/A	N/A
South	373.41	178.81	>199	>199	>199			N/A	N/A
East	73.76	32.39	68.84	112.37	126.54			N/A	N/A

Queue Variation results: (17:00-17:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1262.96	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
West	21.05	1.05	15.77	43.10	53.61			N/A	N/A
South	431.42	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	62.62	22.27	56.69	101.23	116.42			N/A	N/A

Queue Variation results: (17:15-17:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1398.54	?	?	?	?	No excess capacity in final time segment - unable to calculate queue statistics		N/A	N/A
West	3.68	0.00	0.00	6.31	13.67			N/A	N/A
South	419.22	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	19.59	1.01	14.17	40.49	50.62			N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Ira-Needles Boulavard & University Avenue West.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Option A Extension
Report generation date: 2019-07-31 9:56:52 PM

Summary of intersection performance

There are warnings associated with this model run - see the 'Data Errors and Warnings' tables.

	Sat					
	Queue (PCE)	**Delay (s)**	**V/C Ratio**	**LOS**	**Intersection Delay (s)**	**Intersection LOS**
	Default - Total 2031					
Leg North	57.29	103.29	1.05	F	283.75	F
Leg West	1.04	8.06	0.51	A		
Leg South	177.31	319.24	1.18	F		
Leg East	120.09	801.85	1.35	F		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Existing, AM" model duration: 8:00 AM - 9:30 AM
"D2 - Existing, PM" model duration: 4:00 PM - 5:30 PM
"D3 - Existing, Sat" model duration: 12:00 PM - 1:30 PM
"D4 - Background 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Background 2031, PM" model duration: 4:00 PM - 5:30 PM
"D6 - Background 2031, Sat" model duration: 12:00 PM - 1:30 PM
"D7 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM
"D8 - Total 2031, PM" model duration: 4:00 PM - 5:30 PM
"D9 - Total 2031, Sat " model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-31 9:56:51 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-22
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Default - Total 2031, Sat

Data Errors and Warnings

Severity	Area	Item	Description
Last Run	Last Run	Leg North - Capacity	Pedestrian Crossing causes blocking on previous leg due to traffic queing to leave the intersection in 6 timesegment(s).
Warning	Pedestrian Crossing	Leg West - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg South - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg East - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Default	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, Sat	Total 2031	Sat		ONE HOUR	12:00	13:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Ira-Needles Boulavard & University Avenue West	Roundabout	North,West,South,East				283.75	F

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Ira Needles Boulevard	
West	West	University Avenue West	
South	South	Ira Needles Boulevard	
East	East	University Avenue West	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	7.00	8.00	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Pedestrian Crossings

Leg	Crossing Type
North	Unsignalled Pedestrian Crossing
West	Unsignalled Pedestrian Crossing
South	Unsignalled Pedestrian Crossing
East	Unsignalled Pedestrian Crossing

Unsignalled Pedestrian Crossing Crossings

Leg	Space between crossing and intersection entry (PCE)	Vehicles queueing on exit (PCE)	Central Refuge	Crossing Data Type	Crossing length (m)	Crossing time (s)	Crossing length (entry side) (m)	Crossing time (entry side) (s)	Crossing length (exit side) (m)	Crossing time (exit side) (s)
North	1.00	1.00	✓	Distance			7.50	5.36	7.50	5.36
West	1.00	1.00	✓	Distance			7.50	5.36	7.50	5.36
South	1.00	1.00	✓	Distance			7.50	5.36	7.50	5.36
East	1.00	1.00	✓	Distance			7.50	5.36	7.50	5.36

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.723	2192.710
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	1660.00	100.000
West	ONE HOUR	✓	429.00	100.000
South	ONE HOUR	✓	1963.00	100.000
East	ONE HOUR	✓	672.00	100.000

Pedestrian Flows

General Flows Data

Leg	Profile Type	Average Pedestrian Flow (Ped/hr)
North	ONE HOUR	6.00
West	ONE HOUR	1.00
South	ONE HOUR	3.00
East	ONE HOUR	0.00

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	132.000	1302.000	226.000
	West	105.000	0.000	188.000	136.000
	South	1284.000	289.000	0.000	390.000
	East	247.000	238.000	187.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.08	0.78	0.14
	West	0.24	0.00	0.44	0.32
	South	0.65	0.15	0.00	0.20
	East	0.37	0.35	0.28	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.010	1.010	1.010
	West	1.010	1.000	1.020	1.020
	South	1.010	1.020	1.000	1.010
	East	1.010	1.010	1.020	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.0	1.0	1.0	1.0
	West	1.0	0.0	2.0	2.0
	South	1.0	2.0	0.0	1.0
	East	1.0	1.0	2.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	1.05	103.29	57.29	133.32	F	1523.25	2284.87	1609.25	42.26	17.88	1609.37	42.26
West	0.51	8.06	1.04	2.04	A	393.66	590.49	59.30	6.03	0.66	59.31	6.03
South	1.18	319.24	177.31	202.29	F	1801.28	2701.92	6956.19	154.47	77.29	6984.16	155.09
East	1.35	801.85	120.09	202.55	F	616.64	924.96	5371.28	348.42	59.68	6114.06	396.61

Main Results for each time segment

Main results: (12:00-12:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1249.74	312.43	1240.90	1220.50	531.12	4.52	1808.64	1758.07	0.691	0.00	2.21	6.311	A
West	322.97	80.74	321.59	491.03	1281.00	0.00	1266.61	908.88	0.255	0.00	0.35	3.871	A
South	1477.85	369.46	1465.36	1252.99	349.60	0.00	1939.97	1650.55	0.762	0.00	3.12	7.488	A
East	505.92	126.48	498.69	562.02	1252.94	0.00	778.04	566.18	0.650	0.00	1.81	12.745	B

Main results: (12:15-12:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1492.31	373.08	1479.72	1437.29	613.45	5.39	1749.09	1758.26	0.853	2.21	5.35	12.929	B
West	385.66	96.42	384.85	573.60	1519.56	0.00	1094.14	908.85	0.352	0.35	0.55	5.159	A
South	1764.70	441.17	1735.28	1486.76	417.65	0.00	1890.77	1650.54	0.933	3.12	10.48	20.383	C
East	604.11	151.03	566.02	668.22	1484.72	0.00	610.36	565.67	0.990	1.81	11.33	58.510	F

Main results: (12:30-12:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1827.69	456.92	1710.93	1511.48	616.35	6.61	1746.93	1758.53	1.046	5.35	34.55	51.950	F
West	472.34	118.08	470.52	599.49	1727.79	0.00	943.60	908.82	0.501	0.55	1.00	7.713	A
South	2161.30	540.33	1825.92	1701.05	497.26	0.00	1833.22	1650.53	1.179	10.48	94.32	111.168	F
East	739.89	184.97	549.51	744.86	1578.32	0.00	551.85	564.98	1.341	11.33	58.92	246.174	F

Main results: (12:45-13:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1827.69	456.92	1736.72	1514.15	616.91	6.61	1746.53	1758.53	1.046	34.55	57.29	103.291	F
West	472.34	118.08	472.17	602.07	1751.56	0.00	926.42	908.82	0.510	1.00	1.04	8.060	A
South	2161.30	540.33	1829.35	1722.03	501.70	0.00	1830.01	1650.53	1.181	94.32	177.31	271.061	F
East	739.89	184.97	549.59	749.58	1581.47	0.00	549.91	564.98	1.345	58.92	106.50	553.146	F

Main results: (13:00-13:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	1492.31	373.08	1689.95	1512.49	621.30	5.39	1743.41	1758.26	0.856	57.29	7.88	69.143	F
West	385.66	96.42	387.06	602.71	1708.55	0.00	957.51	908.85	0.403	1.04	0.69	6.438	A
South	1764.70	441.17	1858.57	1648.09	447.52	0.00	1869.18	1650.54	0.944	177.31	153.84	319.240	F
East	604.11	151.03	549.74	722.04	1584.06	0.00	550.15	565.67	1.098	106.50	120.09	762.664	F

Main results: (13:15-13:30)

Leg	Total Demand	Intersection Arrivals (PCE)	Entry Flow	Exit Flow (PCE/hr)	Circulating Flow	Pedestrian Demand	Capacity (PCE/hr)	Saturation Capacity	V/C Ratio	Start Queue	End Queue	Delay (s)	LOS

	(PCE/hr)		(PCE/hr)		(PCE/hr)	(Ped/hr)		(PCE/hr)		(PCE)	(PCE)		
North	1249.74	312.43	1270.80	1531.21	616.64	4.52	1746.82	1758.07	0.715	7.88	2.61	7.959	A
West	322.97	80.74	324.31	570.96	1316.49	0.00	1240.95	908.88	0.260	0.69	0.36	4.001	A
South	1477.85	369.46	1923.27	1285.60	355.20	0.00	1935.92	1650.55	0.763	153.84	42.49	186.034	F
East	505.92	126.48	527.31	657.93	1620.54	0.00	531.76	566.18	0.951	120.09	114.74	801.852	F

Queueing Delay Results for each time segment

Queueing Delay results: (12:00-12:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	31.14	2.08	6.311	A	A
West	5.07	0.34	3.871	A	A
South	43.20	2.88	7.488	A	A
East	24.76	1.65	12.745	B	B

Queueing Delay results: (12:15-12:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	71.08	4.74	12.929	B	B
West	8.03	0.54	5.159	A	A
South	125.92	8.39	20.383	C	C
East	116.16	7.74	58.510	F	E

Queueing Delay results: (12:30-12:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	321.99	21.47	51.950	F	D
West	14.43	0.96	7.713	A	A
South	793.48	52.90	111.168	F	F
East	528.88	35.26	246.174	F	F

Queueing Delay results: (12:45-13:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	691.06	46.07	103.291	F	F
West	15.48	1.03	8.060	A	A
South	2037.49	135.83	271.061	F	F
East	1240.78	82.72	553.146	F	F

Queueing Delay results: (13:00-13:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	450.18	30.01	69.143	F	E
West	10.75	0.72	6.438	A	A
South	2483.64	165.58	319.240	F	F
East	1699.45	113.30	762.664	F	F

Queueing Delay results: (13:15-13:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	43.80	2.92	7.959	A	A
West	5.53	0.37	4.001	A	A
South	1472.45	98.16	186.034	F	F
East	1761.26	117.42	801.852	F	F

Queue Variation Results for each time segment

Queue Variation results: (12:00-12:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	2.21	0.00	1.01	4.04	5.05			N/A	N/A
West	0.35	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	3.12	0.00	0.00	7.08	10.11			N/A	N/A
East	1.81	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (12:15-12:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	5.35	0.00	0.00	13.13	20.20			N/A	N/A
West	0.55	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	10.48	0.00	4.05	26.30	37.42			N/A	N/A
East	11.33	0.00	0.00	8.10	34.43			N/A	N/A

Queue Variation results: (12:30-12:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	34.55	4.04	27.27	67.67	83.83			N/A	N/A
West	1.00	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	94.32	48.55	90.02	134.52	149.70			N/A	N/A
East	58.92	2.03	40.51	133.68	174.19			N/A	N/A

Queue Variation results: (12:45-13:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	57.29	10.10	47.47	110.09	133.32			N/A	N/A
West	1.04	0.00	0.00	0.00	2.04			N/A	N/A
South	177.31	108.23	171.95	>199	>199			N/A	N/A
East	106.50	29.37	94.19	186.35	>199			N/A	N/A

Queue Variation results: (13:00-13:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	7.88	0.00	0.00	19.19	30.30			N/A	N/A
West	0.69	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	153.84	93.05	149.70	>199	>199			N/A	N/A
East	120.09	37.47	108.37	>199	>199			N/A	N/A

Queue Variation results: (13:15-13:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	2.61	0.00	0.00	1.01	7.07			N/A	N/A
West	0.36	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	42.49	13.15	38.44	69.79	81.93			N/A	N/A
East	114.74	31.40	102.29	>199	>199			N/A	N/A

Appendix I

Roundabout Screening Tool

INTERSECTION CONTROL STUDIES
SAFETY ASSESSMENT METHODOLOGY (HSM)

Region of Waterloo

Last Rev Nov 2018

Scenario: 180136 - West Hills Commercial

Major Road: Erb Street

Minor Road: The Boardwalk Extension

Major Road Direction:	East / West
Urban or Rural:	Urban
Proposed Control:	Signalized
Proposed Config.	4-Leg Intersection

LT Lanes Proposed (non roundabout):		RT Lanes Proposed (non roundabout):	
Major	2 Approaches	**Major**	No RT Lanes
Minor	2 Approaches	**Minor**	No RT Lanes

Is there going to be any fully protected left-turn phasing? YES

Number of approaches with FPLTP: 2

Is the proposed intersection "new" or is it existing: NEW

Does control and number of approaches remain the same: YES

Will the proposed intersection have illumination: YES

NOTE: No collision history required

5-Year Total Collisions: N/A

5-Year PDO Collisions: N/A

Proposed Multi-Lane or Single Lane RA? MULTI-LANE ROUNDABOUT

Major Road (mid-block) 10-Year Horizon AADT: 31,110

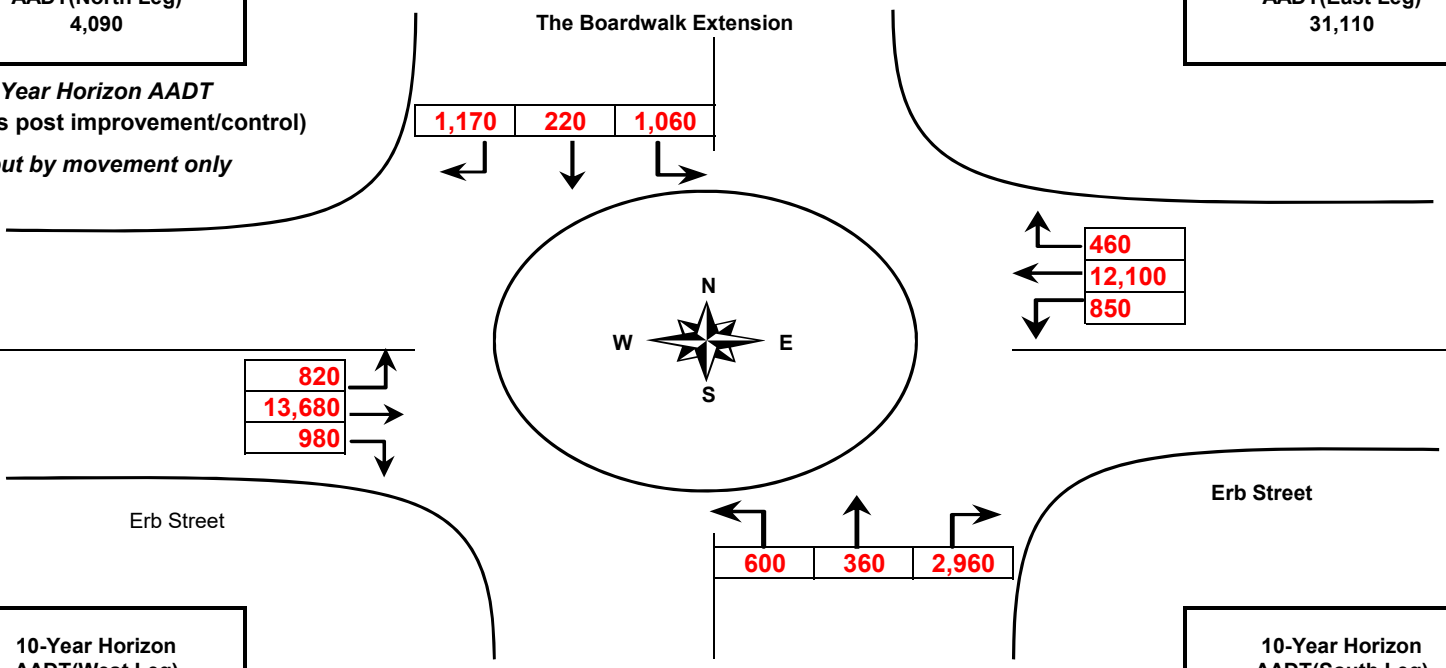
Minor Road (mid-block) 10-Year Horizon AADT: 5,970

10-Year Horizon AADT(North Leg) 4,090

10-Year Horizon AADT(East Leg) 31,110

** 10-Year Horizon AADT (10ys post improvement/control)*

** Input by movement only*



10-Year Horizon AADT(West Leg) 29,350

The Boardwalk Extension

10-Year Horizon AADT(South Leg) 5,970

Direct Capital Costs

Fatal = $1,656,500

Injury = $60,500

PDO = $5,000

Discount Rate = 0.06

20-Year Present Value Collision Costs (DIRECT CAPITAL COSTS)

Collisions by Severity	Total	PDO	Injury	Fatal
Signalized	$2,723,309.13	$321,157.79	$2,269,151.86	$132,999.47
Roundabout	$1,770,502.01	$755,190.43	$1,015,311.58	$0.00

INTERSECTION CONTROL STUDIES
SAFETY ASSESSMENT METHODOLOGY (HSM)

Region of Waterloo

Last Rev Nov 2018

Scenario: **180136 - West Hills Commercial**

Major Road: **Erb Street**
Minor Road: **The Boardwalk Extension**

Major Road Direction: East / West

Urban or Rural: Urban

Proposed Control: Signalized

Proposed Config. 4-Leg Intersection

Roundabout Conflicts: **31530**

5-Year Total Collisions: **N/A**

5-Year PDO Collisions: **N/A**

Estimated **ANNUAL (1-YEAR ONLY)** Collisions				
Future Expected Collisions by Severity	**Total**	**PDO**	**Injury**	**Fatal**
Signalized	**8.88**	**5.60**	**3.27**	**0.01**
Roundabout	**14.63**	**13.17**	**1.46**	**0.00**

TOTAL CRASH COEFFICIENTS USED IN CALCULATION						Fatal/Inj. Ratio	Collision Factor
Control	Intersection Config	Intercept	AADTmaj	AADTmin	Overdispersion		
Signalized	4-Leg Intersection	**-10.99**	**1.07**	**0.23**	**N/A**	**0.002**	**n/a**

PDO CRASH COEFFICIENTS USED IN CALCULATION						Fatal/Inj. Ratio	Collision Factor
Control	Intersection Config	Intercept	AADTmaj	AADTmin	Overdispersion		
Signalized	4-Leg Intersection	**-11.02**	**1.02**	**0.24**	**N/A**	**0.002**	**n/a**

Collision Modification Factors (cmf's)	Left Turn Lane	Right Turn Lane	Calibration Factor	Empirical Bays Weighting	
	0.66		**2.1**	Total	PDO
				N/A	**N/A**
	Illumination	Protected LT Phasing			
	0.91	**0.88**			

Comments:

Appendix J

Intersection Control Study

ERB STREET WEST
& BOARDWALK EXTENSION

WATERLOO, ONTARIO

Intersection Control Study

Prepared for:
Westhill Land Owners

Prepared by:
MTE Consultants Inc.
520 Bingemans Centre Drive
Kitchener, ON N2B 3X9

August 2019

MTE File No.: C34280-101



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1.0 INTRODUCTION

1.1 Overview

MTE Consultants Inc. was retained by the Westhill Land Owners Group to perform an Intersection Control Study for the intersection at Erb Street West, the entrance to Westside Market and a road extension from The Boardwalk.

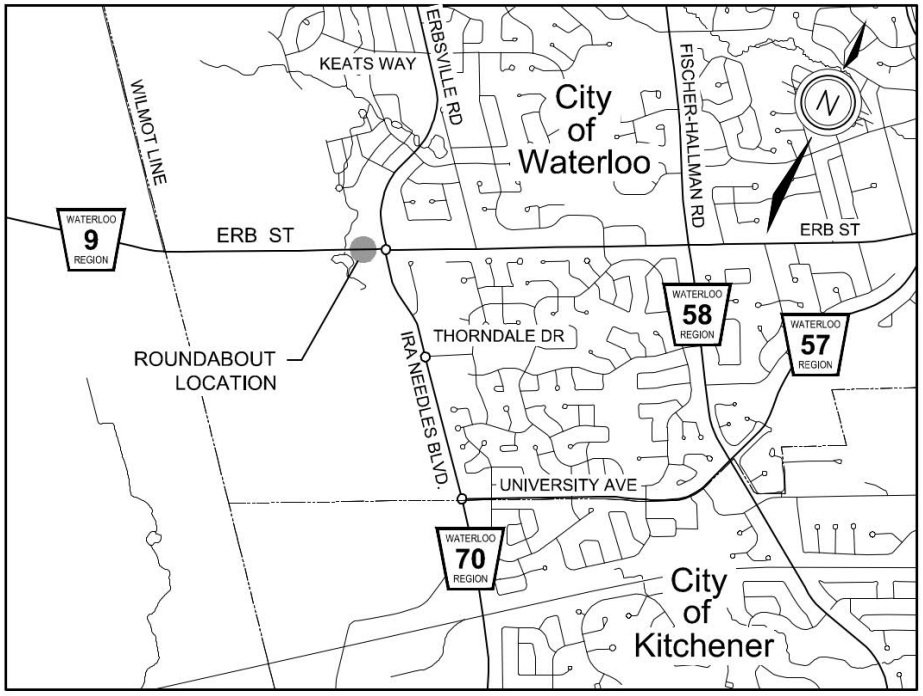
Erb Street West is a two lane east-west arterial road operated by the Region of Waterloo with one lane in each direction and a posted speed limit of 60km/h. In the spring of 2018 the Region of Waterloo filed an EA which specifies upgrading the corridor to four lanes, two lanes in each direction, along with full upgrades to the road. Those upgrades are scheduled to be completed by the fall of 2021.

The study location is currently a three leg signal controlled intersection of Erb Street West and the entrance to the Westside Marketplace to the North. All three legs of the intersection consist of three lanes, with one through lane in each direction along Erb Street West, a westbound left turn lane from the west into the mall, and an eastbound right turn lane into the mall. The mall access consists of one entrance lane and both right and left turn exit lanes.

The proposed Boardwalk Extension is anticipated to be a two lane north/south collector road with one lane in each direction connecting the existing Boardwalk development, Thorndale Blvd and future development to Erb Street West.

The north quadrants are fully developed with a Bank of Montreal (BMO) building to the northwest and Shoppers Drug Mart building to the northeast. The south quadrants are currently undeveloped with a Hydro One corridor to the southwest and an undeveloped portion of Waterloo Commons to the southeast.

Figure 1 - Location Plan



1.2 Purpose of Study

As part of the planning for the Westhill District a new north/south collector road was identified to help facilitate future traffic requirements as well as potentially alleviating congestion experienced at the Erb Street West and Ira Needles Blvd roundabout. The new collector road is proposed to intersect with Erb Street West at an existing signalized intersection approximately 230m west of Ira Needles Boulevard. The purpose of this study is to identify the preferred intersection control for the planned intersection.

This study evaluates both signal and roundabout control alternatives using various criteria including construction costs, societal costs, traffic operations, property impacts, pedestrian and cyclist effects, speed control, fuel consumption and emissions, area land uses, construction staging, maintenance and aesthetics.

2.0 INTERSECTION CONTROL ALTERNATIVES

2.1 Analysis Inputs

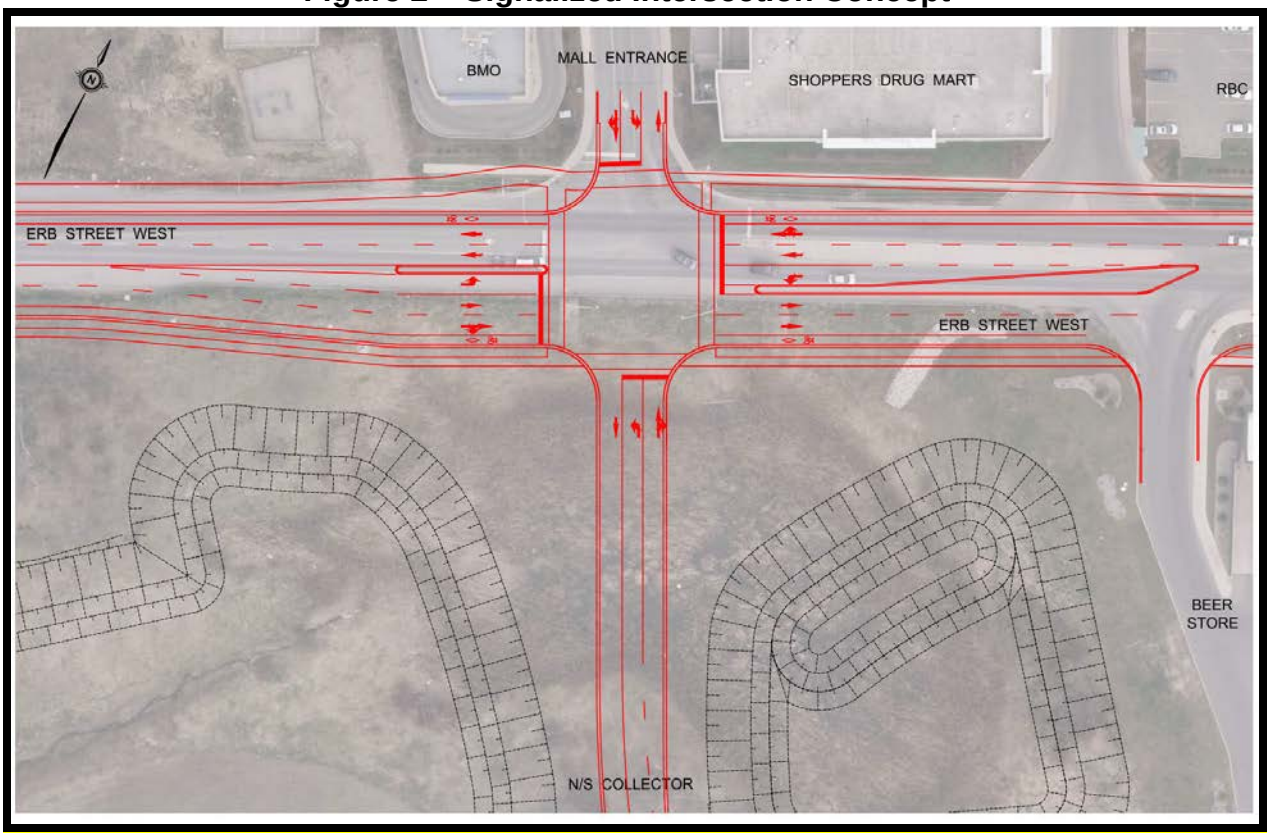
Peak hour and average daily traffic (AADT) forecasts for 2031 were prepared by Paradigm Transportation Solutions from their report dated July 2019. The 2031 data was used to develop signalized and roundabout concept designs to accommodate the proposed 4-lane cross-section from the Erb Street West EA and projected traffic volumes from the Boardwalk extension. Anticipated construction is for 2021, and so a ten year design horizon was determined to be applicable.

The design concepts provided are considered adequate for the evaluation of the intersection functionality, as well as estimating construction costs and property impacts. The designs are considered part of the preliminary design process, and therefore require further refinement as the design process continues.

2.2 Signalized Intersection Concept

The signalized design concept was derived using the forecasted volumes along with consultations with the project design team. The concept drawing of the signalized intersection is shown below in **Figure 2**, and is designed to accommodate the traffic projections for 2031. The design consists of two lanes east/west and one lane north/south with single left turn lanes on all legs. In order to accommodate the signalized intersection, additional property would be required in the southern quadrants.

Figure 2 – Signalized Intersection Concept



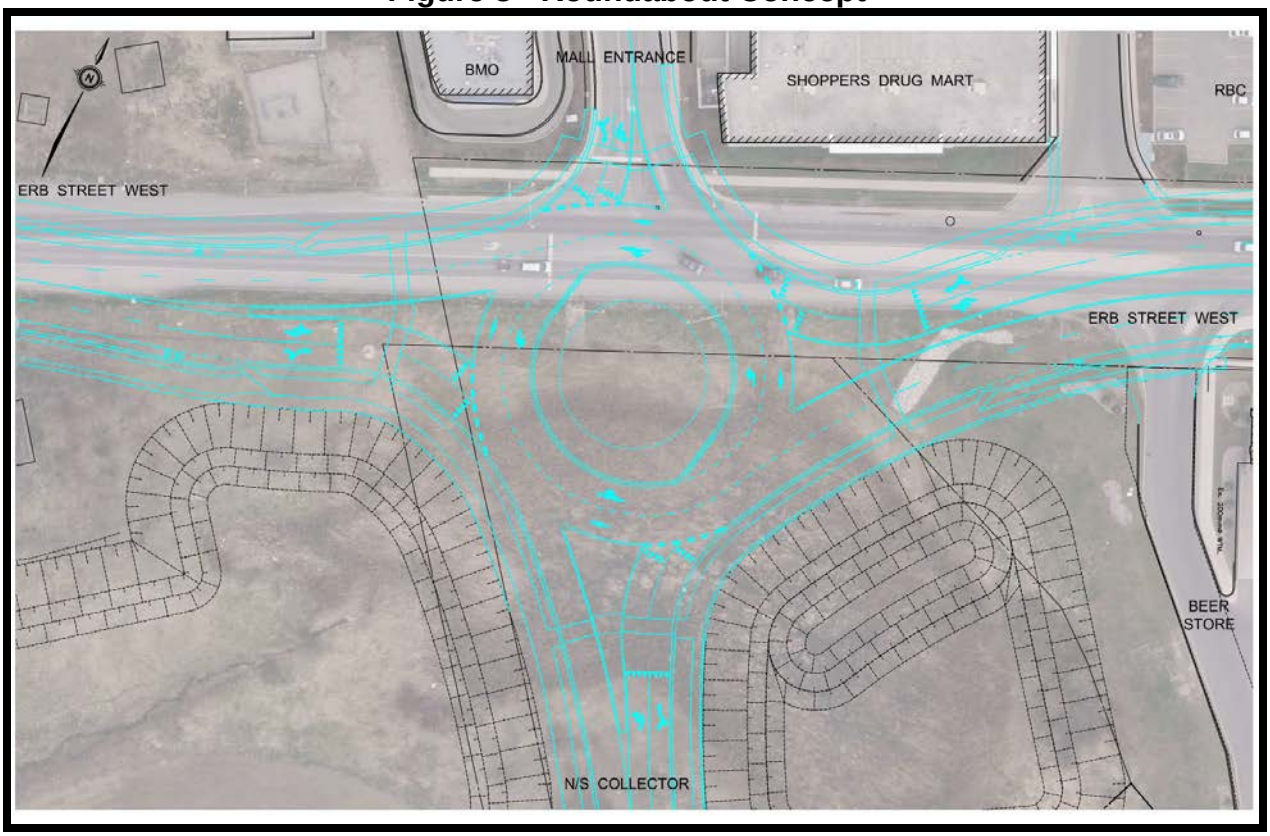
2.3 Roundabout Concept

The roundabout design is based on the forecasted volumes, preliminary modelling in ARCADY and input from the project design team and can be found in **Appendix C** at the end of the report.

The roundabout design is a two lane roundabout with full two lane entry/exits running east/west along Erb Street West and two lane entries for the minor legs with a through-right lane and dedicated left turn lanes. A spiraled central island geometry is utilized for the minor legs to introduce the dedicated left turn lanes and shift left turning traffic from Erb Street West to the outside lane to exit onto the minor legs.

Due to the existing development in the northern quadrants the center of the roundabout is situated 20m± south of the existing Erb Street West alignment. As such, most of the property requirements are on the southern portion of the roundabout on the Waterloo Commons land and Hydro One corridor. Minor property negotiation may be required with the Westside Marketplace development and the Region of Waterloo to encompass the pedestrian crossing on the north leg within the Regional right of way.

Figure 3 - Roundabout Concept



3.0 QUANTITATIVE EVALUATION (COST)

3.1 Injury Collision Costs

3.1.1 *Traffic Signal Injury Collision Prediction*

The data provided by the Region of Waterloo in the form of the Safety Assessment Methodology revised in January 2019 is used to predict the safety performance of an intersection based on the usage. Using the standard spreadsheet that is provided by the Region and the Saturday peak traffic volumes, estimations for future expected collisions on an annual basis were calculated. The signalized intersection is estimated to have 9.23 collisions per year, 5.83 PDO, and 3.39 injury.

3.1.2 *Roundabout Injury Collision Prediction*

The data provided by the Region of Waterloo in the form of the Safety Assessment Methodology revised in January 2019 is used to predict the safety performance of an intersection based on the usage. Using the standard spreadsheet that is provided by the Region and the Saturday peak traffic volumes, estimations for future expected collisions on an annual basis were calculated. The roundabout is estimated to have 15.17 collisions per year, 13.65 PDO, and 1.52 Injury.

3.1.3 *Life Cycle Societal Costs*

The annual societal costs for a signalized intersection and a roundabout were calculated in net present value terms. The 20-Year present value cost used a 6% discount rate. The results are summarized in Table 1 below.

Table 1 – Comparison of Annual Collision Performance

20-Year Present Value Collision Costs (DIRECT CAPITAL COSTS)				
Collisions by Severity	**Total**	**PDO**	**Injury**	**Fatal**
Signalized	**$2,819,771.17**	**$334,348.20**	**$2,352,423.49**	**$132,999.47**
Roundabout	**$1,835,659.41**	**$782,982.69**	**$1,052,676.73**	**$0.00**

The previous table does not include additional costs or any saving that may be associated with property damages. It is difficult to provide an estimate which represents property damage crash savings, and so societal costs are more difficult to obtain. The savings associated with roundabouts are generally societal savings.

3.2 Other Life Cycle Costs

In order to establish life cycle costing a number of assumptions surrounding maintenance costs are required. The present values of maintenance costs through 2031 are presented below:

	Signalized Intersection	Roundabout
Maintenance Item		
Traffic Signals	$2,500 / year	
Street Lighting	$1,000 / year	$1,500 / year
Total Life Cycle Cost	$70,000	$30,000

Present costs are over the 20 year period, and discount rate of 6% is assumed.

3.3 Capital Costs

The estimates that were developed for capital costs included costs for construction and engineering fees. Property acquisitions have not been included as much of the land requirements are encumbered by an easement or will be dedicated by the owner of the Waterloo Commons. Some assumptions made to establish the estimates are as follows:

- The design process has not progressed far enough to properly estimate the full extent of underground construction works. Therefore, while utility costs are provided, they are partial estimates.

- Full road reconstruction regardless of the option selected.
- The roundabout or signalized intersection will be constructed with other Regional Road improvements.
- The roundabout or signalized intersection is an Regional Development Charge eligible expense.
- Similar roundabout and intersection construction projects were used to develop these estimates. Unique features that may arise during design may not be accounted for.
- Construction and property cost estimates include 20% for Engineering Fees, 20% for contingency, and 5% for maintenance.

A summary of the costs is provided below in Table 2. It should be noted that actual construction costs will depend on the timing of construction, contractor availability and scheduling, along with many other factors. At this time, there is minimal property acquisition required, and may not have any cost impact. For this report, property acquisition costs will be considered negligible.

Table 2 – Summary of Construction Costs

Description	Signalized	Roundabout
Site Preparation and Removals	$ 107,500	$ 107,500
Road Works	$ 511,000	$ 728,800
Utilities (Storm)	$ 230,100	$ 248,000
Street lighting and Streetscaping	$ 100,000	$ 120,000
Sub-Total	$ 948,600	$ 1,204,300
Engineering (20%)	$ 189,720	$ 240,860
Contingency (20%)	$ 189,720	$ 240,860
Maintenance (5%)	$ 47,430	$ 60,215
Total	**$ 1,375,470**	**$ 1,746,235**

At the intersection of Erb Street West & Boardwalk Extension, a signalized intersection is estimated to cost approximately $1,375,470 and a roundabout is estimated to cost $1,746,235. There is an approximate $370,765 difference in cost in favour of a signalized intersection.

3.4 Results of Quantitative Evaluation

The table below summarizes the total capital, life cycle and collision cost estimates to establish a direct comparison of total costs associated with a roundabout and signalized intersection. The total overall cost of a signalized intersection is $4,894,270, while the cost of a roundabout is $3,611,935. Therefore there is a $1,282,335 difference in cost between the signalized and roundabout options.

Table 3 – Comparison of Capital and Life Cycle Costs

Cost Item	Signalized	Roundabout
Present Value Collision Costs	$ 2,819,800	$ 1,835,700
Other Life Cycle Costs	$ 70,000	$ 30,000
Capital Cost	$ 1,375,470	$ 1,746,235
Total	$ 4,265,270	$ 3,611,935

4.0 QUALITATIVE EVALULATION

4.1 Traffic Operations

An operational analysis was completed by Paradigm Transportation Solutions using the forecasted 2031 PM peak volumes for both the signalized and roundabout design concepts to determine the level of service. The analysis was done using Synchro for the signalized concept and ARCADY for the roundabout concept. ARCADY Capacity intercept adjustments of 10% and 5% were made as per Region of Waterloo specifications to represent opening capacity and 10+ year capacity respectively. The results are summarized in **Table 4** below with detailed analysis output available in **Appendix C**.

Table 4 – Comparison of 2031 Traffic Operations

	Performance Measure	Signalized Intersection	Roundabout	
			90% Intercept Adjustment	95% Intercept Adjustment
PM Peak	**Avg. Approach Delay**			
	SB Westside Marketplace	≥ 29s	4s	4s
	EB on Erb Street West	≥ 21s	11s	8s
	NB on Boardwalk Extension	≥ 49s	13s	10s
	WB on Erb Street West	≥ 13s	6s	5s
	95th Percentile Queue			
	SB Westside Marketplace	≥ 61m	<15m	<15m
	EB on Erb Street West	≥ 196m	120m	60m
	NB on Boardwalk Extension	≥ 116m	23m	<15m
	WB on Erb Street West	≥ 119m	30m	23m
	Overall LOS	**'C' or lower**	**'A'**	**'A'**

The signalized intersection capacity analysis shows that demand exceeds capacity for at least one turning movement during the PM peak period. As such residual queues would likely cause worse than predicted operations if analyzed over a time period greater than 15 minutes, and the predicted level of service 'C' may be lower.

The roundabout capacity analysis shows an overall level of service 'A' at the 90% intercept, as well as a level of service 'A' at the 95% intercept adjustment.

4.2 Results of Qualitative Evaluation

The following table provides a summary of the qualitative evaluation of signals vs. roundabout, apart from traffic operations.

Table 5 – Summary of Qualitative Comments

Evaluation Criteria	Comments	
	Signalized Intersection	**Roundabout**
Transit	There are no transit routes currently along Erb Street West.	There are no transit routes currently along Erb Street West.
Emergency Services	While emergency vehicle pre-emption would be enabled at this intersection, during peak volumes navigation could become challenging.	With free flow of traffic and the ability to perform u-turns, emergency vehicles should be able to quickly and safely navigate the intersection
Pedestrians and persons with disabilities	Signal will require push button activation per AODA requirements with possible audible signals. Crossing distances are substantial with 5 travel lanes plus cycle lanes.	Crossing distances will be reduced to one vehicle direction at a time with fewer injury crashes and right of way. Consultations may be required if accessibility concerns are raised.
Cyclists	Cycle lanes are proposed for both sides of Erb Street West as well as a multi-use trail along the north side of the right of way. Crossing and left turn movements are not accommodated with actuated signals.	Cycle Lanes are proposed for both sides of Erb Street West with multi-use trail accommodations on proposed for all roundabout legs. Cyclists have the option to take a lane within the roadway or exit onto the MUT.
Speed Control	Traffic speeds will remain high under green light conditions with the exception of peak conditions.	Speeds are reduced with good deflection entering the roundabout.
Compatibility	Excessive queueing could cause access problems.	Lower speeds and less queueing should result in better access.
Noise, Fuel Consumption, Emissions	No change.	Decrease in delay will result in decrease in fuel & emissions. Less stop & starts should decrease noise levels.
Maintenance	No change, lane closures possible.	Work in circulatory roadway may require large vehicles to detour.
Construction Staging	Less complicated.	More complicated, may require temporary roads.
Aesthetics	No change, possible decorative concrete.	Decorative concrete and landscaped central island feature.
Corridor Control	A signal is inconsistent with roundabouts planned	A roundabout is consistent with planned roundabouts, and provides for more effective movements within the corridor.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the cost estimates generated for road reconstruction cost, life cycle costs and collision costs, the roundabout option is $3,611,935, while the signalized option is $4,265,270. Therefore the roundabout is overall $653,335 less than the signalized intersection option presented. There are a few key points to note from this analysis:

- The roundabout option was considered preferable in the 20-year life cycle and safety cost analysis.
- Roundabout option improved the overall level of service to 'A', while the signalized option provided a level of service 'C'.
- Difference in capital cost of intersection was $370,765 or 27% in favour of the signalized intersection option.

When considering all of the capital, life cycle and collision costs, the analysis of the two options represents a preference for the roundabout. Additionally, the roundabout provides a significant level of service improvement at the proposed intersection. Based on the results of this intersection control study, using traffic data for the 2031 design period, the 2 lane roundabout is considered the preferred option.

All of which is respectfully submitted,

MTE CONSULTANTS INC.

Nathan Duimering, C.Tech
Designer

NPD:VPP:zeg

Vince Pugliese, P.Eng. MBA, PMP
Design Engineer



APPENDIX A

SAFETY ANALYSIS BACKGROUND

INTERSECTION CONTROL STUDIES
SAFETY ASSESSMENT METHODOLOGY (HSM)

Region of Waterloo

Last Rev Jan 2019

Scenario: PM Peak - 2031 Planning Horizon

Major Road: Erb Street W

Minor Road: The Boardwalk/Entrance

Major Road Direction:	East / West
Urban or Rural:	Urban
Proposed Control:	Signalized
Proposed Config.	4-Leg Intersection

LT Lanes Proposed (non roundabout):		RT Lanes Proposed (non roundabout):	
Major	2 Approaches	**Major**	No RT Lanes
Minor	2 Approaches	**Minor**	No RT Lanes

Is there going to be any fully protected left-turn phasing?	YES
Number of approaches with FPLTP:	2
Is the proposed intersection "new" or is it existing:	NEW
Does control and number of approaches remain the same:	YES
Will the proposed intersection have illumination:	YES

NOTE: No collision history required

5-Year Total Collisions: N/A

5-Year PDO Collisions: N/A

Proposed Multi-Lane or Single Lane RA? MULTI-LANE ROUNDABOUT

Major Road (mid-block) 10-Year Horizon AADT: 31,110

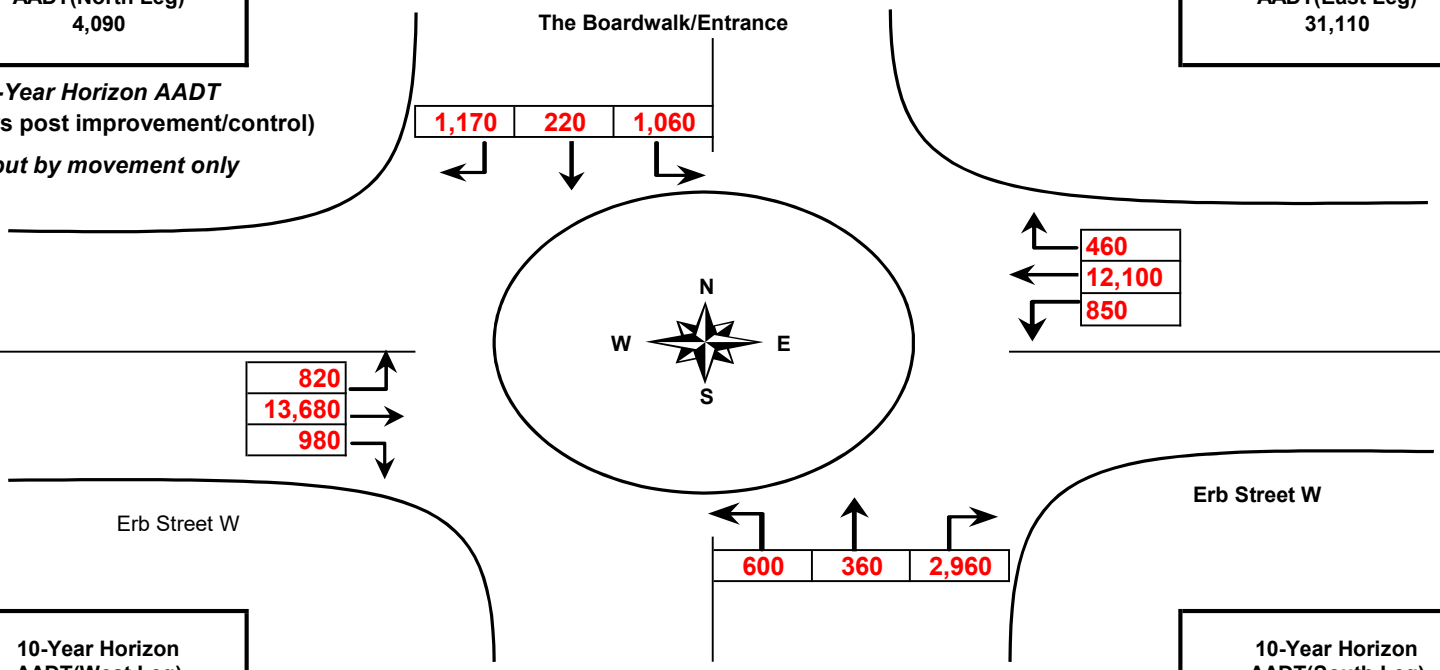
Minor Road (mid-block) 10-Year Horizon AADT: 5,970

10-Year Horizon AADT(North Leg) 4,090

10-Year Horizon AADT(East Leg) 31,110

** 10-Year Horizon AADT (10ys post improvement/control)*

** Input by movement only*



10-Year Horizon AADT(West Leg) 29,350

10-Year Horizon AADT(South Leg) 5,970

The Boardwalk/Entrance

Direct Capital Costs

Fatal = $1,656,500

Injury = $60,500

PDO = $5,000

Discount Rate = 0.06

20-Year Present Value Collision Costs (DIRECT CAPITAL COSTS)

Collisions by Severity	Total	PDO	Injury	Fatal
Signalized	$2,723,309.13	$321,157.79	$2,269,151.86	$132,999.47
Roundabout	$1,770,502.01	$755,190.43	$1,015,311.58	$0.00

INTERSECTION CONTROL STUDIES
SAFETY ASSESSMENT METHODOLOGY (HSM)

Region of Waterloo

Last Rev Jan 2019

Scenario: PM Peak - 2031 Planning Horizon

Major Road: Erb Street W
Minor Road: The Boardwalk/Entrance

Major Road Direction: East / West

Urban or Rural: Urban

Proposed Control: Signalized

Proposed Config. 4-Leg Intersection

Roundabout Conflicts: 31530

5-Year Total Collisions: N/A

5-Year PDO Collisions: N/A

Estimated **ANNUAL (1-YEAR ONLY)** Collisions				
Future Expected Collisions by Severity	**Total**	**PDO**	**Injury**	**Fatal**
Signalized	**8.88**	**5.60**	**3.27**	**0.01**
Roundabout	**14.63**	**13.17**	**1.46**	**0.00**

TOTAL CRASH COEFFICIENTS USED IN CALCULATION						Fatal/Inj. Ratio	Collision Factor
Control	Intersection Config	Intercept	AADTmaj	AADTmin	Overdispersion		
Signalized	4-Leg Intersection	**-10.99**	**1.07**	**0.23**	**N/A**	**0.002**	**n/a**

PDO CRASH COEFFICIENTS USED IN CALCULATION						Fatal/Inj. Ratio	Collision Factor
Control	Intersection Config	Intercept	AADTmaj	AADTmin	Overdispersion		
Signalized	4-Leg Intersection	**-11.02**	**1.02**	**0.24**	**N/A**	**0.002**	**n/a**

Collision Modification Factors (cmf's)	Left Turn Lane	Right Turn Lane	Calibration Factor	Empirical Bays Weighting	
	0.66		**2.1**	Total **N/A**	PDO **N/A**
	Illumination	Protected LT Phasing			
	0.91	**0.88**			

Comments:

INTERSECTION CONTROL STUDIES
SAFETY ASSESSMENT METHODOLOGY (HSM)

Region of Waterloo

Last Rev Jan 2019

Scenario: PM Peak - 2031 Planning Horizon

Major Road: Erb Street W

Minor Road: The Boardwalk/Entrance

Major Road Direction:	East / West
Urban or Rural:	Urban
Proposed Control:	Signalized
Proposed Config.	4-Leg Intersection

LT Lanes Proposed (non roundabout):		RT Lanes Proposed (non roundabout):	
Major	2 Approaches	**Major**	No RT Lanes
Minor	2 Approaches	**Minor**	No RT Lanes

Is there going to be any fully protected left-turn phasing?	YES
Number of approaches with FPLTP:	2
Is the proposed intersection "new" or is it existing:	NEW
Does control and number of approaches remain the same:	YES
Will the proposed intersection have illumination:	YES

NOTE: No collision history required

5-Year Total Collisions: N/A

5-Year PDO Collisions: N/A

Proposed Multi-Lane or Single Lane RA? MULTI-LANE ROUNDABOUT

Major Road (mid-block) 10-Year Horizon AADT: 31,460

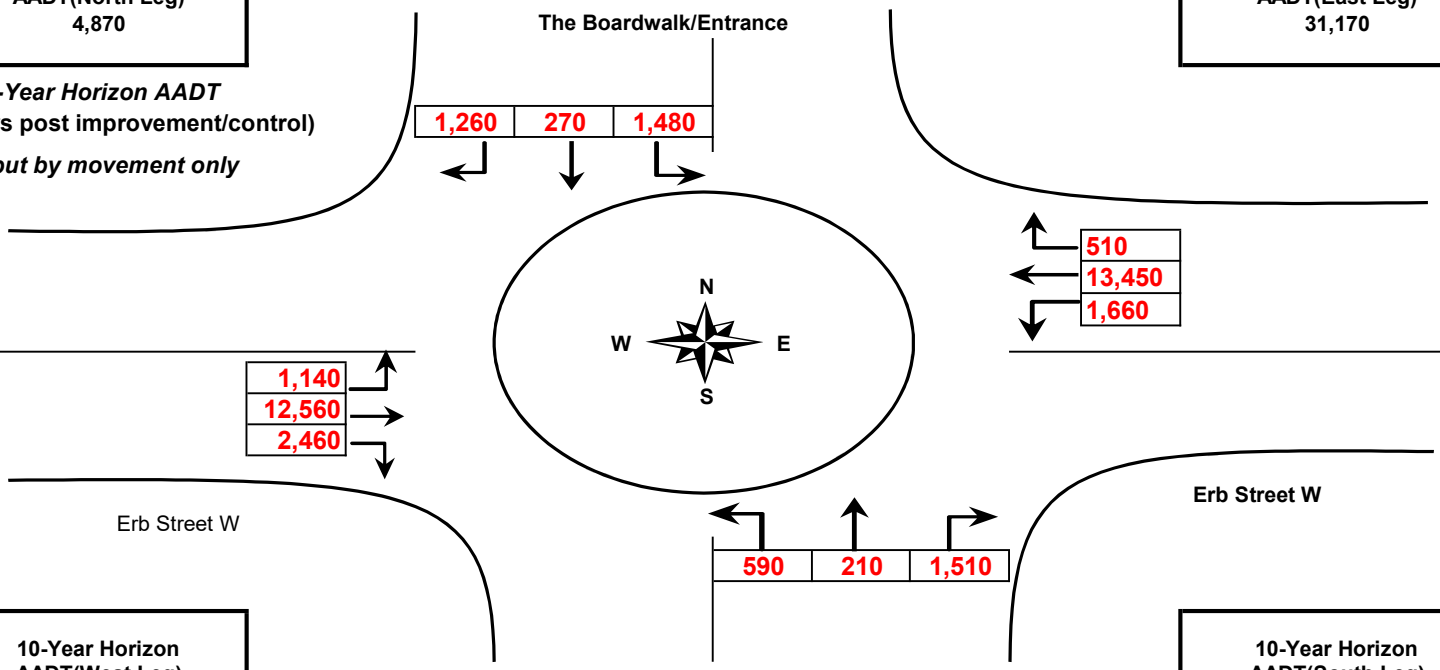
Minor Road (mid-block) 10-Year Horizon AADT: 6,700

10-Year Horizon AADT(North Leg) 4,870

10-Year Horizon AADT(East Leg) 31,170

***10-Year Horizon AADT (10ys post improvement/control)**

***Input by movement only**



10-Year Horizon AADT(West Leg) 31,460

10-Year Horizon AADT(South Leg) 6,700

The Boardwalk/Entrance

Direct Capital Costs

Fatal = $1,656,500

Injury = $60,500

PDO = $5,000

Discount Rate = 0.06

20-Year Present Value Collision Costs (DIRECT CAPITAL COSTS)

Collisions by Severity	Total	PDO	Injury	Fatal
Signalized	$2,819,771.17	$334,348.20	$2,352,423.49	$132,999.47
Roundabout	$1,835,659.41	$782,982.69	$1,052,676.73	$0.00

INTERSECTION CONTROL STUDIES
SAFETY ASSESSMENT METHODOLOGY (HSM)

Region of Waterloo

Last Rev Jan 2019

Scenario: **PM Peak - 2031 Planning Horizon**

Major Road: **Erb Street W**
Minor Road: **The Boardwalk/Entrance**

Major Road Direction:	East / West
Urban or Rural:	Urban
Proposed Control:	Signalized
Proposed Config.	4-Leg Intersection

Roundabout Conflicts:	**32960**
5-Year Total Collisions:	**N/A**
5-Year PDO Collisions:	**N/A**

Estimated **ANNUAL (1-YEAR ONLY)** Collisions				
Future Expected Collisions by Severity	**Total**	**PDO**	**Injury**	**Fatal**
Signalized	**9.23**	**5.83**	**3.39**	**0.01**
Roundabout	**15.17**	**13.65**	**1.52**	**0.00**

TOTAL CRASH COEFFICIENTS USED IN CALCULATION						Fatal/Inj. Ratio	Collision Factor
Control	Intersection Config	Intercept	AADTmaj	AADTmin	Overdispersion		
Signalized	4-Leg Intersection	**-10.99**	**1.07**	**0.23**	**N/A**	**0.002**	**n/a**

PDO CRASH COEFFICIENTS USED IN CALCULATION						Fatal/Inj. Ratio	Collision Factor
Control	Intersection Config	Intercept	AADTmaj	AADTmin	Overdispersion		
Signalized	4-Leg Intersection	**-11.02**	**1.02**	**0.24**	**N/A**	**0.002**	**n/a**

Collision Modification Factors (cmf's)	Left Turn Lane	Right Turn Lane	Calibration Factor	Empirical Bays Weighting	
	0.66		**2.1**	Total **N/A**	PDO **N/A**
	Illumination	Protected LT Phasing			
	0.91	**0.88**			

Comments:

APPENDIX B

CAPITAL COST ESTIMATES

PRELIMINARY CONSTRUCTION COST ESTIMATE - TRAFFIC SIGNAL

Erb Street West & Boardwalk Extension ICS

34280-101 | To be read in conjunction with P:\34280\101\34280-101-QU5.dwg | July 2019

Item No.	Description	Unit	Unit Cost	Est. Qty	Total Cost
A1 - Site Preparation & Removals					
A1.1	Remove & Dispose of Existing Asphalt	m^2	$5.00	4,000	$20,000.00
A1.2	Remove & Dispose of Existing concrete island	m^2	$8.00	231	$1,848.00
A1.3	Remove & Dispose of Existing Concrete Curbs	L.m.	$11.50	359	$4,128.50
A1.4	Remove & Dispose of Existing Concrete sidewalk	L.m.	$8.00	162	$1,296.00
A1.5	Remove & Dispose of Existing steel guardrail	L.m.	$8.90	140	$1,246.00
A1.6	Remove & Dispose of Existing Traffic Light	each	$800.00	5	$4,000.00
A1.7	Remove & Dispose of existing structures	each	$500.00	0	$0.00
A1.8	Traffic Control & Construction Layout	L.S.	$75,000.00	1	$75,000.00
	Subtotal Section A1 - Site Preparation & Removals				**$107,518.50**
A2 - Road Works					
A2.1	Excavate to Subgrade	m^2	$18.00	7,543	$135,774.00
A2.2	Granular 'B' (450mm)	tonnes	$15.00	6,000	$89,994.38
A2.3	Granular 'A' (150mm)	tonnes	$20.00	2,000	$39,997.50
A2.4	Asphalt (140mm total 100mm base/40mm surface)	tonnes	$90.00	1,800	$162,004.50
A2.5	concrete in island	m^2	$55.00	176	$9,680.00
A2.6	Stamped concrete in island and apron	m^2	$65.00	0	$0.00
A2.7	1.5m wide Sidewalk (both sides)	m^2	$55.00	180	$9,900.00
A2.8	3.0m wide MUT (one side) - Granular 'B' (300mm)	tonnes	$15.00	297	$4,455.00
A2.9	3.0m wide MUT (one side) - Granular 'A' (150mm)	tonnes	$20.00	149	$2,970.00
A2.10	3.0m wide MUT (one side) - Asphalt (100mm)	tonnes	$90.00	99	$8,910.00
A2.11	Curb and Gutter	L.M.	$50.00	724	$36,200.00
A2.12	Boulevards - Topsoil & Sod	m^2	$13.00	856	$11,128.00
	Subtotal Section A2 - Road Works				**$511,013.38**
A3 - Storm Sewers					
A3.1	New Sewer Main (600 mm diameter)	m	$390.00	293	$114,270.00
A3.2	New Sewer Main (300 mm diameter)	m	$240.00	145	$34,800.00
A3.3	Storm Manholes (Including benching)	ea	$7,500.00	8	$60,000.00
A3.4	Storm Catchbasins	ea	$3,500.00	6	$21,000.00
	Subtotal Section A3 - Storm Sewers				**$230,070.00**
A4 - Street Lighting & Streetscaping					
A4.1	Street Lighting	L.S.	$50,000.00	1	$50,000.00
A4.2	Tree Planting	L.S.	$20,000.00	0	$0.00
A4.3	Traffic Light Upgrades	L.S.	$50,000.00	1	$50,000.00
	Subtotal Section A4 - Street Lighting				**$100,000.00**
	Subtotal				**$948,601.88**
	Contingency		**20%**		**$189,720.38**
	Total Project Construction Cost				**$1,138,322.25**

PRELIMINARY CONSTRUCTION COST ESTIMATE - ROUNDABOUT

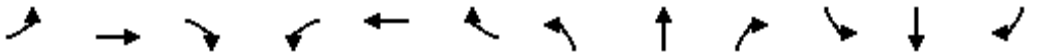
Erb Street West & Boardwalk Extension ICS

34280-101 To be read in conjunction with P:\34280\101\34280-101-QU4.dwg July 2019

Item No.	Description	Unit	Unit Cost	Est. Qty	Total Cost
A1 - Site Preparation & Removals					
A1.1	Remove & Dispose of Existing Asphalt	m^2	$5.00	4,000	$20,000.00
A1.2	Remove & Dispose of Existing concrete island	m^2	$8.00	231	$1,848.00
A1.3	Remove & Dispose of Existing Concrete Curbs	L.m.	$11.50	359	$4,128.50
A1.4	Remove & Dispose of Existing Concrete sidewalk	L.m.	$8.00	162	$1,296.00
A1.5	Remove & Dispose of Existing steel guardrail	L.m.	$8.90	140	$1,246.00
A1.6	Remove & Dispose of Existing Traffic Light	each	$800.00	5	$4,000.00
A1.7	Remove & Dispose of existing structures	each	$500.00	0	$0.00
A1.8	Traffic Control & Construction Layout	L.S.	$75,000.00	1	$75,000.00
	Subtotal Section A1 - Site Preparation & Removals				**$107,518.50**
A2 - Road Works					
A2.1	Excavate to Subgrade	m^2	$18.00	9,890	$178,020.00
A2.2	Granular 'B' (450mm)	tonnes	$15.00	9,006	$135,084.38
A2.3	Granular 'A' (150mm)	tonnes	$20.00	3,002	$60,037.50
A2.4	Asphalt (140mm total 100mm base/40mm surface)	tonnes	$90.00	2,058	$185,220.00
A2.5	concrete in island	m^2	$55.00	160	$8,800.00
A2.6	Stamped concrete in island and apron	m^2	$65.00	802	$52,130.00
A2.7	1.5m wide Sidewalk (both sides)	m^2	$55.00	302	$16,610.00
A2.8	3.0m wide MUT (one side) - Granular 'B' (300mm)	tonnes	$15.00	647	$9,708.75
A2.8	3.0m wide MUT (one side) - Granular 'A' (300mm)	tonnes	$15.00	647	$9,708.75
A2.8	3.0m wide MUT (one side) - Asphalt (100mm)	tonnes	$15.00	216	$3,236.25
A2.9	Curb and Gutter	L.M.	$50.00	1,128	$56,400.00
A2.10	Boulevards Central Island- Topsoil & Sod	m^2	$13.00	1,064	$13,832.00
	Subtotal Section A2 - Road Works				**$728,787.63**
A3 - Storm Sewers					
A3.1	New Sewer Main (600 mm diameter)	m	$390.00	280	$109,200.00
A3.2	New Sewer Main (300 mm diameter)	m	$240.00	118	$28,320.00
A3.3	Storm Manholes (Including benching)	ea	$7,500.00	11	$82,500.00
A3.4	Storm Catchbasins	ea	$3,500.00	8	$28,000.00
	Subtotal Section A3 - Storm Sewers				**$248,020.00**
A4 - Street Lighting & Streetscaping					
A4.1	Street Lighting	L.S.	$100,000.00	1	$100,000.00
A4.2	Tree Planting	L.S.	$20,000.00	1	$20,000.00
	Subtotal Section A4 - Street Lighting				**$120,000.00**
	Subtotal				**$1,204,326.13**
	Contingency		**20%**		**$240,865.23**
	Total Project Construction Cost				**$1,445,191.35**

APPENDIX C

OPERATIONAL ANALYSIS OUTPUT

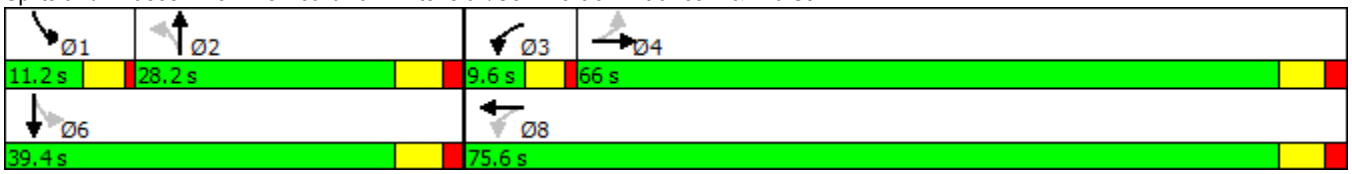


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	1368	98	85	1210	46	60	36	296	106	22	117
Future Volume (vph)	82	1368	98	85	1210	46	60	36	296	106	22	117
Ideal Flow (vphpl)	1775	1900	1900	1900	1900	1750	1900	1900	1900	1775	1900	1750
Storage Length (m)	30.0		0.0	60.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	55.0			0.0			7.5			0.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00							
Frt		0.990			0.995			0.866			0.874	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1686	3504	0	1770	3488	0	1770	1613	0	1670	1642	0
Flt Permitted	0.185			0.081			0.668			0.173		
Satd. Flow (perm)	328	3504	0	151	3488	0	1244	1613	0	304	1642	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			6			134			82	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		435.4			83.2			94.9			96.6	
Travel Time (s)		26.1			5.0			6.8			7.0	
Confl. Peds. (#/hr)	1					1						
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	2%	2%	2%	3%	0%	2%	2%	2%	1%	2%	1%
Adj. Flow (vph)	82	1368	98	85	1210	46	60	36	296	106	22	117
Shared Lane Traffic (%)												
Lane Group Flow (vph)	82	1466	0	85	1256	0	60	332	0	106	139	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases		4		3	8			2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		3	8		2	2		1	6	
Switch Phase												
Minimum Initial (s)	60.0	60.0		5.0	60.0		5.0	5.0		5.0	7.0	
Minimum Split (s)	66.0	66.0		9.5	66.0		24.0	24.0		9.5	13.0	
Total Split (s)	66.0	66.0		9.6	75.6		28.2	28.2		11.2	39.4	
Total Split (%)	57.4%	57.4%		8.3%	65.7%		24.5%	24.5%		9.7%	34.3%	
Maximum Green (s)	60.0	60.0		5.1	69.6		22.2	22.2		6.7	33.4	
Yellow Time (s)	4.0	4.0		3.5	4.0		4.0	4.0		3.5	4.0	
All-Red Time (s)	2.0	2.0		1.0	2.0		2.0	2.0		1.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		0.0	-2.0		-2.0	0.0		0.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.5	4.0		4.0	6.0		4.5	4.0	
Lead/Lag	Lag	Lag		Lead			Lag	Lag		Lead		
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		None	Max		None	None		None	None	
Walk Time (s)	50.0	50.0			50.0		7.0	7.0			7.0	
Flash Dont Walk (s)	10.0	10.0			10.0		11.0	11.0			15.0	
Pedestrian Calls (#/hr)	0	0			0		0	0			0	
Act Effct Green (s)	64.1	64.1		71.2	71.7		20.6	18.6		31.3	31.8	
Actuated g/C Ratio	0.57	0.57		0.64	0.64		0.18	0.17		0.28	0.29	
v/c Ratio	0.44	0.73		0.50	0.56		0.26	0.87		0.63	0.26	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	25.1	21.1		18.6	12.7		41.5	50.3		48.9	14.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	25.1	21.1		18.6	12.7		41.5	50.3		48.9	14.6	
LOS	C	C		B	B		D	D		D	B	
Approach Delay		21.4			13.1			48.9			29.5	
Approach LOS		C			B			D			C	
Queue Length 50th (m)	11.2	135.1		7.4	83.6		11.9	45.9		18.6	9.7	
Queue Length 95th (m)	28.6	167.6		14.4	104.8		24.6	#91.2		#35.8	25.5	
Internal Link Dist (m)		411.4			59.2			70.9			72.6	
Turn Bay Length (m)	30.0			60.0								
Base Capacity (vph)	188	2019		170	2244		270	428		167	578	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.44	0.73		0.50	0.56		0.22	0.78		0.63	0.24	

Intersection Summary			
Area Type:	Other		
Cycle Length: 115			
Actuated Cycle Length: 111.5			
Natural Cycle: 110			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.87			
Intersection Signal Delay: 21.8		Intersection LOS: C	
Intersection Capacity Utilization 111.5%		ICU Level of Service H	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 5: The Boardwalk Extension/Commercial Entrance 1 & Erb St W



Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Erb Street & Commercial Entrance 1,Boardwalk Extension.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Option A Extension
Report generation date: 2019-07-26 11:39:21 AM

Summary of intersection performance

	PM					
	Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	Option A - Total 2031					
Leg North	0.32	4.30	0.24	A	9.20	A
Leg West	5.24	11.40	0.84	B		
Leg South	1.53	13.03	0.61	B		
Leg East	2.61	6.43	0.72	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D4 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Total 2031, PM " model duration: 4:00 PM - 5:30 PM
"D6 - Total 2031, Sat" model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-26 11:39:20 AM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-24
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Option A - Total 2031, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Pedestrian Crossing	Leg North - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default settings only. Is this correct?
Warning	Pedestrian Crossing	Leg North - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg West - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default settings only. Is this correct?
Warning	Pedestrian Crossing	Leg West - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg South - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default settings only. Is this correct?
Warning	Pedestrian Crossing	Leg South - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg East - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default settings only. Is this correct?
Warning	Pedestrian Crossing	Leg East - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Option A	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, PM	Total 2031	PM		ONE HOUR	16:00	17:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Erb Street & Commercial Entrance 1/Boardwalk Extension	Roundabout	North,West,South,East				9.20	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	(untitled)	
West	West	(untitled)	
South	South	(untitled)	
East	East	(untitled)	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	3.50	8.00	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Pedestrian Crossings

Leg	Crossing Type
North	Unsignalled Pedestrian Crossing
West	Unsignalled Pedestrian Crossing
South	Unsignalled Pedestrian Crossing
East	Unsignalled Pedestrian Crossing

Unsignalled Pedestrian Crossing Crossings

Leg	Space between crossing and intersection entry (PCE)	Vehicles queueing on exit (PCE)	Central Refuge	Crossing Data Type	Crossing length (m)	Crossing time (s)	Crossing length (entry side) (m)	Crossing time (entry side) (s)	Crossing length (exit side) (m)	Crossing time (exit side) (s)
North	0.00	0.00		Distance	0.00	0.00				
West	0.00	0.00		Distance	0.00	0.00				
South	0.00	0.00		Distance	0.00	0.00				
East	0.00	0.00		Distance	0.00	0.00				

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			90.00
West	Percentage			90.00
South	Percentage			90.00
East	Percentage			90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.647	1814.551
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	245.00	100.000
West	ONE HOUR	✓	1548.00	100.000
South	ONE HOUR	✓	392.00	100.000
East	ONE HOUR	✓	1341.00	100.000

Pedestrian Flows

General Flows Data

Leg	Profile Type	Average Pedestrian Flow (Ped/hr)
North	ONE HOUR	0.00
West	ONE HOUR	0.00
South	ONE HOUR	0.00
East	ONE HOUR	0.00

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	117.000	22.000	106.000
	West	82.000	0.000	98.000	1368.000
	South	36.000	60.000	0.000	296.000
	East	46.000	1210.000	85.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.48	0.09	0.43
	West	0.05	0.00	0.06	0.88
	South	0.09	0.15	0.00	0.76
	East	0.03	0.90	0.06	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.010	1.000	1.010
	West	1.000	1.000	1.000	1.020
	South	1.000	1.000	1.000	1.000
	East	1.000	1.030	1.000	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
	North	0.0	1.0	0.0	1.0

From	West	0.0	0.0	0.0	2.0
	South	0.0	0.0	0.0	0.0
	East	0.0	3.0	0.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.24	4.30	0.32	~1	A	224.82	337.22	20.00	3.56	0.22	20.01	3.56
West	0.84	11.40	5.24	16.28	B	1420.47	2130.71	249.58	7.03	2.77	249.61	7.03
South	0.61	13.03	1.53	3.00	B	359.71	539.56	74.13	8.24	0.82	74.13	8.24
East	0.72	6.43	2.61	4.11	A	1230.53	1845.79	146.88	4.77	1.63	146.90	4.78

Main Results for each time segment

Main results: (16:00-16:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	184.45	46.11	183.87	122.92	1016.22	0.00	1458.03	717.32	0.127	0.00	0.15	2.849	A
West	1165.42	291.35	1160.26	1040.28	159.81	0.00	2077.17	1828.61	0.561	0.00	1.29	3.973	A
South	295.12	73.78	293.59	153.72	1166.36	0.00	1060.40	506.39	0.278	0.00	0.38	4.685	A
East	1009.58	252.39	1005.79	1326.59	133.36	0.00	2096.30	2033.03	0.482	0.00	0.95	3.380	A

Main results: (16:15-16:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	220.25	55.06	220.02	147.11	1216.20	0.00	1313.46	717.32	0.168	0.15	0.20	3.322	A
West	1391.62	347.91	1388.38	1244.98	191.25	0.00	2054.45	1828.61	0.677	1.29	2.10	5.472	A
South	352.40	88.10	351.44	183.95	1395.68	0.00	912.13	506.39	0.386	0.38	0.62	6.410	A
East	1205.53	301.38	1203.70	1587.51	159.61	0.00	2077.32	2033.03	0.580	0.95	1.40	4.224	A

Main results: (16:30-16:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	269.75	67.44	269.28	179.47	1486.85	0.00	1117.79	717.32	0.241	0.20	0.32	4.280	A
West	1704.38	426.09	1692.54	1522.16	233.98	0.00	2023.56	1828.61	0.842	2.10	5.06	10.701	B
South	431.60	107.90	428.18	224.62	1701.89	0.00	714.14	506.39	0.604	0.62	1.48	12.444	B
East	1476.47	369.12	1471.80	1935.56	194.52	0.00	2052.08	2033.03	0.720	1.40	2.57	6.321	A

Main results: (16:45-17:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	269.75	67.44	269.74	180.51	1491.72	0.00	1114.27	717.32	0.242	0.32	0.32	4.301	A
West	1704.38	426.09	1703.67	1526.96	234.50	0.00	2023.18	1828.61	0.842	5.06	5.24	11.398	B
South	431.60	107.90	431.38	225.65	1712.52	0.00	707.27	506.39	0.610	1.48	1.53	13.027	B
East	1476.47	369.12	1476.33	1948.01	195.89	0.00	2051.09	2033.03	0.720	2.57	2.61	6.428	A

Main results: (17:00-17:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS

North	220.25	55.06	220.71	148.56	1223.17	0.00	1308.42	717.32	0.168	0.32	0.21	3.343	A
West	1391.62	347.91	1403.85	1251.86	192.02	0.00	2053.89	1828.61	0.678	5.24	2.18	5.739	A
South	352.40	88.10	355.93	185.40	1410.47	0.00	902.57	506.39	0.390	1.53	0.65	6.628	A
East	1205.53	301.38	1210.20	1604.87	161.53	0.00	2075.93	2033.03	0.581	2.61	1.44	4.292	A

Main results: (17:15-17:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	184.45	46.11	184.68	123.81	1022.11	0.00	1453.77	717.32	0.127	0.21	0.15	2.862	A
West	1165.42	291.35	1168.87	1046.19	160.60	0.00	2076.60	1828.61	0.561	2.18	1.31	4.050	A
South	295.12	73.78	296.15	154.70	1174.77	0.00	1054.96	506.39	0.280	0.65	0.39	4.752	A
East	1009.58	252.39	1011.48	1336.48	134.44	0.00	2095.52	2033.03	0.482	1.44	0.96	3.418	A

Queueing Delay Results for each time segment

Queueing Delay results: (16:00-16:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.15	0.14	2.849	A	A
West	18.65	1.24	3.973	A	A
South	5.58	0.37	4.685	A	A
East	13.82	0.92	3.380	A	A

Queueing Delay results: (16:15-16:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.99	0.20	3.322	A	A
West	30.20	2.01	5.472	A	A
South	9.06	0.60	6.410	A	A
East	20.49	1.37	4.224	A	A

Queueing Delay results: (16:30-16:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	4.69	0.31	4.280	A	A
West	68.16	4.54	10.701	B	B
South	20.64	1.38	12.444	B	B
East	36.61	2.44	6.321	A	A

Queueing Delay results: (16:45-17:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	4.81	0.32	4.301	A	A
West	77.48	5.17	11.398	B	B
South	22.67	1.51	13.027	B	B
East	38.88	2.59	6.428	A	A

Queueing Delay results: (17:00-17:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	3.13	0.21	3.343	A	A
West	34.76	2.32	5.739	A	A
South	10.15	0.68	6.628	A	A
East	22.33	1.49	4.292	A	A

Queueing Delay results: (17:15-17:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.24	0.15	2.862	A	A
West	20.34	1.36	4.050	A	A
South	6.02	0.40	4.752	A	A

East	14.76	0.98	3.418	A	A

Queue Variation Results for each time segment

Queue Variation results: (16:00-16:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.15	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	1.29	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.38	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.95	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:15-16:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.20	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	2.10	0.00	0.00	4.07	7.12			N/A	N/A
South	0.62	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.40	0.00	0.00	2.05	4.11			N/A	N/A

Queue Variation results: (16:30-16:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.32	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	5.06	0.00	0.00	4.07	16.28			N/A	N/A
South	1.48	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	2.57	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:45-17:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.32	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	5.24	0.00	0.00	0.00	8.14			N/A	N/A
South	1.53	0.00	0.00	0.00	3.00			N/A	N/A
East	2.61	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:00-17:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.21	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	2.18	0.00	0.00	4.07	7.12			N/A	N/A
South	0.65	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.44	0.00	0.00	2.05	3.08			N/A	N/A

Queue Variation results: (17:15-17:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.15	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	1.31	0.00	0.00	2.04	4.07			N/A	N/A
South	0.39	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.96	0.00	0.00	1.03	2.05			N/A	N/A

Junctions 8

ARCADY 8 - Roundabout Module

Version: 8.0.6.541 [19821,26/11/2015]
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Filename: Erb Street & Commercial Entrance 1,Boardwalk Extension - 95%.arc8
Path: C:\Users\AdamMorrison\Paradigm\Projects - 180136 West Hills Commercial\C5 - Analysis and Evaluation\Arcady\Option A Extension
Report generation date: 2019-07-26 11:41:38 AM

Summary of intersection performance

	PM					
	Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	Option A - Total 2031					
Leg North	0.28	3.76	0.22	A	6.98	A
Leg West	3.85	8.29	0.79	A		
Leg South	1.13	9.56	0.53	A		
Leg East	2.16	5.31	0.68	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D4 - Total 2031, AM" model duration: 8:00 AM - 9:30 AM
"D5 - Total 2031, PM " model duration: 4:00 PM - 5:30 PM
"D6 - Total 2031, Sat" model duration: 12:00 PM - 1:30 PM

Run using Junctions 8.0.6.541 at 2019-07-26 11:41:37 AM

File summary

Title	(untitled)
Location	
Site Number	
Date	2019-05-24
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Option A - Total 2031, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Pedestrian Crossing	Leg North - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default settings only. Is this correct?
Warning	Pedestrian Crossing	Leg North - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg West - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default settings only. Is this correct?
Warning	Pedestrian Crossing	Leg West - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg South - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default settings only. Is this correct?
Warning	Pedestrian Crossing	Leg South - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?
Warning	Pedestrian Crossing	Leg East - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default settings only. Is this correct?
Warning	Pedestrian Crossing	Leg East - Unsignalled Pedestrian Crossing Details	Pedestrian crossing uses default flow of 0. Is this correct?

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Option A	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Total 2031, PM	Total 2031	PM		ONE HOUR	16:00	17:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	Erb Street & Commercial Entrance 1/Boardwalk Extension	Roundabout	North,West,South,East				6.98	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	(untitled)	
West	West	(untitled)	
South	South	(untitled)	
East	East	(untitled)	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	3.50	8.00	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Pedestrian Crossings

Leg	Crossing Type
North	Unsignalled Pedestrian Crossing
West	Unsignalled Pedestrian Crossing
South	Unsignalled Pedestrian Crossing
East	Unsignalled Pedestrian Crossing

Unsignalled Pedestrian Crossing Crossings

Leg	Space between crossing and intersection entry (PCE)	Vehicles queueing on exit (PCE)	Central Refuge	Crossing Data Type	Crossing length (m)	Crossing time (s)	Crossing length (entry side) (m)	Crossing time (entry side) (s)	Crossing length (exit side) (m)	Crossing time (exit side) (s)
North	0.00	0.00		Distance	0.00	0.00				
West	0.00	0.00		Distance	0.00	0.00				
South	0.00	0.00		Distance	0.00	0.00				
East	0.00	0.00		Distance	0.00	0.00				

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage			95.00
West	Percentage			95.00
South	Percentage			95.00
East	Percentage			95.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2314.528
West		(calculated)	(calculated)	0.723	2314.528
South		(calculated)	(calculated)	0.647	1915.359
East		(calculated)	(calculated)	0.723	2314.528

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	245.00	100.000
West	ONE HOUR	✓	1548.00	100.000
South	ONE HOUR	✓	392.00	100.000
East	ONE HOUR	✓	1341.00	100.000

Pedestrian Flows

General Flows Data

Leg	Profile Type	Average Pedestrian Flow (Ped/hr)
North	ONE HOUR	0.00
West	ONE HOUR	0.00
South	ONE HOUR	0.00
East	ONE HOUR	0.00

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.000	117.000	22.000	106.000
	West	82.000	0.000	98.000	1368.000
	South	36.000	60.000	0.000	296.000
	East	46.000	1210.000	85.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	0.00	0.48	0.09	0.43
	West	0.05	0.00	0.06	0.88
	South	0.09	0.15	0.00	0.76
	East	0.03	0.90	0.06	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

		To			
		North	West	South	East
From	North	1.000	1.010	1.000	1.010
	West	1.000	1.000	1.000	1.020
	South	1.000	1.000	1.000	1.000
	East	1.000	1.030	1.000	1.000

Truck Percentages - Intersection 1 (for whole period)

		To			
		North	West	South	East
	North	0.0	1.0	0.0	1.0

From	West	0.0	0.0	0.0	2.0
	South	0.0	0.0	0.0	0.0
	East	0.0	3.0	0.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.22	3.76	0.28	~1	A	224.82	337.22	17.83	3.17	0.20	17.83	3.17
West	0.79	8.29	3.85	8.14	A	1420.47	2130.71	198.65	5.59	2.21	198.67	5.59
South	0.53	9.56	1.13	2.00	A	359.71	539.56	59.07	6.57	0.66	59.07	6.57
East	0.68	5.31	2.16	3.08	A	1230.53	1845.79	126.21	4.10	1.40	126.22	4.10

Main Results for each time segment

Main results: (16:00-16:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	184.45	46.11	183.92	122.99	1016.61	0.00	1579.57	757.17	0.117	0.00	0.13	2.603	A
West	1165.42	291.35	1160.86	1040.67	159.86	0.00	2198.95	1930.20	0.530	0.00	1.14	3.513	A
South	295.12	73.78	293.76	153.78	1166.94	0.00	1160.84	534.52	0.254	0.00	0.34	4.146	A
East	1009.58	252.39	1006.16	1327.27	133.43	0.00	2218.06	2145.97	0.455	0.00	0.85	3.041	A

Main results: (16:15-16:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	220.25	55.06	220.05	147.17	1216.52	0.00	1435.04	757.17	0.153	0.13	0.18	2.989	A
West	1391.62	347.91	1389.05	1245.29	191.28	0.00	2176.24	1930.20	0.639	1.14	1.78	4.639	A
South	352.40	88.10	351.64	184.01	1396.32	0.00	1012.53	534.52	0.348	0.34	0.53	5.442	A
East	1205.53	301.38	1204.00	1588.26	159.70	0.00	2199.08	2145.97	0.548	0.85	1.24	3.711	A

Main results: (16:30-16:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	269.75	67.44	269.36	179.81	1488.04	0.00	1238.75	757.17	0.218	0.18	0.28	3.745	A
West	1704.38	426.09	1696.41	1523.32	234.09	0.00	2145.30	1930.20	0.794	1.78	3.77	8.021	A
South	431.60	107.90	429.28	224.94	1705.55	0.00	812.58	534.52	0.531	0.53	1.11	9.336	A
East	1476.47	369.12	1472.86	1939.84	194.99	0.00	2173.56	2145.97	0.679	1.24	2.14	5.249	A

Main results: (16:45-17:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	269.75	67.44	269.74	180.54	1491.79	0.00	1236.04	757.17	0.218	0.28	0.28	3.758	A
West	1704.38	426.09	1704.07	1527.03	234.51	0.00	2144.99	1930.20	0.795	3.77	3.85	8.293	A
South	431.60	107.90	431.51	225.68	1712.89	0.00	807.84	534.52	0.534	1.11	1.13	9.557	A
East	1476.47	369.12	1476.39	1948.46	195.94	0.00	2172.87	2145.97	0.680	2.14	2.16	5.306	A

Main results: (17:00-17:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS

North	220.25	55.06	220.64	148.20	1221.95	0.00	1431.12	757.17	0.154	0.28	0.18	3.003	A
West	1391.62	347.91	1399.70	1250.67	191.91	0.00	2175.78	1930.20	0.640	3.85	1.83	4.768	A
South	352.40	88.10	354.75	185.06	1406.55	0.00	1005.91	534.52	0.350	1.13	0.54	5.549	A
East	1205.53	301.38	1209.13	1600.28	161.02	0.00	2198.12	2145.97	0.548	2.16	1.26	3.753	A

Main results: (17:15-17:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	184.45	46.11	184.65	123.74	1021.76	0.00	1575.84	757.17	0.117	0.18	0.13	2.613	A
West	1165.42	291.35	1168.11	1045.85	160.56	0.00	2198.45	1930.20	0.530	1.83	1.16	3.566	A
South	295.12	73.78	295.92	154.62	1174.05	0.00	1156.24	534.52	0.255	0.54	0.34	4.188	A
East	1009.58	252.39	1011.15	1335.62	134.35	0.00	2217.40	2145.97	0.455	1.26	0.86	3.068	A

Queueing Delay Results for each time segment

Queueing Delay results: (16:00-16:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	1.96	0.13	2.603	A	A
West	16.56	1.10	3.513	A	A
South	4.96	0.33	4.146	A	A
East	12.48	0.83	3.041	A	A

Queueing Delay results: (16:15-16:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.70	0.18	2.989	A	A
West	25.81	1.72	4.639	A	A
South	7.73	0.52	5.442	A	A
East	18.09	1.21	3.711	A	A

Queueing Delay results: (16:30-16:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	4.12	0.27	3.745	A	A
West	52.44	3.50	8.021	A	A
South	15.80	1.05	9.336	A	A
East	30.74	2.05	5.249	A	A

Queueing Delay results: (16:45-17:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	4.20	0.28	3.758	A	A
West	57.31	3.82	8.293	A	A
South	16.85	1.12	9.557	A	A
East	32.24	2.15	5.306	A	A

Queueing Delay results: (17:00-17:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.81	0.19	3.003	A	A
West	28.71	1.91	4.768	A	A
South	8.44	0.56	5.549	A	A
East	19.44	1.30	3.753	A	A

Queueing Delay results: (17:15-17:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	2.04	0.14	2.613	A	A
West	17.82	1.19	3.566	A	A
South	5.29	0.35	4.188	A	A

East	13.22	0.88	3.068	A	A

Queue Variation Results for each time segment

Queue Variation results: (16:00-16:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.13	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	1.14	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.34	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.85	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:15-16:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.18	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	1.78	0.00	0.00	3.05	6.11			N/A	N/A
South	0.53	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.24	0.00	0.00	2.05	3.08			N/A	N/A

Queue Variation results: (16:30-16:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.28	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	3.77	0.00	0.00	0.00	8.14			N/A	N/A
South	1.11	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	2.14	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:45-17:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.28	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	3.85	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.13	0.00	0.00	0.00	2.00			N/A	N/A
East	2.16	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:00-17:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.18	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	1.83	0.00	0.00	4.07	5.09			N/A	N/A
South	0.54	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.26	0.00	0.00	1.03	2.05			N/A	N/A

Queue Variation results: (17:15-17:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.13	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	1.16	0.00	0.00	2.04	3.05			N/A	N/A
South	0.34	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.86	0.00	0.00	1.03	1.03			N/A	N/A

APPENDIX D

ROUNDABOUT DESIGN CHECKS PACKAGE

MTE FILE No: 34280-101-RG1.0
Roundabout N/S Collector at Erb St W.
P:\P\34280\101\34280-101-RG1.DWG

ENGINEER

MTE

OWNER

Region of Waterloo

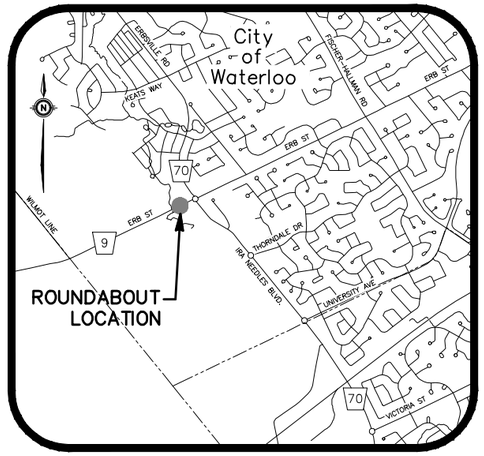
PROJECT

N/S Collector / Erb St W. INTERSECTION

City of Waterloo, Ontario

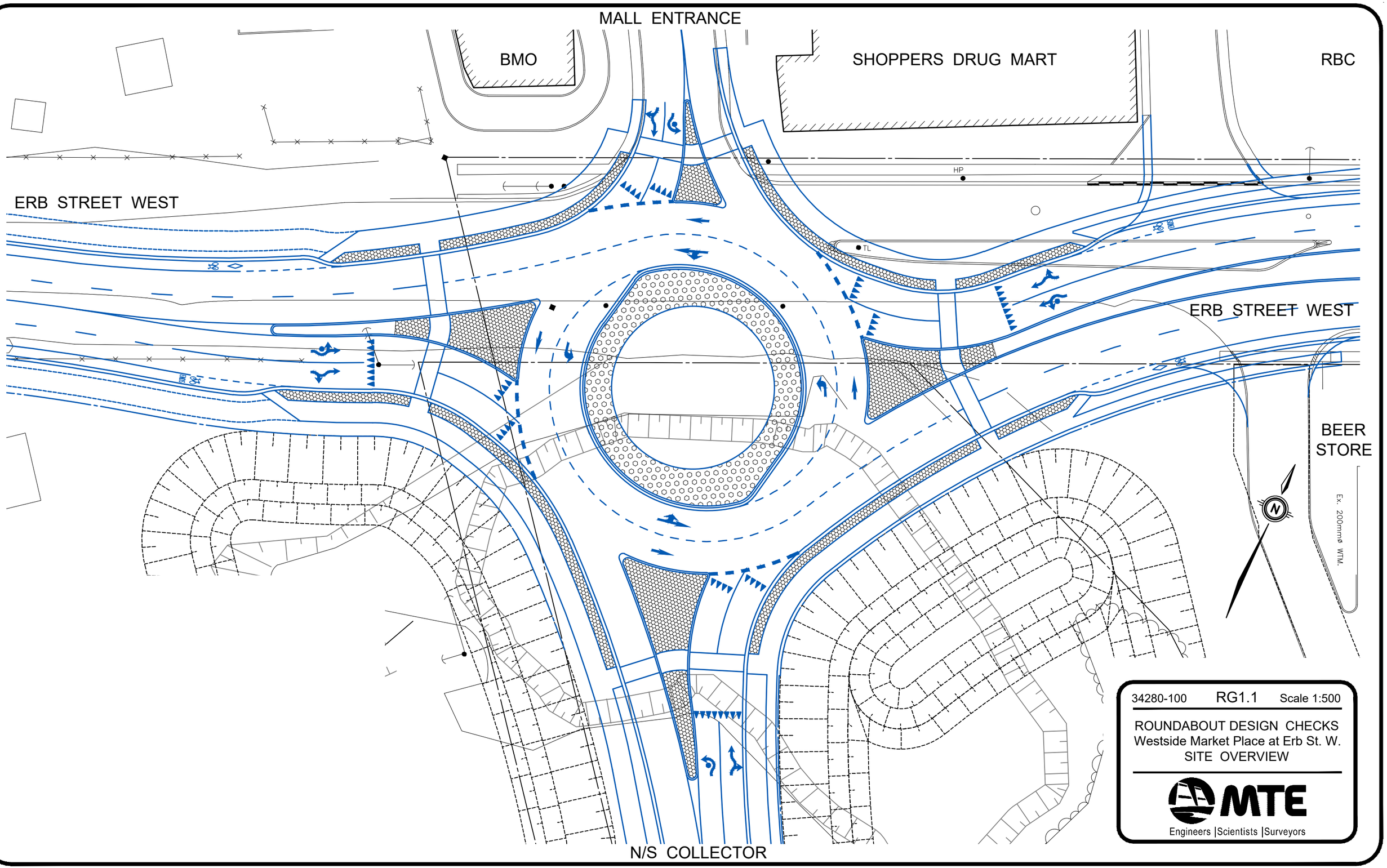
ROUNDABOUT DESIGN CHECKS PACKAGE

Westside Marketplace at Erb Street West (Regional Road 9)



LIST OF DRAWINGS

Sheet	MTE Dwg. No.	Description
1.	RG1.1	Site Overview Plan
2.	RG1.2	Horizontal Geometry
3.	RG1.3	Design Vehicle - Right Rurns - Truck
4.	RG1.4	Design Vehicle - Left Turns - Truck
5.	RG1.5	Design Vehicle - Left Turns - Bus
6.	RG1.6	Radii on Fastest Path
7.	RG1.7	Path Overlap Tangents
8.	RG1.8	Entry Angles
9.	RG1.9	Clear View Areas
10.	RG1.10	Pavement Markings



34280-100 RG1.1 Scale 1:500

ROUNDABOUT DESIGN CHECKS
Westside Market Place at Erb St. W.
SITE OVERVIEW

MTE
Engineers | Scientists | Surveyors

DWG PATH:P:\P\34280\101\34280-101-RG1.dwg
July 19, 2019 11:43 a.m. Plotted By: pgaimbault

MALL ENTRANCE

BMO

SHOPPERS DRUG MART

RBC

ERB STREET WEST

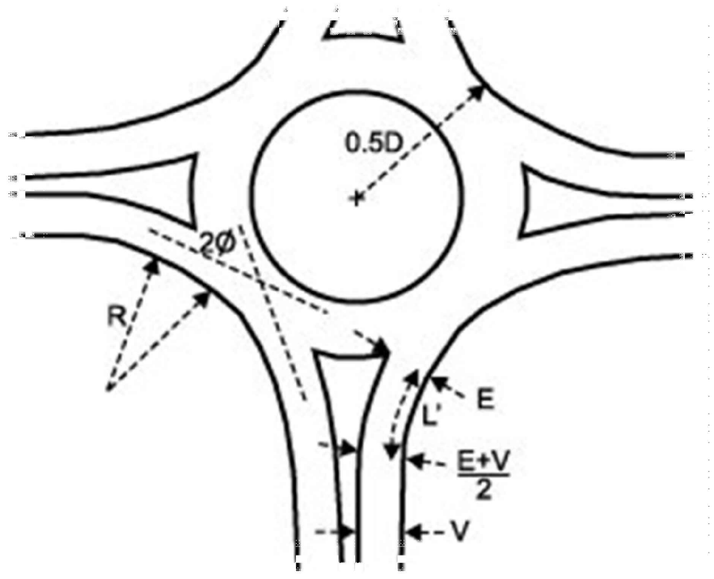
ERB STREET WEST

BEER STORE

N/S COLLECTOR

7.13
3.12
8.25
5.62
ø–56.6
9.65
9.62
6.70
6.70
7.77
ø–52.2
9.65
8.84
30.61
ø–37.2
ø–32.8
ø–32.8
ø–37.2
9.65
ø–52.2
8.84
7.77
25.91
9.73
6.70
9.65
ø–56.6
5.76
8.89
15.63
7.80
6.70

Ex. 200mmø WTM.



34280-100 RG1.2 Scale 1:500

ROUNDABOUT DESIGN CHECKS
Westside Market Place at Erb St. W.
HORIZONTAL GEOMETRY

MTE
Engineers | Scientists | Surveyors

DWG PATH: P:\P\34280\101\34280-101-RG1.dwg
July 19, 2019 11:43 a.m. Plotted By: pgaimbault

MALL ENTRANCE

BMO

SHOPPERS DRUG MART

RBC

ERB STREET WEST

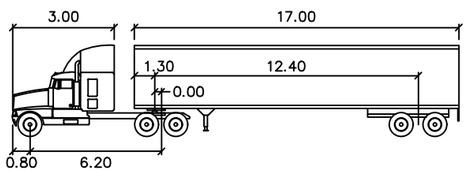
ERB STREET WEST

BEER STORE

Ex. 200mmø WTM.

N/S COLLECTOR

WB-20 TAC-2017 (CA)



WB–20 meters

Tractor Width	: 2.60	Lock to Lock Time	: 6.0
Trailer Width	: 2.60	Steering Angle	: 28.3
Tractor Track	: 2.60	Articulating Angle	: 70.0
Trailer Track	: 2.60		

34280-100 RG1.3 Scale 1:500

ROUNDABOUT DESIGN CHECKS
Westside Market Place at Erb St. W.
DESIGN VEHICLE - RIGHT TURNS

MTE
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DWG PATH: P:\P\34280\101\34280-101-RG1.dwg
July 19, 2019 11:43 a.m. Plotted By: praimbault

MALL ENTRANCE

BMO

SHOPPERS DRUG MART

RBC

ERB STREET WEST

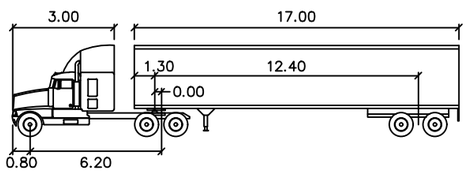
ERB STREET WEST

BEER STORE

Ex. 200mmø WTM.

N/S COLLECTOR

WB-20 TAC-2017 (CA)



WB-20 meters

Tractor Width	: 2.60	Lock to Lock Time	: 6.0
Trailer Width	: 2.60	Steering Angle	: 28.3
Tractor Track	: 2.60	Articulating Angle	: 70.0
Trailer Track	: 2.60		

34280-100 RG1.4 Scale 1:500

ROUNDABOUT DESIGN CHECKS
Westside Market Place at Erb St. W.
DESIGN VEHICLE - LEFT TURNS

MTE
Engineers | Scientists | Surveyors

DWG PATH:P:\P\34280\101\34280-101-RG1.dwg
July 19, 2019 11:43 a.m. Plotted By: praimbault

MALL ENTRANCE

BMO

SHOPPERS DRUG MART

RBC

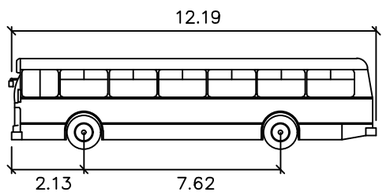
ERB STREET WEST

ERB STREET WEST

BEER STORE

Ex. 200mmø WTM.

N/S COLLECTOR



CITY–BUS Scale 1:200
meters

Width	: 2.59
Track	: 2.59
Lock to Lock Time	: 6.0
Steering Angle	: 41.4

34280-100 RG1.5 Scale 1:500

ROUNDABOUT DESIGN CHECKS
Westside Market Place at Erb St. W.
DESIGN VEHICLE - LEFT TURNS BUS

MTE
Engineers | Scientists | Surveyors

DWG PATH: P:\P\34280\101\34280-101-RG1.dwg
July 19, 2019 11:43 a.m. Plotted By: pgaimbault

MALL ENTRANCE

BMO

SHOPPERS DRUG MART

RBC

ERB STREET WEST

ERB STREET WEST

BEER STORE

N/S COLLECTOR

R-58.9

R-23.4

R-203.0

R-12.1

R-31.6

R-71.6

R-49.3

R-34.1

R-33.1

R-68.2

R-49.4

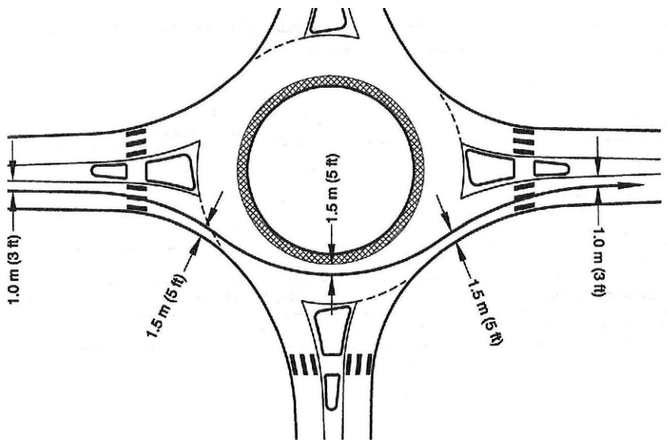
R-71.5

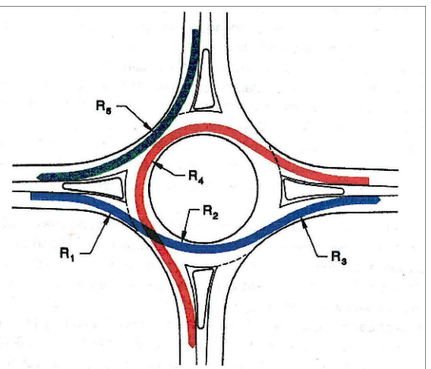
R-41.2

R-92.3

R-100.9

Ex. 200mmø WTM.



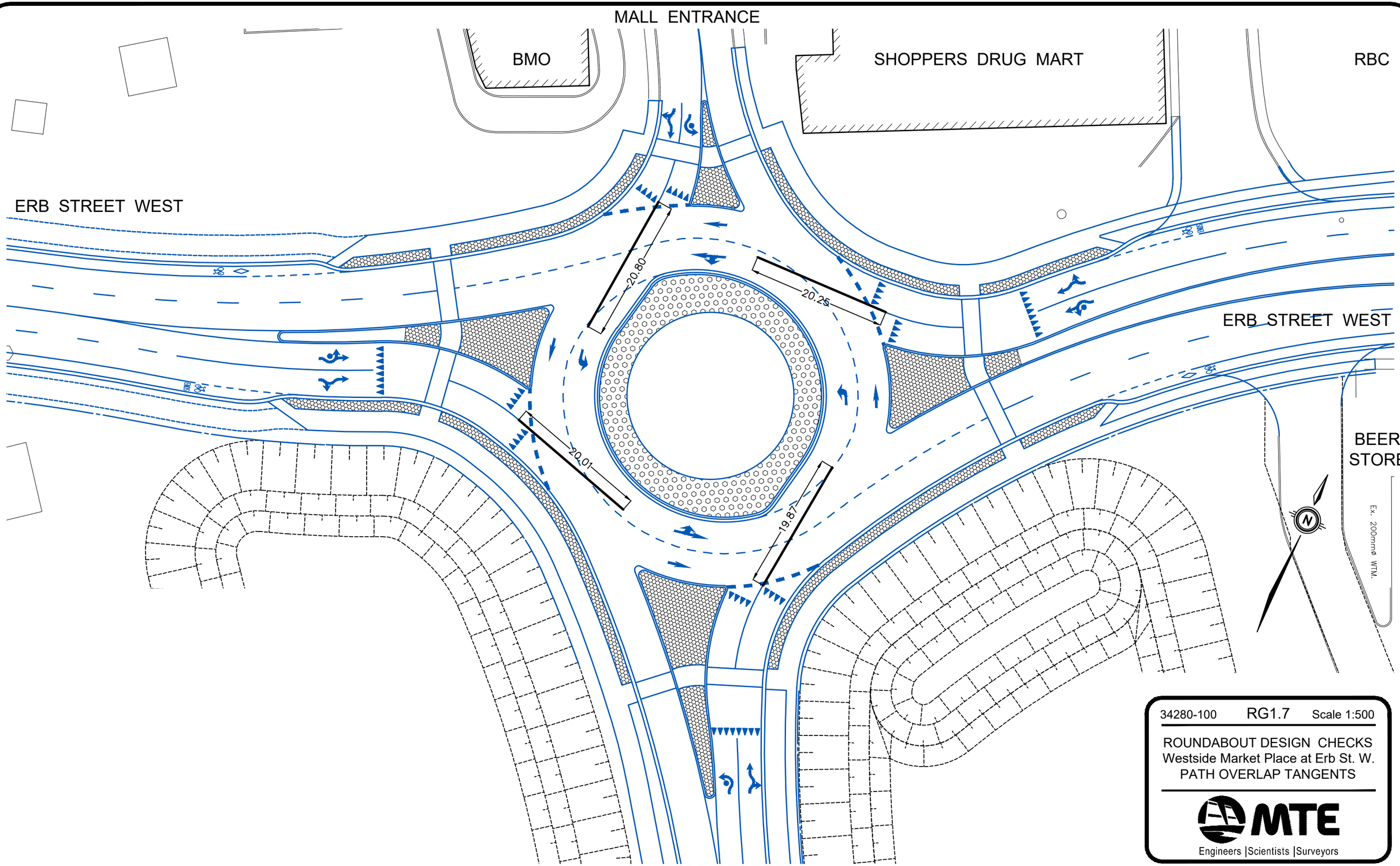


34280-100 RG1.6 Scale 1:500

ROUNDABOUT DESIGN CHECKS
Westside Market Place at Erb St. W.
RADII ON FASTEST PATH

MTE
Engineers | Scientists | Surveyors

DWG PATH:P:\P\34280\101\34280-101-RG1.dwg
July 19, 2019 11:43 a.m. Plotted By: pgaimbault

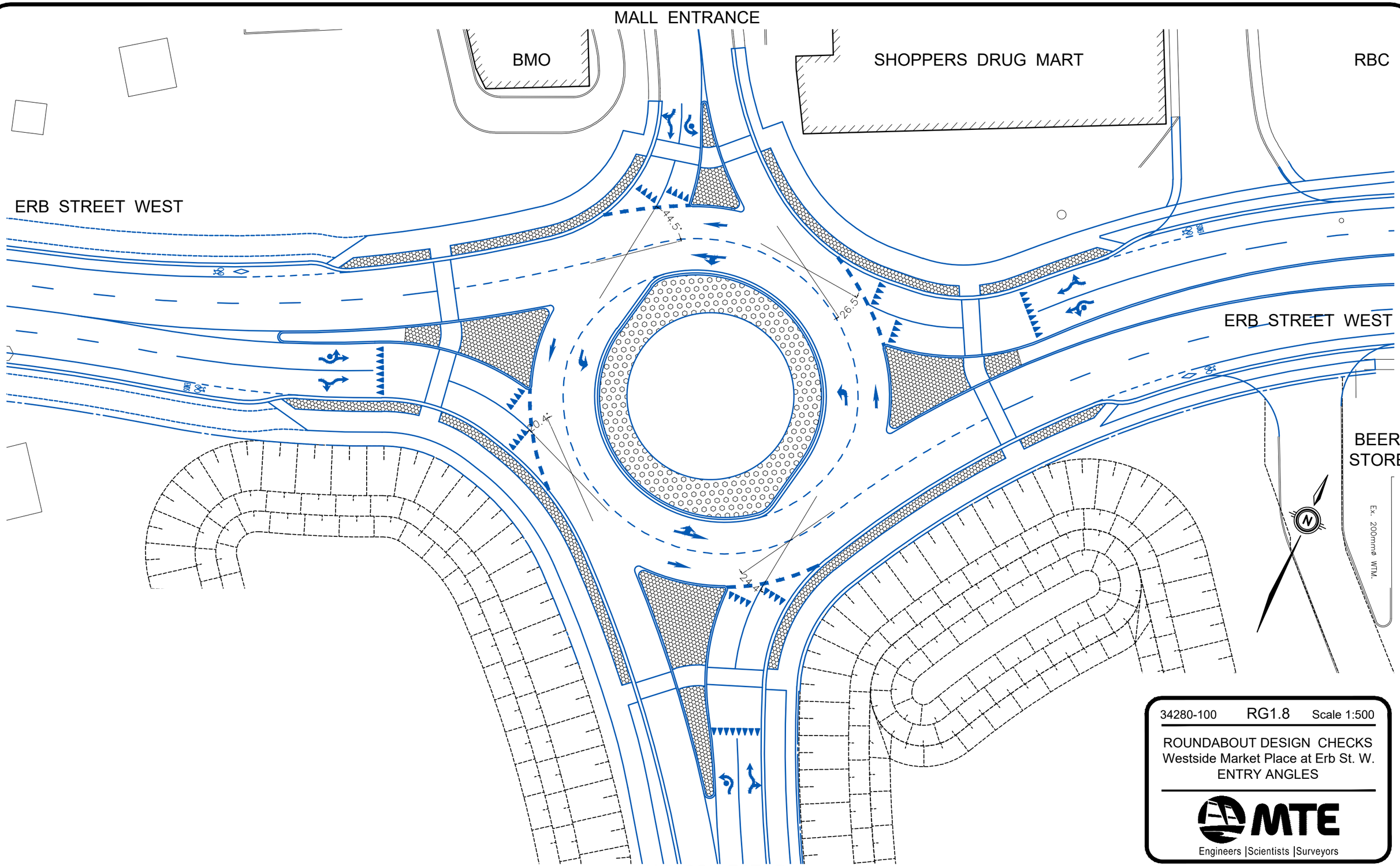


34280-100 RG1.7 Scale 1:500

ROUNDABOUT DESIGN CHECKS
Westside Market Place at Erb St. W.
PATH OVERLAP TANGENTS

MTE
Engineers | Scientists | Surveyors

DWG PATH: P:\P\34280\101\34280-101-RG1.dwg
July 19, 2019 11:43 a.m. Plotted By: pgaimbault



34280-100 RG1.8 Scale 1:500

ROUNDABOUT DESIGN CHECKS
Westside Market Place at Erb St. W.
ENTRY ANGLES

MTE
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DWG PATH:P:\P\34280\101\34280-101-RG1.dwg
July 19, 2019 11:43 a.m. Plotted By: pgaimbault

MALL ENTRANCE

BMO

SHOPPERS DRUG MART

RBC

ERB STREET WEST

ERB STREET WEST

BEER STORE

Ex. 200mmø WTM.

N/S COLLECTOR

LEGEND

STOPPING SIGHT DISTANCE ENVELOPE
DRIVER'S EYE–1.05m AND OBJECT HEIGHT–0.6m

INTERSECTION SIGHT DISTANCE ENVELOPE
DRIVER'S EYE–1.05m AND OBJECT HEIGHT–1.05m

UNRESTRICTED AREA (UNLIMITED HEIGHT)

34280-100 RG1.9 Scale 1:500

ROUNDABOUT DESIGN CHECKS
Westside Market Place at Erb St. W.
CLEAR VIEW AREAS

MTE
Engineers |Scientists |Surveyors

DWG PATH:P:\P\34280\101\34280-101-RG1.dwg
July 19, 2019 11:43 a.m. Plotted By: praimbault

MALL ENTRANCE

BMO

SHOPPERS DRUG MART

RBC

ERB STREET WEST

ERB STREET WEST

BEER STORE

Ex. 200mmø WTM.

N/S COLLECTOR

LEGEND

NOTES

1. 333, 363, 393, DENOTES PAVEMENT MARKING SPACING (IE., 3m LINE, 3m GAP, 3m LINE)
2. (1) DENOTES PAVEMENT MARKING
3. ⟨1⟩ DENOTES PAVEMENT MARKING, DURABLE
4. △1 DENOTES PAVEMENT MARKING, TEMPORARY–REMOVABLE
5. [1] DENOTES PAVEMENT MARKING, TEMPORARY
6. ⟨A⟩ DENOTES CROSSWALK MARKING (SEE DETAIL 'A')

PAVEMENT MARKING LEGEND	
1	SOLID YELLOW, 10cm
5	SOLID WHITE, 10cm
10	111 BROKEN WHITE, 10cm
15	SOLID WHITE, 60cm
16	1–1–1 SOLID WHITE, 45cm
20	SOLID WHITE, SYMBOLS AND ARROWS

34280-100 RG1.10 Scale 1:500

ROUNDABOUT DESIGN CHECKS
Westside Market Place at Erb St. W.
PAVEMENT MARKINGS

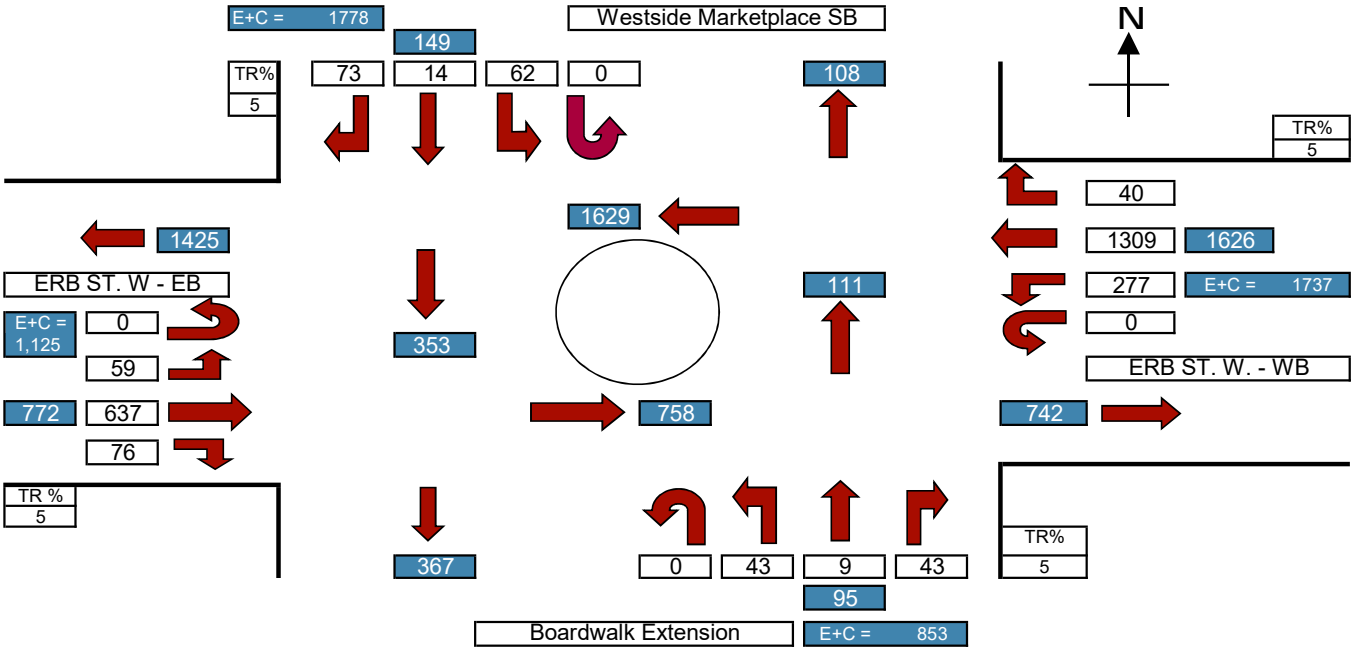
MTE
Engineers | Scientists | Surveyors

DWG PATH:P:\P\34280\101\34280-101-RG1.dwg
July 19, 2019 11:43 a.m. Plotted By: pgaimbault

ROUNDABOUT TRAFFIC FLOW SHEET

Project: Westhill District Plan
Project No.: 34280-101
Intersection: Erb St. W. & Boardwalk Extension
Time Period: **AM PEAK 2031**

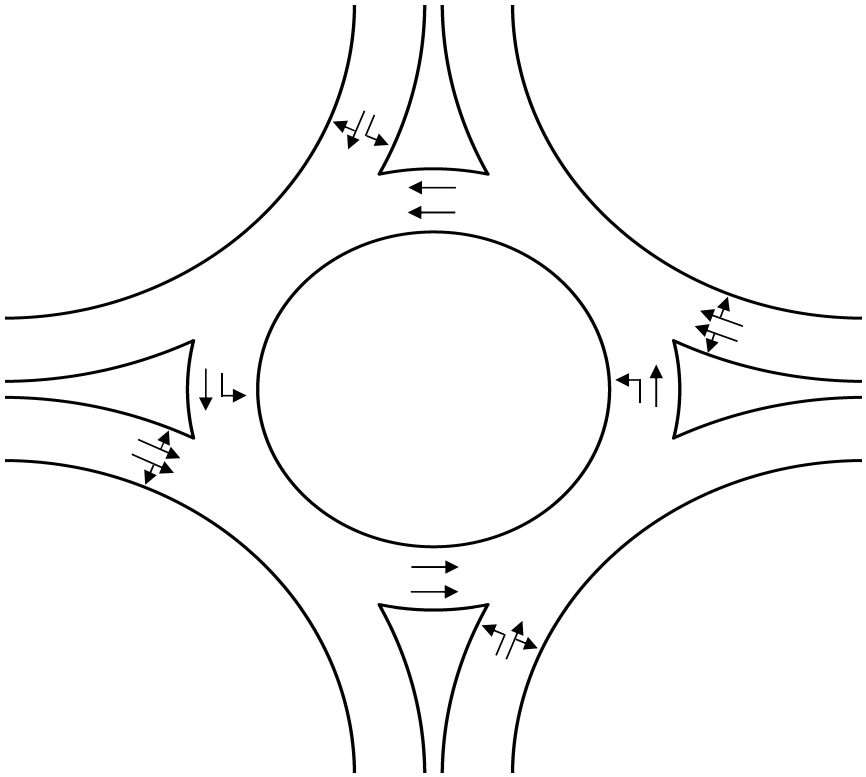
Drawn By: NPD
Sheet: **1 of 3**



Capacity Guidelines

1. Single Lane service volumes < 900vph - 1200 vph
2. Exit flow < 900vph - 1200 vph for single lane exit
3. Entry flow + circulating flow < 1400vph use single lane entry
4. 1400 vph < Entry + Circ. flow < 2200vph use two-lane entry
3. Entry flow + circulating flow > 2200vph use three-lane entry

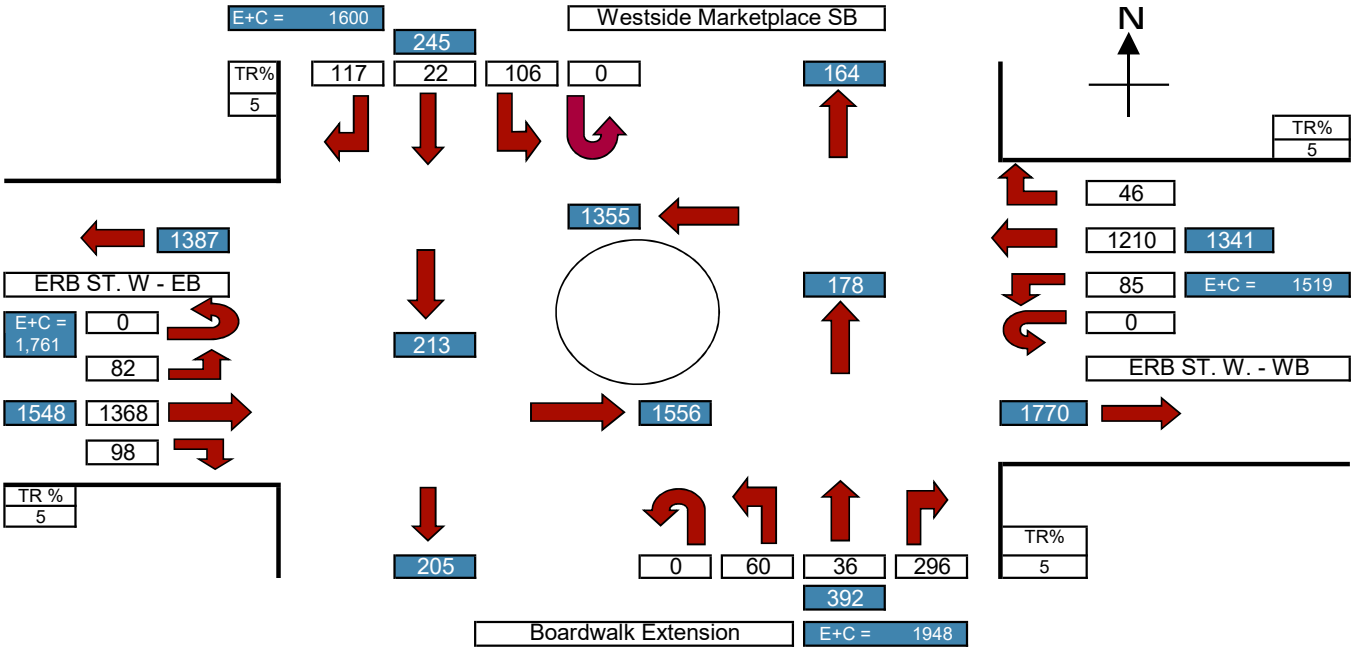
		Model Inputs			
Leg	PCU	1st Exit	2nd Exit	3rd Exit	U-turn
stside Marketplace	1.05	73	14	62	0
ERB ST. W - EB	1.05	76	637	59	0
oardwalk Extensio	1.05	43	9	43	0
ERB ST. W. - WB	1.05	40	1309	277	0



ROUNDABOUT TRAFFIC FLOW SHEET

Project: Westhill District Plan
Project No.: 34280-101
Intersection: Erb St. W. & Boardwalk Extension
Time Period: **PM PEAK 2031**

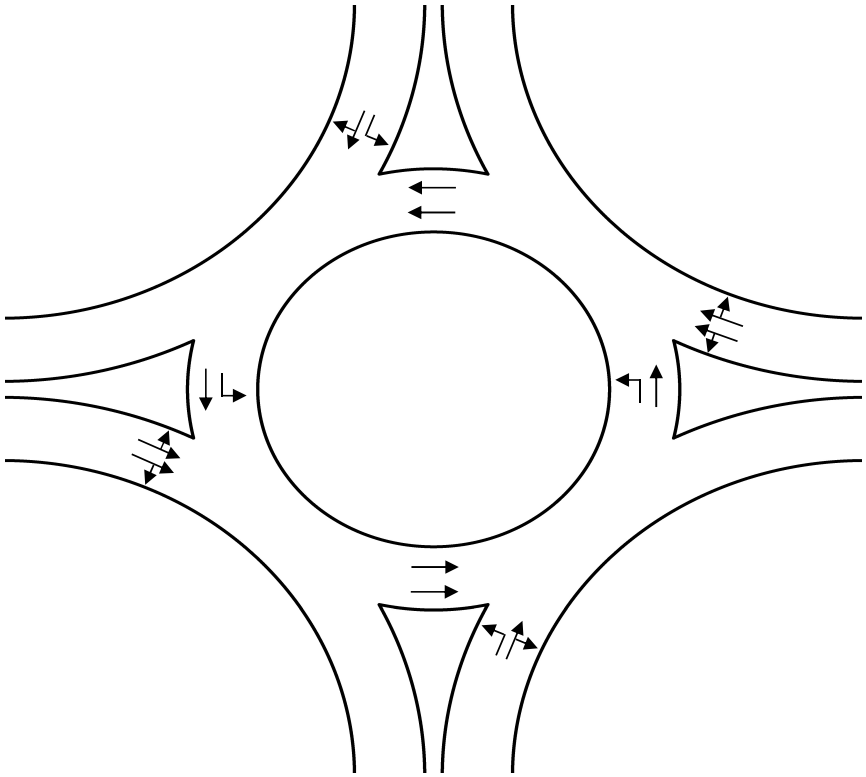
Drawn By: NPD
Sheet: **1 of 3**



Capacity Guidelines

1. Single Lane service volumes < 900vph - 1200 vph
2. Exit flow < 900vph - 1200 vph for single lane exit
3. Entry flow + circulating flow < 1400vph use single lane entry
4. 1400 vph < Entry + Circ. flow < 2200vph use two-lane entry
3. Entry flow + circulating flow > 2200vph use three-lane entry

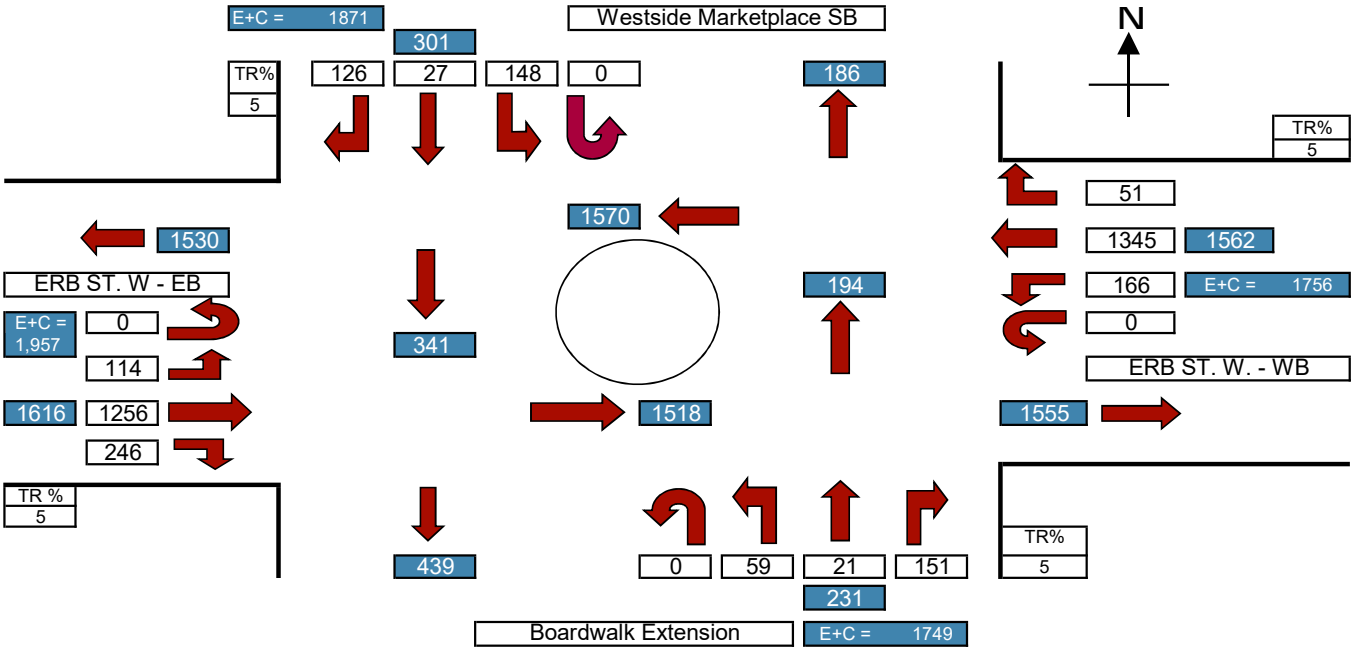
	Model Inputs				
Leg	PCU	1st Exit	2nd Exit	3rd Exit	U-turn
stside Marketplace	1.05	117	22	106	0
ERB ST. W - EB	1.05	98	1368	82	0
oardwalk Extensio	1.05	296	36	60	0
ERB ST. W. - WB	1.05	46	1210	85	0



ROUNDABOUT TRAFFIC FLOW SHEET

Project: Westhill District Plan
Project No.: 34280-101
Intersection: Erb St. W. & Boardwalk Extension
Time Period: **SATURDAY PEAK 2031**

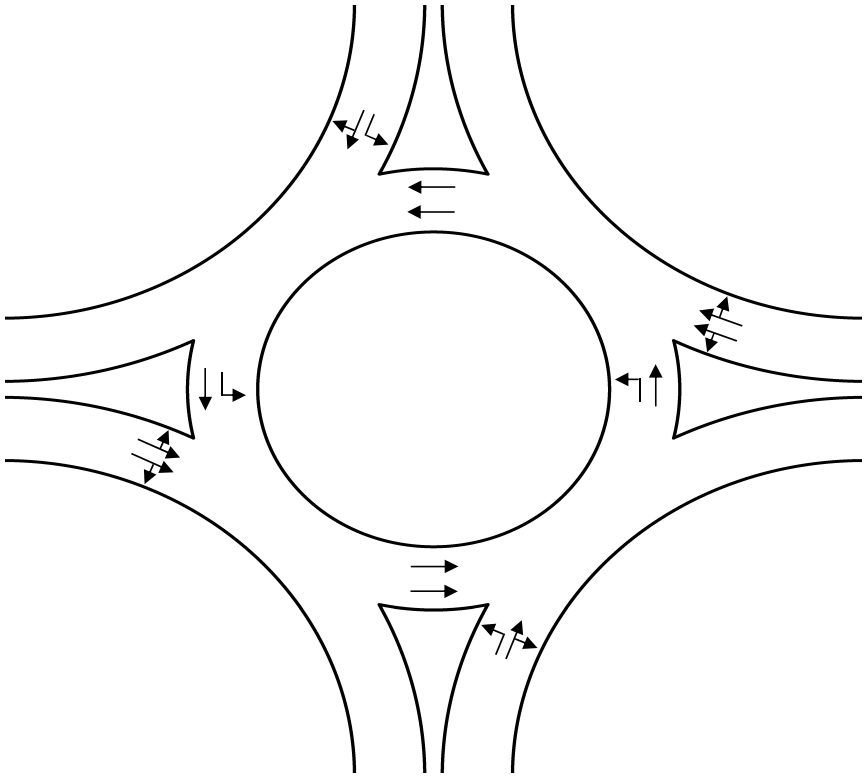
Drawn By: NPD
Sheet: **1 of 3**



Capacity Guidelines

1. Single Lane service volumes < 900vph - 1200 vph
2. Exit flow < 900vph - 1200 vph for single lane exit
3. Entry flow + circulating flow < 1400vph use single lane entry
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3. Entry flow + circulating flow > 2200vph use three-lane entry

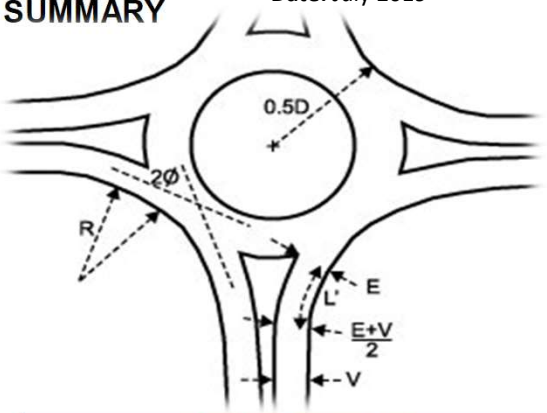
	Model Inputs				
Leg	PCU	1st Exit	2nd Exit	3rd Exit	U-turn
stside Marketplace	1.05	126	27	148	0
ERB ST. W - EB	1.05	246	1256	114	0
oardwalk Extensio	1.05	151	21	59	0
ERB ST. W. - WB	1.05	51	1345	166	0



ROUNDABOUT GEOMETRIC DESIGN SUMMARY

Project: Westhill District Plan
Project No.: 34280-101
Intersection: Erb Street West and N/S Collector
Date: July 2019

Drawn By: NPD
Sheet: 1 of 4



Mall Entrance	Erb Street West	N/S Collector	Erb Street West

Design Parameters	SB	EB	NB	WB
Entry Width, E (m)	8.25	8.84	8.89	8.84
Effective Flare Length, L (m)	3.12	30.61	15.83	25.91
Road Half Width, V (m)	6.00	6.70	6.70	6.70
Entry Radius, R (m)	20.70	39.70	24.70	29.70
Entry Angle, Ø (°)	22.25	10.20	12.20	13.25
Inscribed Circle Diameter, ICD (m)	52.1	52.1	52.1	52.1
Central Island Diameter (m)	32.76	37.11	32.76	37.11
Upstream Circ. Road Width (m)	9.65	9.65	9.65	9.65
Exit Width (m)	5.62	9.62	5.76	9.73
Pedestrian Refuge Width (m)	2.05	3.37	3.87	3.42

Path Radius-Speed Parameters	SB	EB	NB	WB
R1 (km/h)	42	45	50	46
R2 (km/h)	39	34	34	56
R3 (km/h)	52	46	54	68
R4 (km/h)	28	26	28	28
R5 (km/h)	33	30	39	37
Delta V (km/h)	22	24	18	19

Minimum Sight Distance Parameters	SB	EB	NB	WB
Approach Design Speed (km/h)	50	60	60	60
Approach SSD (m)	62.9	84.6	84.6	84.6
Circulating (R2) SSD (m)	43.1	35.1	35.6	70.4
Pedestrian (R5) SSD (m)	34.2	29.4	43.2	39.3
Entering ISD (m)	57.0	52.9	56.0	62.9
Circulating ISD (m)	34.9	34.9	34.9	32.7

Note:

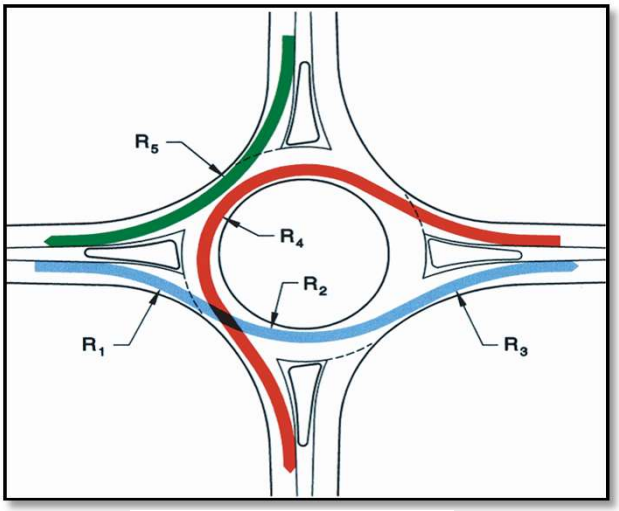
- Intersection sight distance (ISD) calculated based on 4.5s critical gap.

Additional Information	
Design Vehicle:	WB-20 for right turns and I-BUS for left turns (trucks use conc. apron for left turns.)
Circulatory Road:	Dual Lane (9.2m)
Truck Apron:	4.0m wide
Pedestrian Facilities:	3.0m MUT on all legs, crosswalks with signs & zebra crosswalks provided on all legs
Bicycle Facilities:	3.0m Multi-use Trail
Other Comments:	None

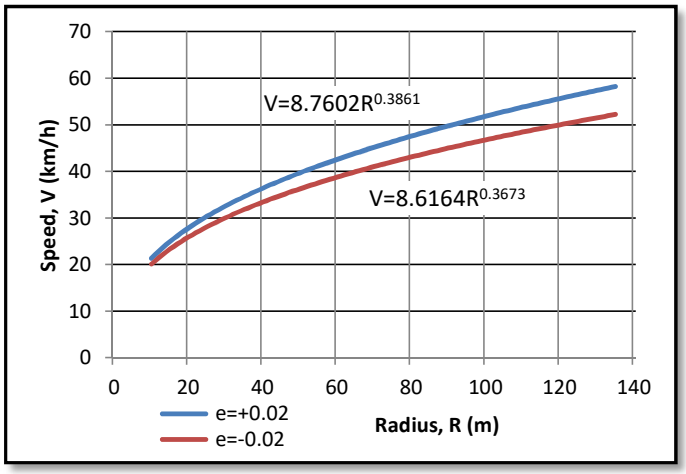
ROUNDABOUT SPEED-RADIUS CALCULATIONS

Project: Westhill District Plan
Project No.: 34280-101
Intersection: Erb Street West and N/S Collector
Date: July 2019

Drawn By: NPD
Sheet: 1 of 1



NCHRP Report 672, Figure 6-46



Speed–Radius Relationship

Mall Entrance SB

Speed - Radius Calculations

	R1	R2	R3	R2+A	R4	R5
Accel. Distance (m)	-	-	-	45.6	-	-
Radius, R (m)	58.9	49.3	100.9	-	20.1	31.6
Speed, V (km/h)	42	39	52	64	28	33

Conflicting Speed Differentials

Max. V	Min. V	Delta V
-	-	-
50	28	22

Erb Street West EB

	R1	R2	R3	R2+A	R4	R5
Accel. Distance	-	-	-	38.4	-	-
Radius, R (m)	68.3	33.1	71.5	-	17.0	23.4
Speed, V (km/h)	45	34	46	57	26	30

Max. V	Min. V	Delta V
-	-	-
50	26	24

N/S Collector NB

	R1	R2	R3	R2+A	R4	R5
Accel. Distance	-	-	-	49.0	-	-
Radius, R (m)	92.3	34.1	112.2	-	20.1	49.4
Speed, V (km/h)	50	34	54	62	28	39

Max. V	Min. V	Delta V
-	-	-
46	28	18

Erb Street West WB

	R1	R2	R3	R2+A	R4	R5
Accel. Distance	-	-	-	47.9	-	-
Radius, R (m)	71.6	121.4	203.0	-	17.0	41.2
Speed, V (km/h)	46	56	68	76	26	37

Max. V	Min. V	Delta V
-	-	-
46	26	19

Notes:

- Speed-Radius values were determined by offsetting from face of curb, not from edge of pavement or painted edge line.
- R2 and R4 values will differ depending on whether the circulatory road is crowned or adverse crossfall.