



1012 Snyder's Road West Baden, Ontario

Functional Servicing Report

Project Location:

1012 Snyder's Road West
Baden, Ontario

Prepared for:

Snyder's Road (Baden) GP Inc.
91 Caldari Road, Unit 1
Concord, ON L4K 3Z9

Prepared by:

MTE Consultants
520 Bingemans Centre Drive
Kitchener, ON N2B 3X9

April 12, 2021

MTE File No.: 40777-104





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MTE Drawing No. AG1.1 & AG1.2	Encl.
General Plan of Services	
MTE Drawing No. GP1.1 & GP1.2	Encl.
SWMF Outlet Pipe P&P	
MTE Drawing No. MS7.1, MS7.2, MS7.3	Encl.
Section E-E	
MTE Drawing No. MS9.0	Encl.

1.0 Introduction

1.1 Overview

MTE Consultants Inc. (MTE) was retained by Snyder's Road (Baden) GP Inc. to prepare the following Functional Servicing Report (FSR) in support of a Draft Plan of Subdivision application. The lands that comprise the Draft Plan of Subdivision are within the property limits of 1012 Snyder's Road West, located in the community of Baden, Township of Wilmot, Region of Waterloo. These lands are herein referred to as the 'subject lands'.

Refer to **Figure 1.1** for the location of the subject lands. The proposed development plans for the subject lands include a residential subdivision with a school block, trail blocks, future development blocks, and a stormwater management block. Refer to the Draft Plan of Subdivision prepared by MHBC, dated March 31, 2021, in **Appendix A** for more details.

The Draft Plan includes the following:

- Six municipal roads;
- Twenty-eight single family residential blocks, including a total maximum 296 units and 29 future units;
- A school block, with potential to be developed as a multi-residential block with maximum 74 units;
- A Stormwater Management Facility block;
- Six trail blocks along the limits of the subject lands;
- A walkway block; and
- Nine future development blocks, for the purpose of future right-of-ways and residential lands.

This report is to be read in conjunction with the Preliminary Stormwater Management Report – 1012 Snyder's Road West (April 12, 2021) prepared by MTE.

1.2 Background Information

The subject lands were originally assessed as part of the adjacent Baden Subdivision (Activa Holdings Inc.), and Baden West Subdivision (Baden West Developments Inc.) as undeveloped lands. The original primary storm outlet for the subject lands is the SWM Facility (SWMF) within the Baden West Subdivision, and is described within the Final SWM Report dated January 2005 (Stantec).

In 2014, Conestoga Rovers & Associates prepared the *Wastewater Servicing Study for New Growth Area, Baden and New Hamburg* outlining the overall future servicing strategy for the Baden – New Hamburg area. In 2019, MTE engaged in consultation with the Township of Wilmot with respect to updating the wastewater servicing strategy for Baden and New Hamburg. This updated strategy proposes several realigned trunk sanitary sewers and new or upgraded pumping stations that take into account the surrounding lands' ownership, as well as the natural topography of the Baden – New Hamburg lands.

MTE was retained by the Township of Wilmot to undertake an EA to establish a preferred wastewater servicing strategy for Baden. This EA will determine the preferred alignment for the sanitary trunk sewer to service Baden utilizing an evaluation matrix (natural environment, social/economic environment, infrastructure/utilities, financial and technical) herein referred to as the "Baden Trunk Sewer". The Baden Trunk Sewer is intended to convey flows from developments north and south of Snyder's Road to the Baden sanitary pumping station.

It should be noted that the Region of Waterloo has initiated an overall servicing study for lands west of Baden and east of New Hamburg. The study is to be completed by 2021.

The Baden Trunk Sewer will begin at the intersection of Snyder's Road West and Christian Street, at a previously agreed upon sanitary sewer invert of 349.00m±. A figure summarizing the potential Baden Trunk Sewer Alternatives has been provided in **Appendix B**.

1.3 Purpose of Study

The purpose of this study is to develop a comprehensive servicing strategy for the subdivision which outlines how the subdivision can be developed on full municipal services, including sanitary sewage collection, domestic water supply, storm drainage, and utilities.

The subject lands - along with the adjacent future Aactiva lands and downstream Schmidt lands - are part of an integrated Draft Plan Class EA process whereby the Draft Plan submissions will be reviewed in parallel with the sewer alternatives of the Class EA for the Baden Trunk Sewer. This trunk sanitary sewer is proposed to service a majority of the future Baden developments and direct sanitary flows towards the Baden West WWPS, and ultimately to the New Hamburg WWTP.

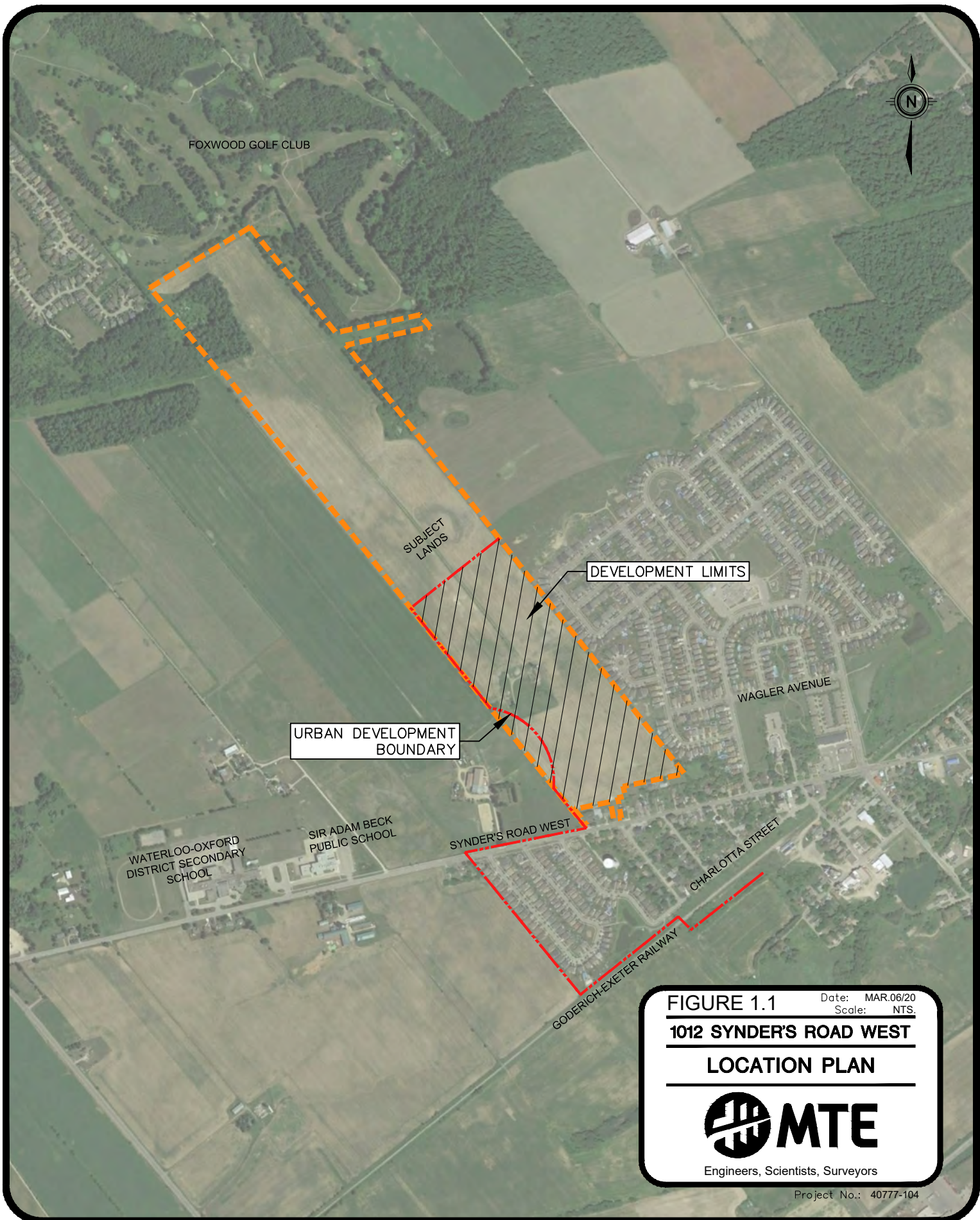


FIGURE 1.1

Date: MAR.06/20
Scale: NTS.

1012 SYNDER'S ROAD WEST

LOCATION PLAN



Engineers, Scientists, Surveyors

Project No.: 40777-104

2.0 Existing Conditions

The development portion within the urban boundary for the subject lands are approximately 20.73 ha, and is generally bounded by the existing Baden Subdivision to the northeast, additional lands owned by the applicant to the northwest, existing agricultural land to the west, and Snyder's Road West to the southeast. The subject lands are comprised of rolling agricultural land and remnant building foundations from recently demolished residential and agricultural buildings.

MTE conducted a detailed topographical survey of the property in 2019, and additional lands surrounding Christian Street in 2020. The existing topography of the subject lands are shown in **MTE Drawing 40777-104-EC1.1**.

The subject lands generally consist of rolling topography with several low-lying areas, with slopes typically ranging from 1.0 % to 6.0 %. Existing elevations within the lands range from approximately 357.7 m to 364.3 m. Under pre-development conditions, a majority of surface runoff from the subject lands flows northeasterly towards a series of ditch inlets along the adjacent Baden Subdivision, or southwesterly towards a 1000 mm diameter CSP culvert crossing on the adjacent agricultural lands. This CSP culvert directs flows to the existing SWMF within the Baden West subdivision. The northwestern part of the subject lands largely drains internally in a low-lying depression just north of the site on the additional lands owned by the developer. The low-lying depression spills to wetlands on adjacent agricultural lands to the west.

The subject lands are located within the Baden Creek Subwatershed.

3.0 Proposed Development

The Draft Plan of Subdivision for this residential development comprises the following:

- Residential blocks;
- School block (with potential to be developed as a multi-residential block);
- Trail and walkway blocks;
- Future development – residential and right-of-way – blocks;
- Stormwater Management facility; and,
- Municipal right-of-ways (all right-of-ways 20.0m width).

3.1 Municipal Right-of-Way

As shown on the Draft Plan, the proposed development is serviced by six local roads; to be connected to Snyder's Road West and the existing Wagler Avenue and Bettschen Lane in the neighbouring Activa Baden Subdivision. The roadway will be constructed to an urban cross-section, including: asphalt pavement, concrete curb and gutters, concrete sidewalks, roadway illumination, and boulevard landscaping.

Refer to **Appendix C** for more details regarding the proposed typical 20.0m right-of-way cross-section based on the Township of Wilmot's new Infrastructure Standards and Specifications.

A geotechnical investigation for the subject lands was completed by Peto MacCallum Ltd., dated April 28, 2020. The proposed pavement structure outlined in the report is summarized in **Table 3.1** below. The future final design will implement the requirements of the Peto MacCallum report.

Table 3.1 – Proposed Pavement Structure

Pavement Structure	Street One, Three (mm)	Street Two, Four, Five, Six, Wagler Avenue (mm)
HL3 Surface Course Asphalt	100	100
HL4 Binder Course Asphalt		
Granular 'A' Base	150	150
Granular 'B' Sub-base	450	350

4.0 Proposed Grading

4.1 Considerations

While developing the preliminary grading design of the subject lands, the following is a list of considerations which influenced and/or governed the conceptual design:

- Match centreline elevations of existing road grades;
- Match existing and proposed boundary grades around the perimeter of the subdivision lands;
- Ensure major storm event overland flows are directed towards the proposed SWMF;
- Comply with municipal standards for minimum and maximum road and landscaped area grades;
- Ensure adequate cover is provided, where feasible, over municipal services;
- Minimize impacts to the surrounding natural environmentally sensitive features; and,
- Optimize the cut/fill deficit for the subject lands within the urban boundary to allow excess fill to be distributed in the future development lands outside the urban boundary.

4.2 Lot Grading

Preliminary slopes for centreline of road ranging from 0.5% (minimum) to 3.0% (maximum) were used to complete the preliminary lot grading design. The considerations listed above were incorporated into the overall preliminary grading design. Preliminary lot grades range from 2.0% (minimum) to 5.0% (maximum) with a combination of traditional back-to-front drainage, split drainage and walkout lots are proposed as shown in **Figure 4.1**.

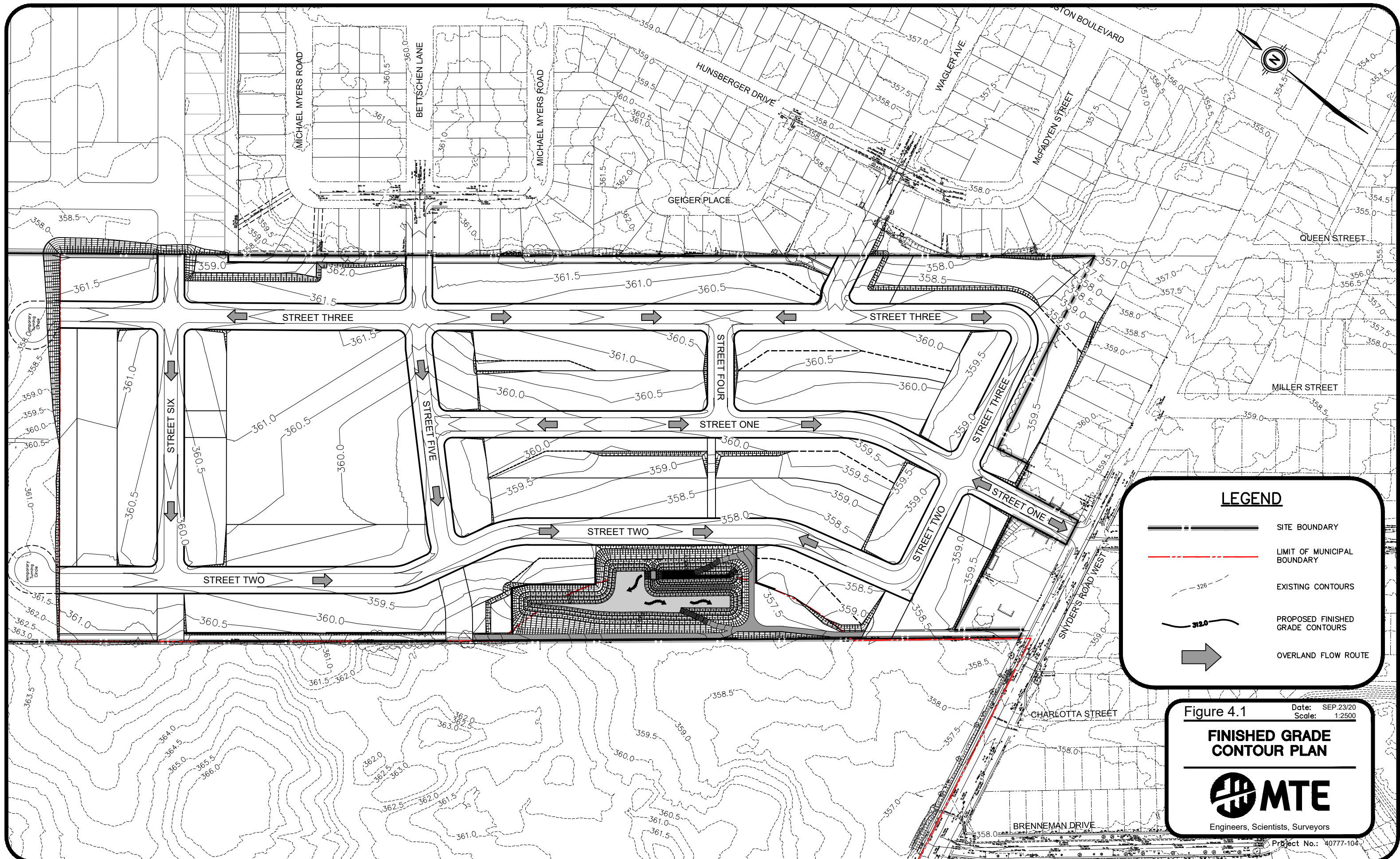
A 6.0m wide trail block is proposed around a significant portion of the subject lands. In order to design the trail within the Accessibility for Ontarians with Disabilities Act (AODA), the use of retaining walls is required to provide adequate slopes to the trail while matching into the surrounding existing and proposed grades.

Preliminary finished grades are designed to optimize the earthmoving (cutting and filling) required for road and lot construction, as well as allow for adjacent future lands to direct major overland flow routes towards the proposed SWMF. The preliminary finished grade contours are shown in **Figure 4.1** and the enclosed **MTE Drawing 40777-104-AG1.1 to 1.2**.

4.2.1 MW106C-19 Perched Groundwater Condition

An isolated perched groundwater condition has been identified within MW106C-19, with an observed average GW elevation of 359.1 m. Two other monitoring wells MW106A-19 and MW106B-19 within the nest have average groundwater elevations of 352.10 m and 352.13 m, respectively. Please refer to the attached **MTE Drawing 40777-104-MS9.0** for a cross section of the observed groundwater and surrounding soils conditions.

Through an area grading program, a trench wick drain will be constructed through the silt layer responsible for the perched condition to dissipate the local groundwater conditions. This will allow sufficient groundwater separation from the underside of footing. The stabilized high composite groundwater elevations are shown in **MTE Drawing 40777-104-EC1.1**.



LEGEND

- SITE BOUNDARY
- LIMIT OF MUNICIPAL BOUNDARY
- EXISTING CONTOURS
- PROPOSED FINISHED GRADE CONTOURS
- OVERLAND FLOW ROUTE

Figure 4.1

Date: SEP.23/20
Scale: 1:2500

FINISHED GRADE CONTOUR PLAN



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5.0 Municipal Servicing

5.1 Sanitary Servicing

A majority of the subject lands will be serviced by a 250mm local sanitary sewer system that will outlet to the future Baden Trunk Sanitary Sewer at Snyder's Road West. The blocks fronting on the Wagler Avenue Extension through the site (Blocks 3 and 44) have the potential to be serviced through the extension of the sanitary sewer from the adjacent Activa Baden Subdivision, providing capacity for a population of 37 people within the subject lands.

In order to service future surrounding developments as described in the above-mentioned technical memo, a 450mm trunk sewer is proposed through the subject lands along Streets One, Three, Five and Six, and will terminate at the limits of Street Six. This sewer will be used to service the subject lands where possible, and local sewers will be installed where required. This trunk sanitary sewer will connect to the future Baden Trunk Sewer at Snyder's Road West.

The limits of the Baden Trunk Sewer begin at the intersection of Snyder's Road West and Christian Street, at a previously agreed upon sanitary sewer invert of 349.00m±. This trunk sewer ultimately connects to the Baden West Waste Water Pumping Station (WWPS) adjacent to Foundry Street.

The proposed sanitary sewer network is shown on **Figure 5.1**, and the sanitary sewer design sheet is included in **Appendix D**. Preliminary sewer design for the proposed sanitary sewer network was designed in accordance with the Township of Wilmot Standards and utilizing a residential population density of 60 ppha for proposed and future flows.

5.2 Water Distribution

MTE has prepared a preliminary water distribution analysis which is meant to confirm that adequate pressure and flow demands are provided through connections to the existing distribution network. The Preliminary Water Distribution report is provided in **Appendix E**.

In accordance with Region of Waterloo policy, the domestic and fire flow water demands described above were provided to the Region of Waterloo Transportation and Environmental Services Department. Water Services staff input these demands into their water supply model, and returned available flow and residual pressure curves to MTE for distribution design.

The Haestad Methods water distribution system analysis program (WaterCAD Connect Edition) was utilized for the analysis of the subject lands. The WaterCAD model includes the proposed lot fabric and watermain connectivity to size the internal watermains, and accounts for looping and head losses in the local system.

The network for the analysis was developed by assigning physical parameters to each node and pipe. The model was run under five demand scenarios: Average Day, Maximum Day, Minimum Hour, Peak Hour, and Maximum Day + Fire Flow. Each scenario was checked against guidelines for pressure flow availability.

The model utilizes proposed demands for the build-out of the 1012 Snyder's Road West development, and the future adjacent Activa Lands. Four (4) development scenarios were analyzed within this model:

- Scenario 1A: 1012 Snyder's Road West w/ Stage 2 Multi-residential Block
- Scenario 1B: 1012 Snyder's Road West w/ Stage 2 Institutional Block
- Scenario 2A: 1012 Snyder's Road West w/ Stage 2 Multi-residential Block + Future Activa Lands development
- Scenario 2B: 1012 Snyder's Road West w/ Stage 2 Institutional Block + Future Activa Lands development

Water supply for the proposed 1012 Snyder's Road West Subdivision will be provided by external connection points to the existing municipal water distribution system:

- 300 mm diameter – Snyder's Road West
- 200 mm diameter – Bettschen Lane and Michael Myers Road
- 200 mm diameter – Wagler Avenue and McFayden Street
- 200 mm diameter – Michael Myers Road and Jacob Cressman Drive (future Activa Lands)
- 200 mm diameter – Kropf Drive and Isaac Shantz Drive (future Activa Lands)

The Preliminary Water Distribution Report is provided in **Appendix E**.

5.3 Storm Drainage

5.3.1 Original Outlet - 1000mm CSP Culvert and Baden West SWMF

Under existing conditions, a portion of the subject lands (Drainage Area 105) drains towards the existing 1000mm CSP culvert that directs flows to the Baden West SWMF. The SWMF will ultimately outlet to a tributary of Baden Creek. The original SWM strategy was to utilize the 1000mm CSP culvert outlet described in the Baden West SWM report which directed flows from the subject lands to the existing storm sewer system on Brenneman Drive.

Originally MTE proposed that the attenuation of flows to an allowable limit based on proportionate existing pre-development drainage area directed towards this CSP culvert. Due to the elevation of the existing culvert and storm sewer on Brenneman Drive, the storm sewer on Brenneman would require a reconstruction over 60% of its length.

Under the original strategy the quality flow would be routed in series with the downstream SWMF. Although this is accepted by the MECF it does not represent the preferred method where quality control measures are placed in parallel with each other.

5.3.2 New Storm Sewer along Christian Street and Charlotta Street

MTE's current proposed SWM strategy directs flows towards a new proposed 1200mm diameter storm sewer system along Christian Street and Charlotta Street towards the Baden Creek tributary within the Schmidt Lands. The invert at the outlet structure to the tributary was designed such that the invert is above the anticipated 100-year flood level within the tributary. Refer to MTE Drawings **40777-104-MS7.1 to 7.3** for a plan and profile showing this proposed outlet pipe.

This outlet allows the subject lands to release additional flows towards Baden Creek such that post development flows would be attenuated to pre development levels, rather than having to restrict flows to what is defined within Stantec's *Baden West Final SWM Report* (January, 2005).

This revised storm outlet also allows the subject lands to be lowered by approximately 1.5m+/-, as the Christian Street outlet provides significant improvements as compared to the Brenneman Drive. The Christian Street outlet drains directly to the Baden Creek tributary rather than routing flows through the existing SWMF.

The Wiebe Lands (southwest of the subject lands) are expected to flow towards the 1000mm CSP adjacent to Brenneman Drive and to the Baden West SWMF in both pre-development and post development conditions. In consideration of the future development of the Wiebe Lands (denoted as 'Y' Parcel in the *Baden-New Hamburg Wastewater Servicing Strategy* Technical Memo), some storm flows maybe directed towards the proposed Christian Street trunk storm sewer outlet. The Township will determine which if any portion of these lands will be permitted to direct flows towards the existing CSP outlet or the proposed Christian Street storm sewer outlet. If the Township determines that these lands will direct flows towards the proposed outlet, the design of the outlet sewer will have to be analyzed to determine adequate capacity to accept these additional flows.

5.4 Conveyance Systems

Storm drainage for the subject lands will be provided through a combination of minor (storm sewer) and major (overland flow) drainage systems. There are several storm drainage catchment areas within the subject lands that are conveyed to the proposed SWMF.

The majority of the onsite conveyance will be collected via a storm sewer network, ranging in size from 300mm to 1350mm diameter. Storm sewers draining into the SWMF will be sized to convey runoff for a 5-year storm event utilizing the Township of Wilmot IDF curve parameters in accordance with the current development standards. Storm sewers will be constructed to typical depths within a minimum cover of 1.5m within the road allowance. Please refer to **Figure 5.3** for the internal storm sewer network.

These conveyance systems will outlet into the proposed forebay within the SWMF at one location. The SWMF outlets into a pipe conveyance system sized to convey events up to and including the Regional Storm event. This conveyance system is an independent 1200mm storm sewer system that ultimately drains to the Baden Creek tributary within the Schmidt Lands. Refer to **MTE Drawing 40777-104-MS7.1 to 7.3** for details regarding the proposed conveyance system.

An emergency overland flow route is proposed for the subject lands in the event of a blockage of the 1200mm storm sewer on Christian Street. The emergency overland flow would spill towards the existing 1000mm CSP culvert and low point within Snyder's Road West, following the natural topography of the adjacent lands and existing drainage pattern. It should be noted that the subject lands were graded such that the flows will spill over Snyder's Road West and be directed towards the Baden West SWMF, and prevent excess ponding within the subject lands. Refer to **Figure 5.4**. Refer to **Appendix F** for more information regarding the preliminary proposed storm sewer system.

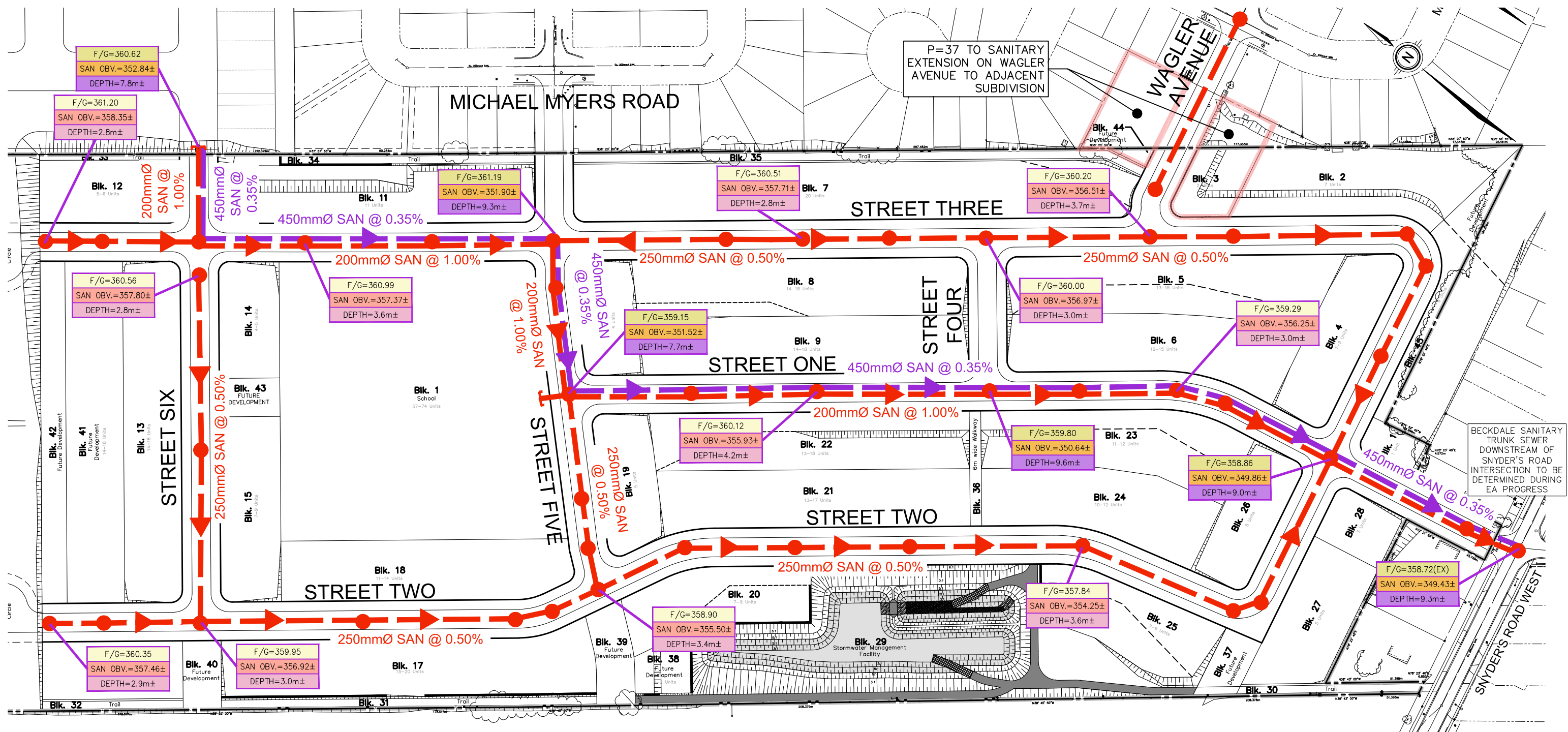
5.5 Existing Activa Subdivision DICB158

The Township of Wilmot has identified an area of concern within the adjacent Activa Baden Subdivision bordering the subject lands. An easement within Lots 6 and 7 fronting Michael Myers Road contains DICB158, and the Township has concerns about flows directed to this catch basin and the emergency overland flow route associated with this catch basin under future development conditions.

The Township had identified this low lying area and depression adjacent to Lots 6 and 7. Under the future development condition, the Township requires a conveyance solution to maintain a maximum ponding elevation of 358.80m± under the 100-year storm event on the existing lots, as well as maintain positive drainage to an acceptable outlet.

Please refer to the Stantec technical memo *Re: Activa Baden North Subdivision: Dedicated Storm Sewer for Low Lying Areas near Existing DICB158* (dated March 29, 2021), which summarizes the analyses performed on the flows towards DICB158, looking at several potential options to accommodate these flows, and provide recommendations that allow the development of the subject lands. The technical memo is provided in **Appendix G**.

After discussions with the Township and Stantec (November 6, 2020), it was concluded that Activa will provide a positive legal outlet from the low point towards a future SWMF provided by Activa in the adjacent development. DICB158 is proposed to be capped and flows originally directed to DICB158 will be directed to the new outlet. This outlet will provide an outlet for all storm events up to and including the 100-year event, and MTE will direct a very small area of 0.20ha towards the depression under the post-development condition. Refer to **Figure 5.5** for the conceptual grading of Block 11 adjacent to the depression.



LEGEND

- SUBJECT LANDS
- PROPOSED LOCAL GRAVITY SEWER
- PROPOSED TRUNK SEWER
- MANHOLE
- FLOW ROUTE

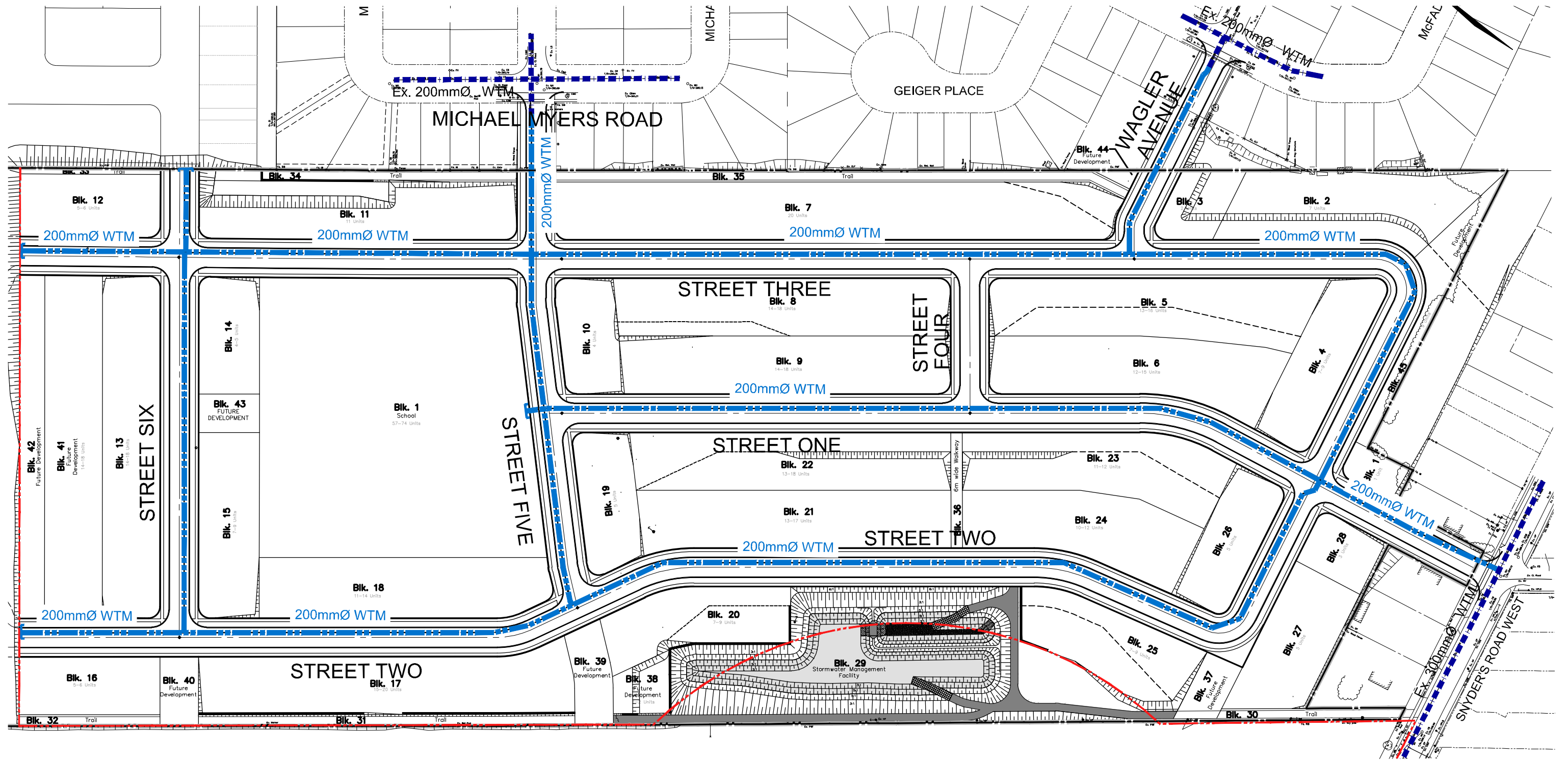
F/G=360.35 SAN OBV.=357.46± DEPTH=2.9m±	C/L ROAD GRADE PROPOSED LOCAL SANITARY OBVERT SANITARY COVER
F/G=358.72 SAN OBV.=349.43± DEPTH=9.3m±	C/L ROAD GRADE PROPOSED TRUNK SANITARY OBVERT SANITARY COVER

FIGURE 5.1 Date: MAY30/20
Scale: 1:2000

**PRELIMINARY
SANITARY SERVICING
PLAN**

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LEGEND

- SUBJECT LANDS
- EX. 150mmØ WTM
- EX. WATERMAIN
- 200mmØ WTM
- PROPOSED WATERMAIN

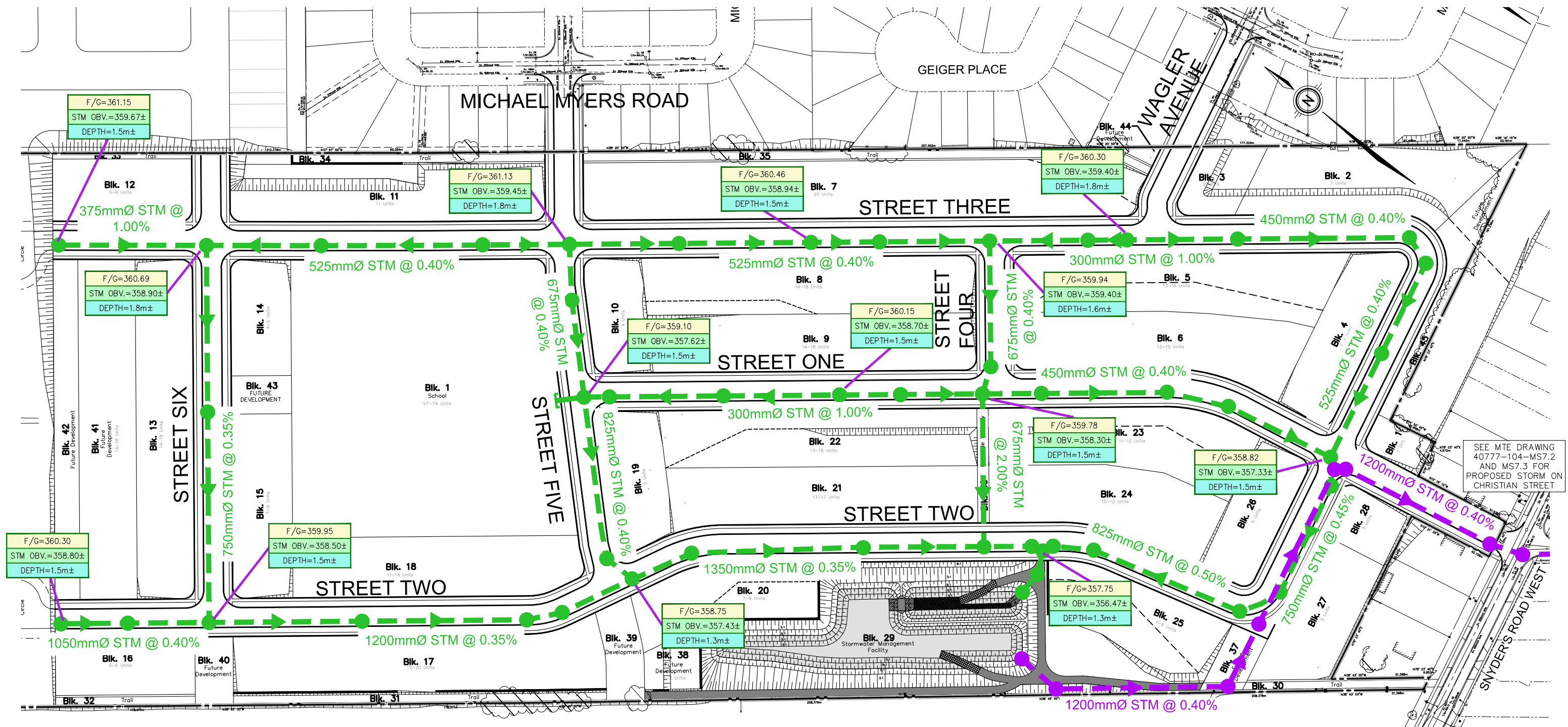
FIGURE 5.2 Date: NOV.3/20 Scale: 1:2000

PRELIMINARY WATER DISTRIBUTION PLAN



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SEE MTE DRAWING
40777-104-MS7.2
AND MS7.3 FOR
PROPOSED STORM ON
CHRISTIAN STREET

LEGEND

— SUBJECT LANDS

— PROPOSED STORM SEWER

— PROPOSED STORM OUTLET

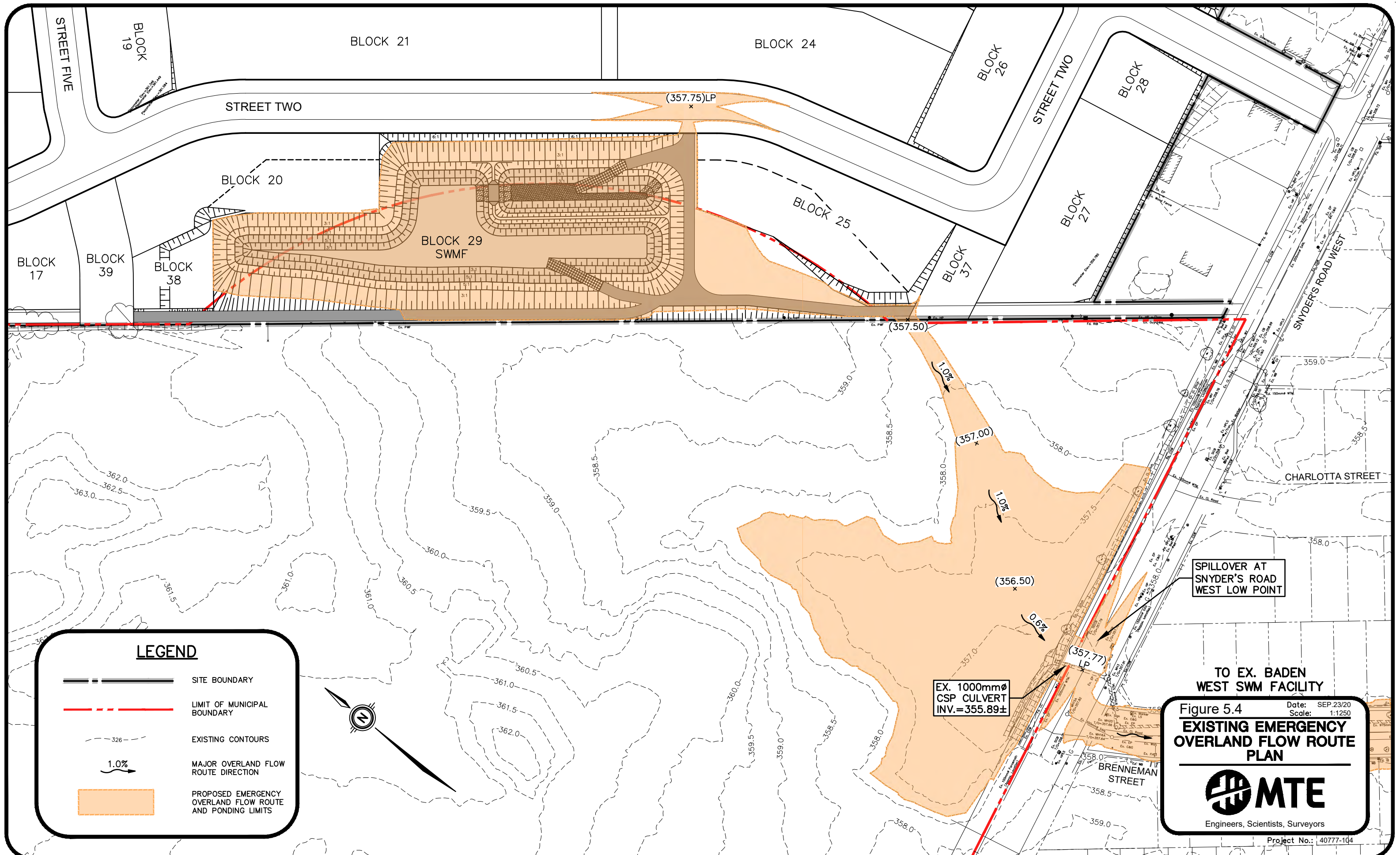
F/G=314.28	C/L ROAD GRADE
STM OBV.=312.78±	LOCAL STORM OBVERT
DEPTH=1.5m±	STORM COVER

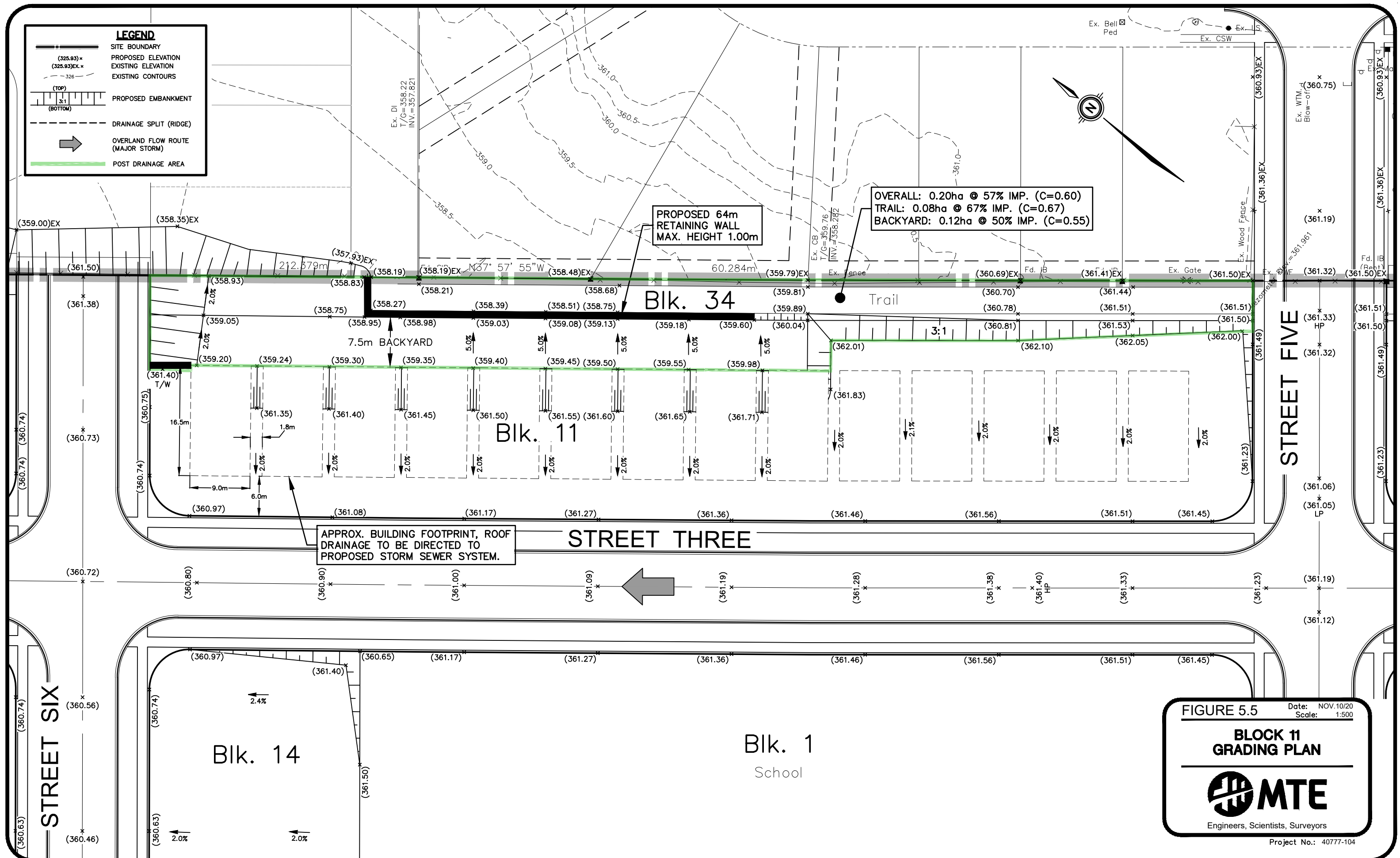
FIGURE 5.3 Date: MAY30/20
Scale: 1:2000

**PRELIMINARY STORM
SERVICING PLAN**

MTE
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Project No.: 40777-104





6.0 Stormwater Management

The proposed SWM strategy includes water quality, quantity, and erosion control within a proposed stormwater management facility located in Block 29 of the subject lands. The SWM strategy for the proposed development is presented in the *1012 Snyder's Road West – Preliminary Stormwater Management Report* (April 12, 2021) prepared by MTE. The following summarizes the key points of the report:

- Water quality and quantity control will be provided within one (wet pond) stormwater management facility. The proposed facility will provide peak flow attenuation of runoff from the contributing drainage area for storm events up to and including the 100-year storm event;
- Conveyance of Regional storm flows through the SWMF;
- Flows from the subject lands will be restricted to the equivalent pre-development lands that were draining to the Baden Creek tributary in pre-development conditions;
- Enhanced (previously Level 1) water quality control will be provided in the proposed SWMF; and
- Erosion protection is provided through the extended detention (for 24 hours) for post-development flows for the 25mm storm event.

Storm drainage for the proposed development will be provided through a combination of minor (storm sewer) and major (overland) drainage systems. The storm sewers will be designed for the 5-year storm event, with major overland flow routes generally flowing through the proposed road allowance and drainage channels.

7.0 Utility Servicing

It is anticipated that Kitchener Wilmot Hydro (electrical), Bell Canada (telephone), Union Gas (natural gas), and Rogers Cable (cable TV) can all adequately service the proposed development through the connection to and extension of existing services from Snyder's Road, where required.

8.0 Summary

The main findings of the functional servicing report for the proposed subdivision at 1012 Snyder's Road West are:

1. The roadworks and lot grading within the proposed development can generally be completed in compliance with the Township of Wilmot's Design Standards while maintaining the minimum cover over the proposed sewers.
2. The proposed development can be adequately serviced for sanitary sewage through the future Baden Trunk sanitary sewer. Furthermore, future developments adjacent to the subject lands will have the potential to direct sanitary flows to this trunk sanitary sewer by gravity through the subject lands.
3. Water supply for the proposed development can satisfactorily meet the pressure and flow demands through external connections to Snyder's Road West, Bettschen Lane, and Wagler Avenue.
4. Stormwater management for the development achieves an enhanced level of water quality control, quantity control to pre-development levels and erosion protection through the implementation of the proposed SWMF, as outlined in the *Preliminary Stormwater Management Report*, dated April 12, 2021.
5. The proposed development can be adequately serviced through the extension of existing utilities including hydro, gas, cable TV, and telephone.

All of which is respectfully submitted,

MTE Consultants Inc.



Alex Cressman, E.I.T.
Designer
519-743-6500 ext. 1279
acressman@mte85.com

AJC:tmd

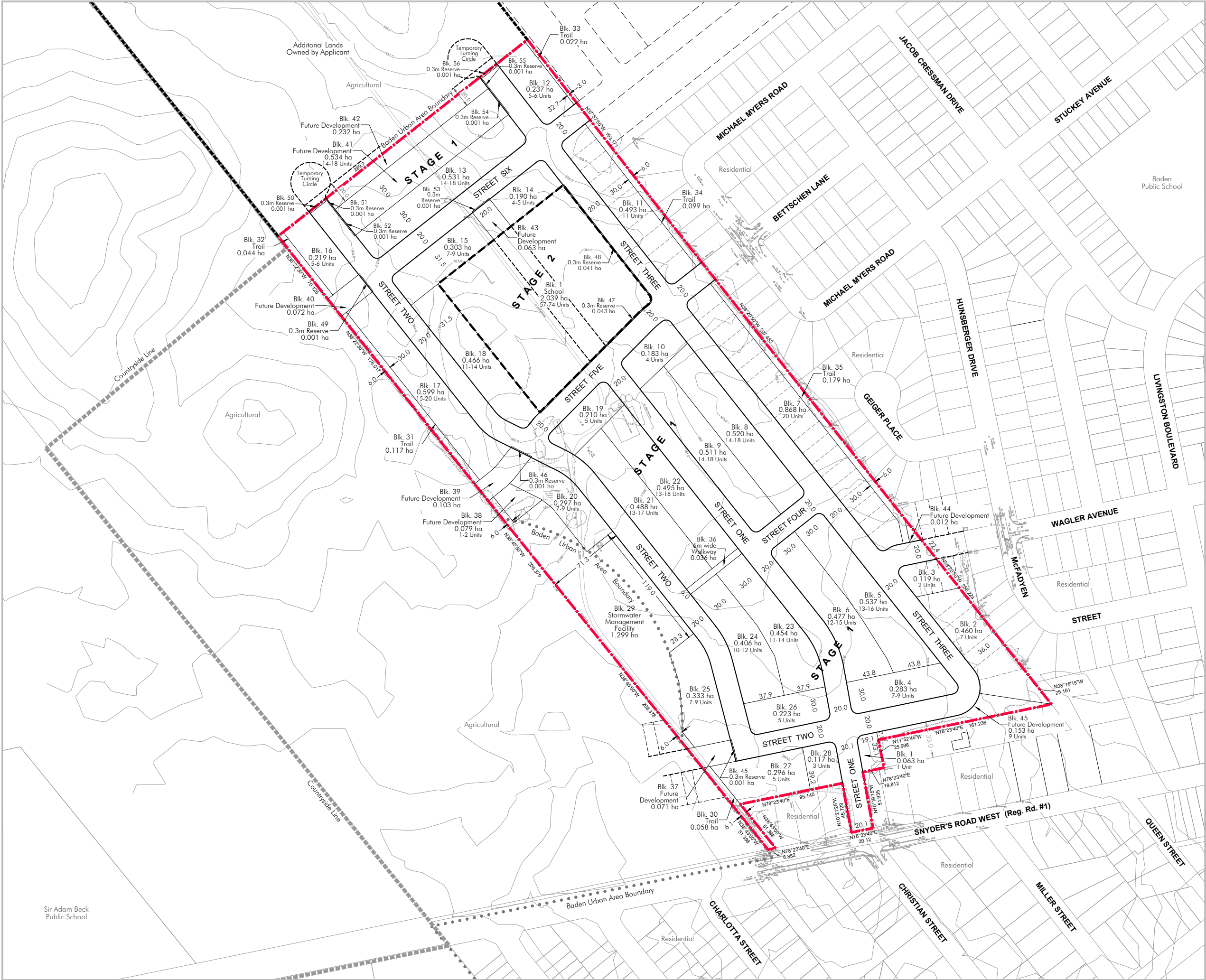


Jeff Martens, P.Eng.
Vice President
519-743-6500 ext. 1231
jmartens@mte85.com

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Appendix A

Draft Plan of Subdivision (Reduced)

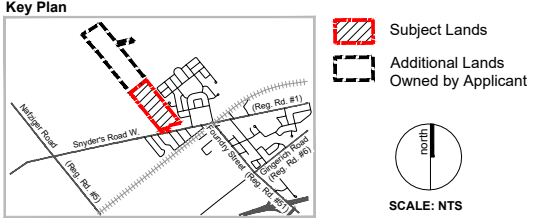


DRAFT PLAN OF SUBDIVISION

Legal Description
PART OF LOT 16, CONCESSION NORTH OF SNYDERS ROAD
TOWNSHIP OF WILMOT
REGION OF WATERLOO

Owner's Certificate
I HEREBY AUTHORIZE MACNAUGHTON HERMSEN BRITTON CLARKSON PLANNING LIMITED TO SUBMIT THIS PLAN FOR APPROVAL.
DATE: April 1, 2021
NICK GOUGOULIAS - PRESIDENT (SNYDER'S ROAD (BADEN) GP INC.)

Surveyor's Certificate
I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LAND TO BE SUBDIVIDED ON THIS PLAN AND THEIR RELATIONSHIP TO THE ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN.
DATE: MARCH 30, 2021
TREVOR D.A. McNEIL, OLS (MTE OLS LTD.)



Additional Information Required Under Section 51(17) of the Planning Act R.S.O. 1990, c.P.13 as Amended
A. AS SHOWN B. AS SHOWN C. AS SHOWN
D. RESIDENTIAL, SCHOOL, STORMWATER MANAGEMENT, TRAIL
E. AS SHOWN F. AS SHOWN
G. AS SHOWN H. MUNICIPAL WATER SUPPLY I. CLAY/SANDY LOAM
J. AS SHOWN K. ALL SERVICES AS REQUIRED L. AS SHOWN

Area Schedule				30T-_____		
Description*	Stage 1			Stage 2		
	Blocks	Units** (min/max)	Area (ha)	Block	Units** (min/max)	Area (ha)
Residential	1-28	245-296	10.381			
School				1	57-74	2.039
Stormwater Management Facility	29		1.299			
Trail	30-35		0.519			
Walkway	36		0.036			
Future Development	37-45	24-29	1.319			
0.3m Reserves	46-57		0.094			
Roads			5.043			
	57	269-325	18.691	1	57-74	2.039
Total	58	326-399	20.730			

*Blocks shown on Draft Plan are 'Residential' unless otherwise specified.
** For minimum unit yield 11.582 m (38 ft) wide lots are assumed. For maximum unit yield, 10.973 m (36 ft) wide lots are assumed and 30% townhomes (5m wide units/lots) where feasible. School Block assumes townhouse block and street towns for maximum unit yield and townhouse block and 11.582 m (38 ft) wide lots for minimum unit yield. Conceptual lotting assumed adjacent to existing development.

Notes
1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SHOWN.
2. SITE BOUNDARY AND LEGAL BASE PLAN PREPARED BY MTE OLS LTD.
3. TOPOGRAPHIC AND EXISTING FEATURES SURVEY COMPLETED BY MTE AND DATED APRIL 2019.
4. ADJACENT PARCEL FABRIC IS FROM REGION OF WATERLOO OPEN DATA AND IS APPROXIMATE.

Stage Limits Countryside Line Baden Urban Area Boundary

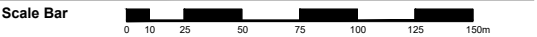
1. Mar. 31, 2021 For Submission/Draft Plan of Subdivision application; DGS
Revision No. Date Issued / Revision By

PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE
MHBC
200-540 BINGEMANS CENTRE DR. KITCHENER, ON N2B 3X9 | P: 519.576.3650 F: 519.576.0121 | WWW.MHBCPLAN.COM

Approval Stamp	Date March 31, 2021
File No.	1985A
Plan Scale	1:1,500 (24x36)
Drawn By	DGS
Checked By	PC

Project Snyder's Road Property
Applicant SNYDER'S ROAD (BADEN) GP INC.
91 Caldari Road, Unit 1
Concord, ON L4K 3Z9
P: 905.893.9997

File Name DRAFT PLAN OF SUBDIVISION



Appendix B

Baden Trunk Sewer EA Figure

LEGEND

- PROPERTY LINE
- EXISTING SANITARY TRUNK
- EXISTING SANITARY SEWER
- EXISTING SANITARY FORCEMAIN
- PROPOSED SANITARY TRUNK UPGRADE
- PROPOSED SANITARY ALIGNMENT
- CATCHMENT AREA DELINEATION
- SANITARY FLOW
- DRAINAGE BY GRAVITY TO NAFZIGER ROAD TRUNK SEWER
- DRAINAGE TO FOUNDRY STREET TRUNK SEWER
- DRAINAGE TO FORGET GLEN WWPS
- DRAINAGE TO WILMOT EMPLOYMENT LANDS TRUNK SEWER
- LANDS NOT TO BE DEVELOPED
- ORCA REGULATORY FLOODPLAIN
- TOWNSHIP URBAN AREA
- COUNTRYSIDE LINE
- PRIMARY STUDY AREA
- DETAILED STUDY AREA

ALTERNATIVES:

- 1 DO NOTHING
- 2 WASTEWATER SERVICES STUDY FOR NEW GROWTH AREAS, BADEN AND NEW HAMBURG (CRA, 2014)
- 3 MODIFIED CRA, PREFERRED ALTERNATIVE/ALTERNATIVE 3
- 4 TRUNK SEWER OPTION FOUNDRY STREET
- 5 TRUNK SEWER OPTION FUTURE RIGHT-OF-WAY
- 6 TRUNK SEWER OPTION SNYDER'S ROAD/FOUNDRY ST.
- 7 TRUNK SEWER OPTION CHRISTIAN STREET

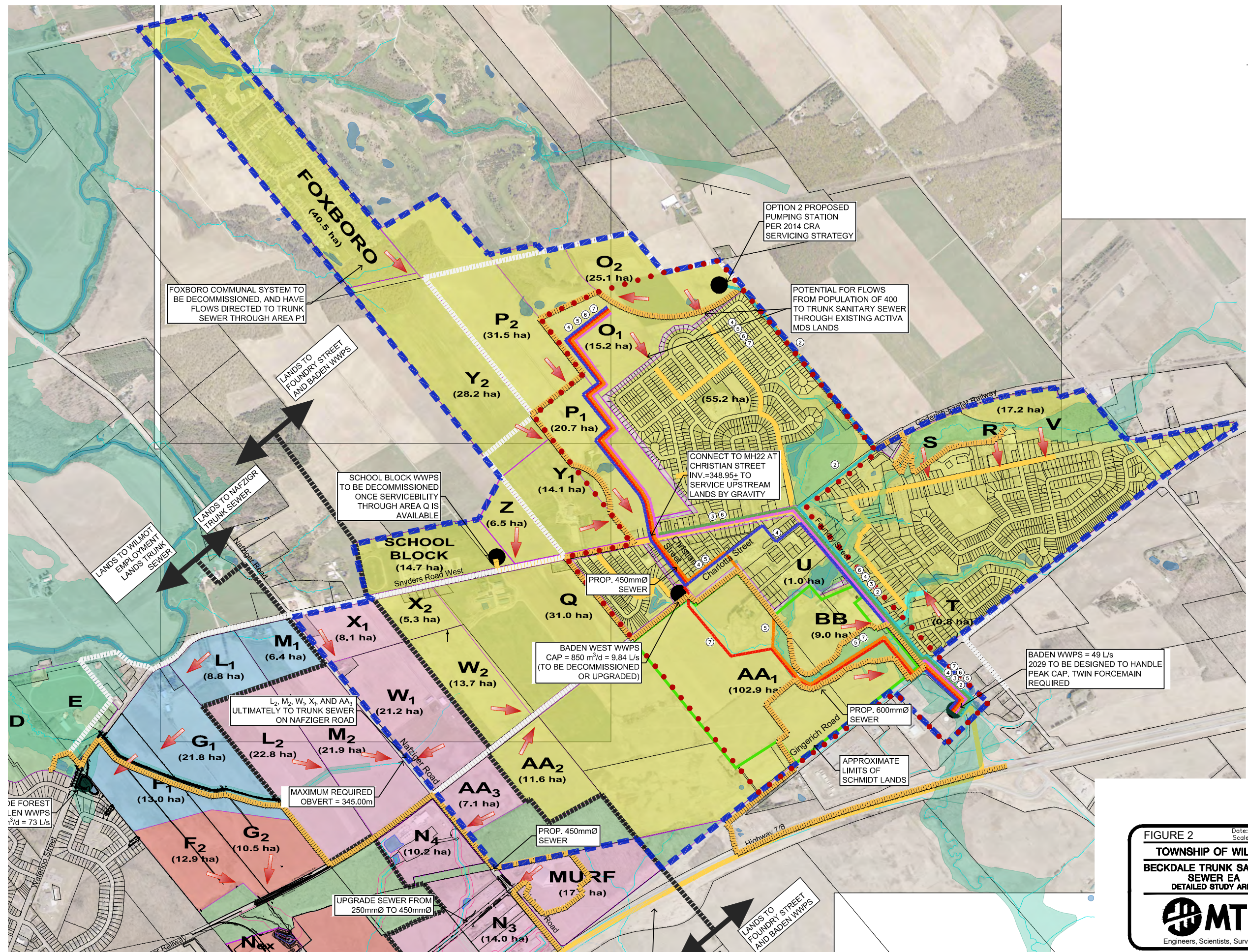


FIGURE 2 Date: MAR/04/21 Scale: 1:7,500

TOWNSHIP OF WILMOT

BECKDALE TRUNK SANITARY SEWER EA

DETAILED STUDY AREA

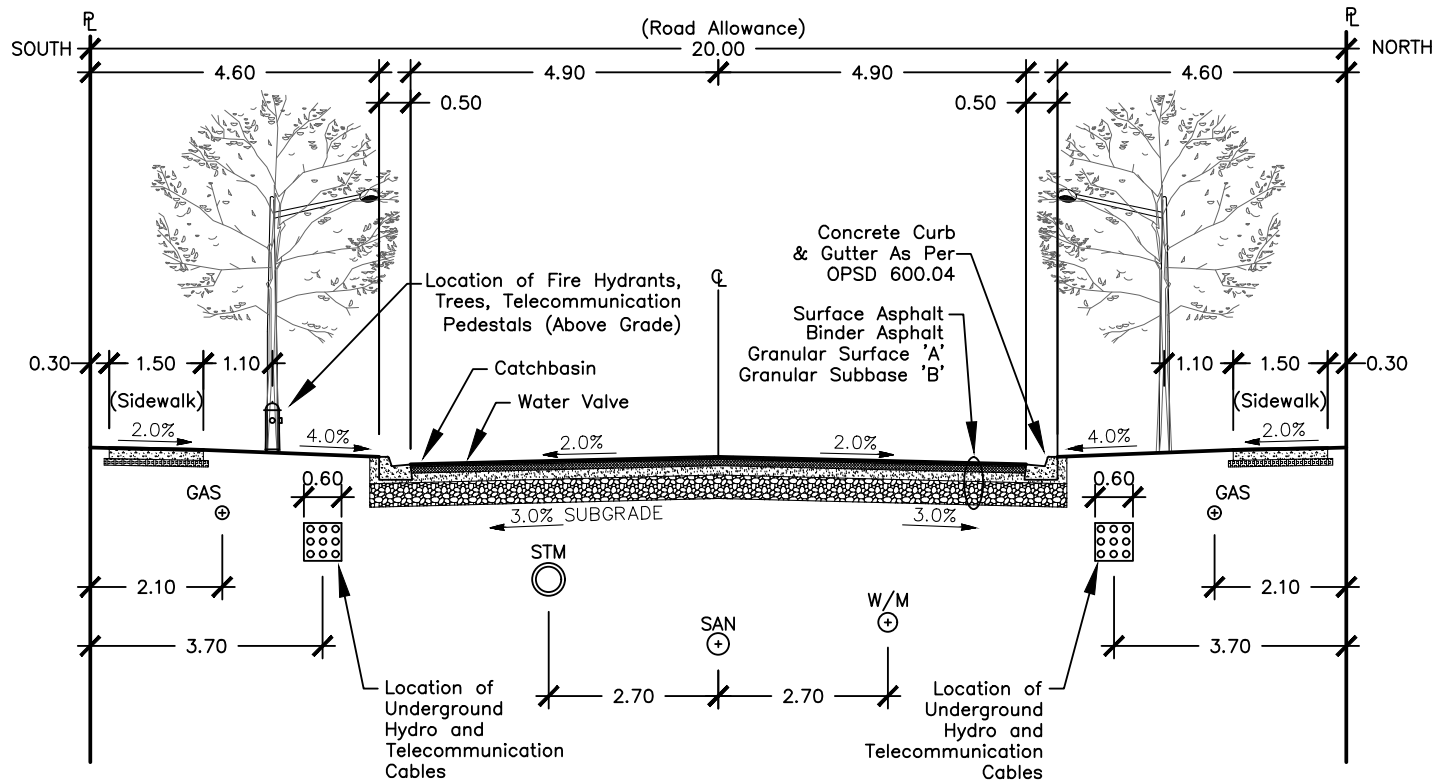
MTE

Engineers, Scientists, Surveyors

Project No.: 48730-100

Appendix C

20.0m Right-of-Way



UTILITY	MIN. COVER
SANITARY	2.8m
STORM	1.5m
WATER	2.0m
HYDRO	0.9m
BELL	0.75m
CABLE	0.75m
GAS	0.6m

ROAD STRUCTURE SHALL BE:	
HL3 SURFACE ASPHALT	40mm
HL4 BINDER ASPHALT	60mm
GRAN 'A' BASE COURSE	150mm
GRAN 'B' SUBBASE COURSE	450mm

APPENDIX C
Date: OCT.08/20
Scale: NTS
1012 SNYDER'S ROAD WEST

ROAD SECTION
URBAN 20.0m RIGHT-OF-WAY



Engineers, Scientists, Surveyors

Project No.: 40777-104

Appendix D

Sanitary Sewer Analysis

BADEN - NEW HAMBURG SANITARY SERVICING (1012 Snyder's Road West) TOWNSHIP OF WILMOT, Ontario				SANITARY SEWER DESIGN SHEET (60 Ppha) ENGINEERING AND PUBLIC WORKS						Design Parameters																					
										Average Daily Flow					Mannings "n"												0.0130				
Project Number: 40777-104 Date: November 2, 2020 Design By: AJC Checked By: JEM File: Q:\40777\104\PRELIMINARY\Sanitary\34896-104 + 40777-104 Sanitary Servicing Strategy .xls										0.0032 L/s/c					Min. Velocity 0.6 m/sec Max. Velocity 3.0 m/sec Residential Harmon Peaking Factor (F)												Residential Areas Infiltration 0.25 L/s/ha				
										Commercial 0.95 L/s/ha Industrial 0.40 L/s/ha Inst. / School 0.25 L/s/ha																					
LOCATION				RESIDENTIAL AREAS and POPULATION						SCHOOL, INSTITUTIONAL			COMMERCIAL			INDUSTRIAL				INFILTRATION			DESIGN								
STREET	AREA NO.	MANHOLE LOCATION		AREA	DENSITY	POPUL.	CUMUL POPUL.	PEAK FACTOR "F"	PEAK RES. FLOW	HECTARES AND FLOW OF EACH ZONING									TOTALS- C-I FLOW	AREA	CUMUL AREA	INFIL FLOW	TOTAL VOLUME FLOW	LENGTH	SLOPE	PIPE SIZE	CAPACITY	FULL FLOW VELOCITY			
		FROM MH	TO MH							0.25 L/s/ha			0.95 L/s/ha			0.40 L/s/ha															
										AREA	CUMUL AREA	PEAK FLOW	AREA	CUMUL AREA	PEAK FLOW	AREA	CUMUL AREA	PEAK FLOW													
				ha	ppha	1000s	1000s	L/sec	ha	ha	L/sec	ha	ha	L/sec	ha	ha	L/sec	L/sec	ha	ha	L/sec	L/sec	m	%	mm	L/sec.	m/s				
1) TO BADEN WWPS																															
TO MH22																															
Foxboro		FOXBORO	P2	40.50	15.00	0.608	0.608	3.929224	7.5975								0.0000	40.50	40.50	10.1250	17.7225		0.50	200	23.1802	0.738					
Parcel P2		P2	P1 (1012 LANDS)	31.50	60.00	1.890	2.498	3.508804	27.8923								0.0000	31.50	72.00	18.0000	45.8923		0.50	300	68.3430	0.967					
Parcel O1		O2	O1	25.10	60.00	1.506	1.506	3.678302	17.6316								0.0000	25.10	25.10	6.2750	23.9066		0.50	250	42.0285	0.857					
Parcel O2		O1	P1 (1012 LANDS)	15.20	60.00	0.912	2.418	3.520256	27.0925								0.0000	15.20	40.30	10.0750	37.1675		0.50	250	42.0285	0.857					
Parcel Y2		Y2	P1 (1012 LANDS)	28.20	60.00	1.692	1.692	3.641126	19.6090								0.0000	28.20	28.20	7.0500	26.6590		0.50	250	42.0285	0.857					
Parcel Y1		Y1	P1 (1012 LANDS)	14.10	60.00	0.846	0.846	3.845654	10.3552								0.0000	14.10	14.10	3.5250	13.8802		0.50	250	42.0285	0.857					
Parcel P1		P1 (1012 Lands)	3A			0.000	7.454	3.080204	73.0733								0.0000	0.00	154.60	38.6500	111.7233		0.35	450	168.5854	1.061					
1012 SNYDER'S ROAD INTERNAL PIPE DESIGN (Italicized Sections indicate Trunk Sewer through Subject Lands)																															
	1	1A	2A	0.17	60.00	0.010	0.010	4.413806	0.1433								0.0000	0.17	0.17	0.0425	0.1858	30.0	1.00	250	59.4373	1.211					
	2	2A	3A	0.26	60.00	0.016	0.026	4.36488	0.3584								0.0000	0.26	0.43	0.1075	0.4659	50.0	0.50	250	42.0285	0.857					
	3	3A	4A	0.28	60.00	0.017	7.496	3.077799	73.4335								0.0000	0.28	155.31	38.8275	112.2610	55.5	0.35	450	168.5854	1.061					
	4	4A	5A	0.32	60.00	0.019	7.515	3.076719	73.5958								0.0000	0.32	155.63	38.9075	112.5033	65.0	0.35	450	168.5854	1.061					
	5	5A	8A	0.32	60.00	0.019	7.535	3.075641	73.7580								0.0000	0.32	155.95	38.9875	112.7455	64.5	0.35	450	168.5854	1.061					
	6	6A	7A	0.31	60.00	0.019	0.019	4.384601	0.2596								0.0000	0.31	0.31	0.0775	0.3371	39.0	1.00	250	59.4373	1.211					
	7	7A	8A	0.59	60.00	0.035	0.054	4.307832	0.7404								0.0000	0.59	0.90	0.2250	0.9654	90.0	0.50	250	42.0285	0.857					
	8	8A	20A	0.08	60.00	0.005	7.593	3.072357	74.2542								0.0000	0.08	156.93	39.2325	113.4867	24.1	0.35	450	168.5854	1.061					
	9	20A	21A	0.25	60.00	0.015	7.608	3.071522	74.3807								0.0000	0.25	157.18	39.2950	113.6757	56.3	0.35	450	168.5854	1.061					
	10	PLUG	21A	2.04	60.00	0.122	0.122	4.218497	1.6435								0.0000	2.04	2.04	0.5100	2.1535	15.0	0.50	250	42.0285	0.857					
	11	21A	22A	0.26	60.00	0.016	7.746	3.063917	75.5423								0.0000	0.26	159.48	39.8700	115.4123	63.7	0.35	450	168.5854	1.061					
	12	22A	23A	0.52	60.00	0.031	7.778	3.062215	75.8044								0.0000	0.52	160.00	40.0000	115.8044	65.0	0.35	450	168.5854	1.061					
	13	23A	24A	0.70	60.00	0.042	7.820	3.059933	76.1570								0.0000	0.70	160.70	40.1750	116.3320	89.6	0.35	450	168.5854	1.061					
	14	24A	25A	0.40	60.00	0.024	7.844	3.058634	76.3583								0.0000	0.40	161.10	40.2750	116.6333	48.6	0.35	450	168.5854	1.061					
	15	25A	26A	0.39	60.00	0.023	7.867	3.057371	76.5545								0.0000	0.39	161.49	40.3725	116.9270	50.0	0.35	450	168.5854	1.061					
	16	26A	27A	0.25	60.00	0.015	7.882	3.056564	76.6802								0.0000	0.25	161.74	40.4350	117.1152	26.1	0.35	450	168.5854	1.061					
	17	27A	41A	0.28	60.00	0.017	7.899	3.055661	76.8210								0.0000	0.28	162.02	40.5050	117.3260	61.8	0.35	450	168.5854	1.061					
	18	11A	12A	0.80	60.00	0.048	0.048	4.318252	0.6597								0.0000	0.80	0.80	0.2000	0.8597	90.0	0.50	250	42.0285	0.857					
	19	12A	13A	0.66	60.00	0.040	0.088	4.258866	1.1875								0.0000	0.66	1.46	0.3650	1.5525	90.0	0.50	250	42.0285	0.857					
	20	9A	10A	0.94	60.00	0.056	0.056	4.303845	0.7726								0.0000	0.94	0.94	0.2350	1.0076	29.0	1.00	250	59.4373	1.211					
	21	10A	13A	0.24	60.00	0.014	0.071	4.281699	0.9649								0.0000	0.24	1.18	0.2950	1.2599	50.0	0.50	250	42.0285	0.857					
	22	13A	14A	0.55	60.00	0.033	0.191	4.154935	2.5312								0.0000	0.55	3.19	0.7975	3.3287	84.6	0.50	250	42.0285	0.857					
	23	14A	15A	0.65	60.00	0.039	0.230	4.125	3.0250								0.0000	0.65	3.84	0.9600	3.9850	79.0	0.50	250	42.0285	0.857					
	24	15A	16A	0.30	60.00	0.018	0.248	4.112219	3.2512								0.0000	0.30	4.14	1.0350	4.2862	18.9	0.50	250	42.0285	0.857					
		16A	19A	0.00	60.00	0.000	0.248	4.112219	3.2512								0.0000	0.00	4.14	1.0350	4.2862	27.2	0.50	250	42.0285	0.857					
	25	21A	17A	0.21	60.00	0.013	0.013	4.404463	0.1766								0.0000	0.21	0.21	0.0525	0.2291	54.0	1.00	250	59.4373	1.211					
	26	17A	18A	0.20	60.00	0.012	0.025	4.36794	0.3420								0.0000	0.20	0.41	0.1025	0.4445	26.1	0.50	250	42.0285	0.857					
		18A	19A	0.00	60.00	0.000	0.025	4.36794	0.3420								0.0000	0.00	0.41	0.1025	0.4445	22.2	0.50	250	42.0285	0.857					
	27	19A	35A	0.36	60.00	0.022	0.295	4.08182	3.8274								0.0000	0.36	4.91	1.2275	5.0549	49.6	0.50	250	42.0285	0.857					
	28	35A	36A	0.54	60.00	0.032	0.327	4.062225	4.2280								0.0000	0.54	5.45	1.3625	5.5905	58.5	0.50	250	42.0285	0.857					
	29	36A	37A	0.29	60.00	0.017	0.344	4.0522	4.4419								0.0000	0.29	5.74	1.4350	5.8769	58.4	0.50	250	42.0285	0.857					

LOCATION				RESIDENTIAL AREAS and POPULATION						SCHOOL, INSTITUTIONAL	COMMERCIAL			INDUSTRIAL				INFILTRATION			DESIGN							
STREET	AREA NO.	MANHOLE LOCATION		AREA	DENSITY	POPUL.	CUMUL POPUL.	PEAK FACTOR "F"	PEAK RES. FLOW	HECTARES AND FLOW OF EACH ZONING									TOTALS- C-I FLOW	AREA	CUMUL AREA	INFIL FLOW	TOTAL VOLUME FLOW	LENGTH	SLOPE	PIPE SIZE	CAPACITY	FULL FLOW VELOCITY
		FROM MH	TO MH							0.25 L/s/ha			0.95 L/s/ha			0.40 L/s/ha												
										AREA	CUMUL AREA	PEAK FLOW	AREA	CUMUL AREA	PEAK FLOW	AREA	CUMUL AREA	PEAK FLOW										
										ha	ppha	1000s	1000s	L/sec	ha	ha	L/sec	ha										
	30	37A	38A	0.50	60.00	0.030	0.374	4.035637	4.8091									0.0000	0.50	6.24	1.5600	6.3691	90.0	0.50	250	42.0285	0.857	
	31	38A	39A	0.70	60.00	0.042	0.416	4.013805	5.3197									0.0000	0.70	6.94	1.7350	7.0547	84.5	0.50	250	42.0285	0.857	
		39A	40A	0.00	60.00	0.000	0.416	4.013805	5.3197									0.0000	0.00	6.94	1.7350	7.0547	17.3	0.50	250	42.0285	0.857	
	32	40A	41A	0.84	60.00	0.050	0.467	3.989391	5.9273									0.0000	0.84	7.78	1.9450	7.8723	81.2	0.50	250	42.0285	0.857	
	33	6A	28A	0.37	60.00	0.022	0.022	4.37431	0.3091									0.0000	0.37	0.37	0.0925	0.4016	46.0	1.00	250	59.4373	1.211	
	34	28A	29A	0.40	60.00	0.024	0.046	4.321517	0.6355									0.0000	0.40	0.77	0.1925	0.8280	50.0	0.50	250	42.0285	0.857	
	35	29A	30A	0.65	60.00	0.039	0.085	4.261966	1.1558									0.0000	0.65	1.42	0.3550	1.5108	85.4	0.50	250	42.0285	0.857	
	36	30A	31A	0.23	60.00	0.014	0.099	4.244765	1.3375									0.0000	0.23	1.65	0.4125	1.7500	43.4	0.50	250	42.0285	0.857	
	37	31A	32A	0.65	60.00	0.039	0.138	4.202574	1.8459									0.0000	0.65	2.30	0.5750	2.4209	90.0	0.50	250	42.0285	0.857	
	38	32A	33A	0.43	60.00	0.026	0.164	4.178407	2.1784									0.0000	0.43	2.73	0.6825	2.8609	16.7	0.50	250	42.0285	0.857	
	39	33A	34A	0.49	60.00	0.029	0.193	4.153476	2.5541									0.0000	0.49	3.22	0.8050	3.3591	52.8	0.50	250	42.0285	0.857	
	40	34A	41A	0.43	60.00	0.026	0.219	4.133411	2.8812									0.0000	0.43	3.65	0.9125	3.7937	59.3	0.50	250	42.0285	0.857	
	41	41A	42A	0.18	60.00	0.011	8.595	3.019685	82.6117									0.0000	0.18	173.63	43.4075	126.0192	79.5	0.35	450	168.5854	1.061	
		42A	EX. MH22		60.00	0.000	8.595	3.019685	82.6117									0.0000	0.00	173.63	43.4075	126.0192	29.2	0.35	450	168.5854	1.061	
		MH22	AA1 TRUNK	0.00	60.00	0.000	8.595	3.019685	82.6117									0.0000	0.00	173.63	43.4075	126.0192		0.50	450	201.4981	1.268	
TO BADEN WWPS																												
Baden West Subdivision***		EX. MH15A WWPS	WWPS	9.12	60.00	0.547	0.547	3.953755	6.8861									0.0000	9.12	9.12	2.2800	9.1661		0.50	250	42.0285	0.857	
			AA1 TRUNK			0.000	0.547	3.953755	6.8861										0.0000	0.00	9.12	2.2800	9.1661		0.50	250	42.0285	0.857
			AA1 TRUNK			0.000	9.143	2.993264	87.1022											182.750	45.6875	132.7897		0.50	450	201.4981	1.268	
Parcel Z		Z	Q	6.50	60.00	0.390	0.390	4.027354	4.9992										6.50	6.50	1.6250	6.6242		0.50	250	42.0285	0.857	
School Block		SCHOOL	Q	14.70	150.00	2.205	2.205	3.552451	24.9319										14.70	14.70	3.6750	28.6069		0.50	250	42.0285	0.857	
Parcel W2		W2	Q	13.70	60.00	0.822	0.822	3.853275	10.0814										13.70	13.70	3.4250	13.5064		0.50	250	42.0285	0.857	
Parcel X2		X2	Q	5.30	60.00	0.318	0.318	4.067542	4.1170										5.30	5.30	1.3250	5.4420		0.50	250	42.0285	0.857	
Parcel Q		Q	TRUNK LEG	31.00	60.00	1.860	5.595	3.199399	56.9754										31.00	71.20	17.8000	74.7754		1.00	375	175.2411	1.587	
Parcel AA2		AA2	TRUNK LEG	11.60	60.00	0.696	0.696	3.895993	8.6307										11.60	11.60	2.9000	11.5307		0.50	250	42.0285	0.857	
		TRUNK LEG	AA1 TRUNK					6.291	3.151137											82.800	20.7000	83.7966		0.50	375	123.9142	1.123	
		AA1 TRUNK	FOUNDRY	102.90	60.00	6.174	21.608	2.618799	180.1049										102.90	368.45	92.1125	272.2174		0.30	600	336.1373	1.189	
ADDITIONAL LANDS TO BADEN WWPS																												
EX. ACTIVA BADEN SUBDIVISION			FOUNDRY	55.20	60.00	3.312	3.312	3.405544	35.9001									0.0000	55.20	55.20	13.8000	49.7001		0.50	375	123.9142	1.123	
Parcels S, R, V		S, R, V	FOUNDRY	17.20	60.00	1.032	1.032	3.791139	12.4528									0.0000	17.20	17.20	4.3000	16.7528		0.50	450	201.4981	1.268	
Parcel U		U	FOUNDRY	1.00	60.00	0.060	0.060	4.298037	0.8208									0.0000	1.00	1.00	0.2500	1.0708		0.50	250	42.0285	0.857	
Parcel BB		BB	FOUNDRY	9.00	60.00	0.540	0.540	3.956801	6.8008									0.0000	9.00	9.00	2.2500	9.0508		0.50	250	42.0285	0.857	
Parcel T		T	FOUNDRY	0.80	60.00	0.048	0.048	4.318252	0.6597									0.0000	0.80	0.80	0.2000	0.8597		0.50	250	42.0285	0.857	
TOTAL PEAK FLOW TO BADEN WWPS																			0.0000		451.65	112.91	327.0082		0.50	600	433.9513	1.536
2) TO NAFZIGER TRUNK SEWER																												
TOTAL PEAK FLOWS TO NAFZIGER TRUNK																												
Parcel X1		X1	W1	8.10	60.00	0.486	0.486	3.980539	6.1574									0.0000	8.10	8.10	2.0250	8.1824		0.50	250	42.0285	0.857	
Parcel W1		W1	NAFZIGER	21.20	60.00	1.272	1.758	3.628666	20.3041									0.0000	21.20	29.30	7.3250	27.6291		0.50	375	123.9142	1.123	
Parcel AA3		AA2	NAFZIGER	7.10	60.00	0.426	0.426	4.009014	5.4358									0.0000	7.10	7.10	1.7750	7.2108		0.50	300	68.3430	0.967	
Parcel L		L2	M2	22.80	60.00	1.368	1.368	3.708132	16.1458									0.0000	22.80	22.80	5.7000	21.8458		0.50	250	42.0285	0.857	
Parcel M		M2	NAFZIGER	21.90	60.00	1.314	2.682	3.48329	29.7350									0.0000	21.90	44.70	11.1750	40.9100		0.50	375	123.9142	1.123	
Pacel N4		N4	NAFZIGER																									

LOCATION				RESIDENTIAL AREAS and POPULATION					SCHOOL, INSTITUTIONAL	COMMERCIAL			INDUSTRIAL				INFILTRATION			DESIGN								
STREET	AREA NO.	MANHOLE LOCATION		AREA	DENSITY	POPUL.	CUMUL POPUL.	PEAK FACTOR "F"	PEAK RES. FLOW	HECTARES AND FLOW OF EACH ZONING									TOTALS- C-I FLOW	AREA	CUMUL AREA	INFIL FLOW	TOTAL VOLUME FLOW	LENGTH	SLOPE	PIPE SIZE	CAPACITY	FULL FLOW VELOCITY
		FROM MH	TO MH							0.25 L/s/ha			0.95 L/s/ha			0.40 L/s/ha												
										AREA	CUMUL AREA	PEAK FLOW	AREA	CUMUL AREA	PEAK FLOW	AREA	CUMUL AREA	PEAK FLOW										
										ha	ppha	1000s	1000s	L/sec	ha	ha	L/sec	ha										
3) THROUGH WILMOT EMPLOYMENT LANDS																												
TOTAL PEAK FLOWS THROUGH EASTERN REACH OF WILMOT EMPLOYMENT LANDS																												
		EAST WILMOT	N3				4.866	3.255917	50.4272	17.70	4.4250			10.20	4.0800	8.5050	0.00	109.00	27.2500	86.1822		0.50	450	201.4981	1.268			
Parcel N3		N3	N2				4.866	3.255917	50.4272	17.70	4.4250			13.97	24.17	9.6680	14.0930	13.97	122.97	30.7425	95.2627		0.50	450	201.4981	1.268		
Parcel N2		N2	EAST OUTLET				4.866	3.255917	50.4272	17.70	4.4250			10.61	34.78	13.9120	18.3370	10.61	133.58	33.3950	102.1592		0.50	450	201.4981	1.268		
TOTAL PEAK FLOWS TO FOREST GLEN WWPS																												
Parcel M1 drainage split towards L1		M1	L1	6.40	60.00	0.384	0.384	4.030515	4.9262								0.0000	6.40	6.40	1.6000	6.5262		0.50	200	23.1802	0.738		
Parcel L1 drainage split towards G1		L1	G1	8.80	60.00	0.528	0.912	3.825436	11.1044								0.0000	8.80	15.20	3.8000	14.9044		0.50	200	23.1802	0.738		
Parcel G1 through F1 to WWPS		G1	F1	21.80	60.00	1.308	2.220	3.550107	25.0850								0.0000	21.80	37.00	9.2500	34.3350		0.50	250	42.0285	0.857		
Parcel F1 to WWPS		F1	WWPS	13.00	60.00	0.780	3.000	3.442407	32.8702								0.0000	13.00	50.00	12.5000	45.3702		0.50	300	68.3430	0.967		
CONVEY FROM FOREST GLEN WWPS TO WESTERN REACH THROUGH WILMOT EMPLOYMENT LANDS																												
		WWPS	F2				3.000	3.442407	32.8702								0.0000	0.00	50.00	12.5000	45.3702		0.50	300	68.3430	0.967		
		G2	F2	10.50	60.00	0.630	0.630	3.920484	7.8614								0.0000	10.50	10.50	2.6250	10.4864		0.50	300	68.3430	0.967		
		F2	WEST WILMOT	12.90	60.00	0.774	4.404	3.29562	46.1959								0.0000	12.90	73.40	18.3500	64.5459		0.35	525	254.2991	1.175		
TOTAL PEAK FLOWS TO WESTERN REACH THROUGH WILMOT EMPLOYMENT LANDS																												
		WEST WILMOT	N1				4.404	3.29562	46.1959								0.0000	0.00	73.40	18.3500	64.5459		0.35	525	254.2991	1.175		
Existing industrial through Wilmot		Nex	N1											10.54	10.54	4.2160	4.2160	10.54	10.54	2.6350	6.8510		0.50	200	23.1802	0.738		
Existing residential west of Wilmot towards outlet		Ex. Res	N1	7.69	60.00	0.461	0.461	3.991923	5.8624								0.0000	7.69	7.69	1.9225	7.7849		0.50	450	201.4981	1.268		
		N1	WEST OUTLET				4.865	3.255967	50.4217					35.65	46.19	18.4760	18.4760	35.65	127.28	31.8200	100.7177		0.50	525	303.9456	1.405		
4) COMBINE TOTAL FLOWS FROM WILMOT EMPLOYMENT AND BADEN WWPS DOWNSTREAM																												
COMBINE EASTERN AND WESTERN REACHES THROUGH WILMOT EMPLOYMENT LANDS TO CONVEY DOWNSTREAM							9.731	2.966425	91.8814	17.70	4.4250			80.97	32.3880	36.8130	0.00	260.86	65.2150	193.9094		0.50	600	433.9513	1.536			
COMBINE BADEN WWPS FLOWS DOWNSTREAM							36.331	2.396159	277.0835	17.70	4.4250		0.00	0.0000	80.97	32.3880	36.8130		712.51	178.13	492.0240		0.50	750	786.8062	1.782		

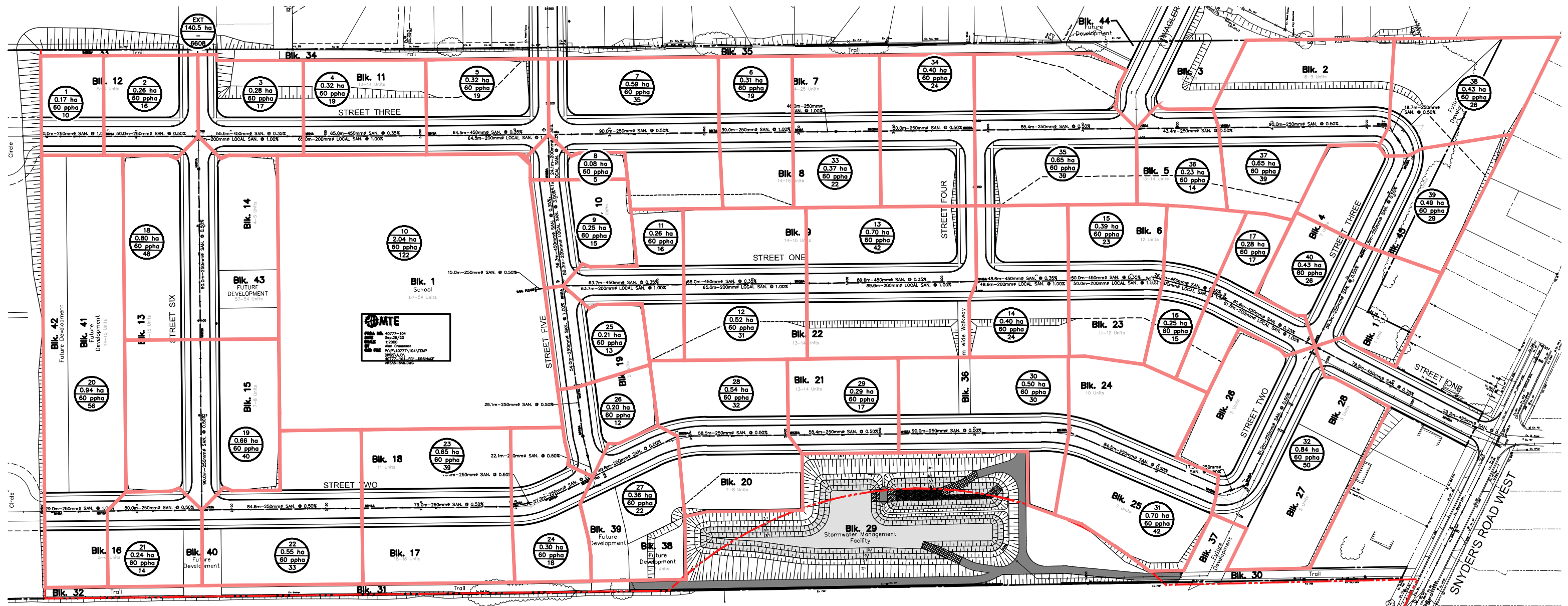
*EXISTING ACTIVA SITE SANITARY SEWER FROM THE BETTSCHEN PLUG TO SNYDER'S ROAD. CUMULATIVE POPULATION AND AREA NUMBERS TAKEN FROM ACTIVA BADEN SANITARY DESIGN SHEETS (MDS LANDS 2ND SUB) DATED OCT. 22, 2009. TOTAL FLOW CALCS FOR EXISTING ACTIVA SITE ARE BASED ON DESIGN INFORMATION PROVIDED ON THE 2009 DESIGN SHEETS AND HAVE NOT BEEN UPDATED TO CURRENT 2018 STANDARDS.

*FLOW WITHIN THE EXISTING ACTIVA SUBDIVISION HAS BEEN CALCULATED BASED ON THE ORIGINAL 2009 CRITERIA USED IN THE INITIAL DESIGN (VALUES ARE INDICATED ON THE DESIGN SHEETS).
FLOW FROM THE GINGERICH SITE IS CALCULATED BASED ON 2018 DGSSMS DESIGN CRITERIA
FOR PRELIMINARY PURPOSES A POPULATION OF 40 PERSONS PER HA HAS BEEN ASSUMED. THIS VALUE MUST BE VERIFIED WITH THE TOWNSHIP.

** Schools posted enrollment and staff totalling 2200. Used a density of 150ppha to achieve 2205. Using designated criteria of 0.25L/s/ha (cell K13)would yield a flow of 3.675L/sec = flow in cell X126
School ultimately drains towards New Hamburg lands

***Sanitary Sewer drainage areas from Baden West Subdivision based on Sanitary Sewer Design Sheet provided by Stantec (dated 02/10/05) not including the original external drainage area specified (52.0ha, P=3120)

**** For the purpose of these calculations, the pump flow rate is equal to the peak sanitary flow rate entering the pumping station



Appendix E

Water Distribution Analysis



1012 Snyder's Road West Development

Preliminary Water Distribution Report

Project Location:

1012 Snyder's Road West
Baden, Ontario

Prepared for:

Snyder's Road (Baden) GP Inc.
91 Caldari Road, Unit 1
Concord, ON L4K 3Z9

Prepared by:

MTE Consultants Inc.
520 Bingham's Centre Drive
Kitchener, ON N2B 3X9

April 12, 2021

MTE File No.: 40777-104





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Appendices

Appendix A	Draft Plans of Subdivision (Reduced)
Appendix B	Region of Waterloo Modelling Simulation Results
Appendix C	Usage Rates, Water Demands, and Design Values
Appendix D	WaterCAD Output Files

1.0 Introduction

1.1 Overview

MTE Consultants Inc. (MTE) was retained by Snyder's Road (Baden) GP Inc. to complete a Preliminary Water Distribution Analysis in support of Draft Plan Application for the proposed 1012 Snyder's Road West residential subdivision, located in the community of Baden, Township of Wilmot. The 1012 Snyder's Road West property is referred to herein as the 'subject lands'. Refer to **Figure 1.1** for the location of the subject lands.

The proposed development plans for the subject lands include the following:

- The Draft Plan includes the following:
- Twenty-eight single family residential blocks, for a total maximum 296 units and 29 future units;
- Seven municipal roads;
- A school block (with contingency to be developed as a 74-unit multi-residential block for a potential total of 399 units);
- A Stormwater Management Facility block;
- Six trail blocks along the limits of the subject lands;
- A walkway block; and
- Nine future development blocks, for the purpose of future right-of-ways and residential lands.

For more details, refer to the Draft Plan of Subdivision prepared by MHBC, dated March 31, 2021, in **Appendix A** for more details.

Per discussions with the Township of Wilmot, this preliminary Water Distribution analysis includes multiple scenarios where the future Activa lands northeast of the subject lands are modelled in addition to the proposed development. This analysis was performed to confirm that the current Baden water supply has sufficient capacity and pressures to adequately service the proposed and future developments.

The purpose of this Preliminary Water Distribution Analysis is to confirm that adequate pressure and water supply is available to support the proposed developments through connections to the existing and/or future water distribution network. The guidelines for the minimum and maximum pressures within the developments, under various demand scenarios including fire flows, are set out by the Ministry of the Environment, Conservation and Parks (MECP), Region of Waterloo, and the Township of Wilmot.

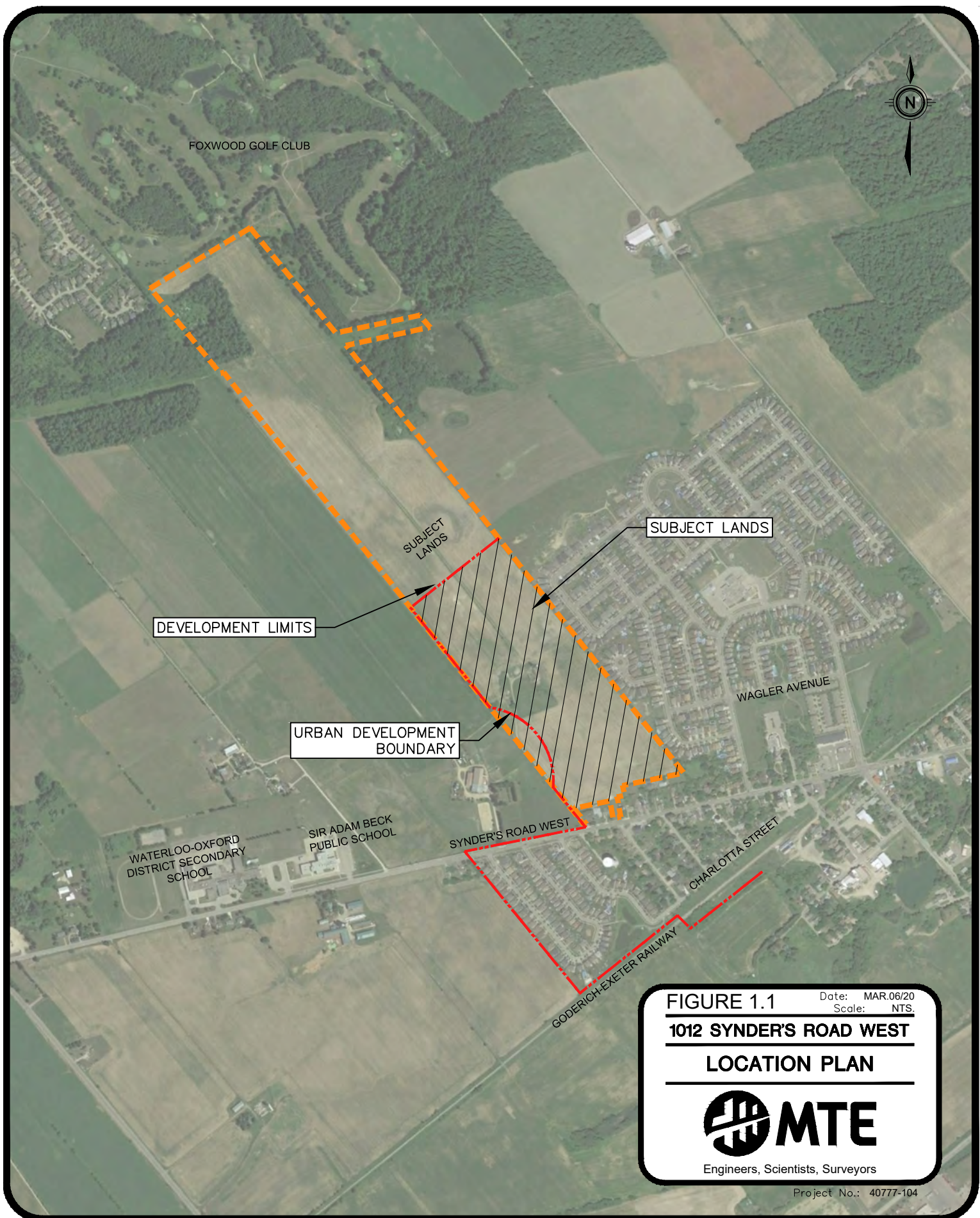


FIGURE 1.1

Date: MAR.06/20
Scale: NTS.

1012 SYNDER'S ROAD WEST

LOCATION PLAN



Engineers, Scientists, Surveyors

Project No.: 40777-104

2.0 Analysis Methodology

2.1 Micro Water Distribution System Model Development

The Bentley water distribution system analysis program (WaterCAD Connect Edition) was utilized for the analysis of this study. The network for the analysis was developed by assigning physical parameters to each node and pipe. The model utilizes proposed demands for the build-out of the 1012 Snyder's Road West development, and the future adjacent Activa Lands. The study area consists of single family residential blocks, multiple residential, and an institutional facility (with contingency to be developed as a multi-residential block). Refer to **Figure 2.1** for the proposed model of the water distribution network.

Four (4) development scenarios were analyzed within this model:

- Scenario 1A: 1012 Snyder's Road West w/ Stage 2 Multi-residential Block
- Scenario 1B: 1012 Snyder's Road West w/ Stage 2 Institutional Block
- Scenario 2A: 1012 Snyder's Road West w/ Stage 2 Multi-residential Block + Future Activa Lands development
- Scenario 2B: 1012 Snyder's Road West w/ Stage 2 Institutional Block + Future Activa Lands development

2.1.1 Network Connections

Water supply for the proposed 1012 Snyder's Road West Subdivision will be provided by external connection points to the existing municipal water distribution system:

- 300 mm diameter – Snyder's Road West
- 200 mm diameter – Bettschen Lane and Michael Myers Road
- 200 mm diameter – Wagler Avenue and McFayden Street
- 200 mm diameter – Michael Myers Road and Jacob Cressman Drive (future Activa Lands)
- 200 mm diameter – Kropf Drive and Isaac Shantz Drive (future Activa Lands)

Modelling of the 1012 Snyder's Road West development includes demands for the future Activa development northeast of the subject lands. These lands were included to ensure that adequate flows and pressures are available to support the future build out scenario. Demands for the future Activa lands are based on a proposed Draft Plan of Subdivision by MHBC (dated November 19, 2019), which includes approximately 192 single family dwelling and 238 multiple residential units. Refer to **Appendix A** for more details.

2.1.2 System Pressure

The system pressure information for this analysis is based on the Region's nodal information provided by Mr. Kevin Dolishny on December 4, 2020. The nodes used in the Region's model are described below:

- JCT_00365 – Intersection of Michael Myers Road and Bettschen Lane
- JCT_00359 – Intersection of McFayden Street and Wagler Avenue
- JCT_00307 – Intersection of Street One and Snyder's Road West
- JCT_00385 – Intersection of Michael Myers Road and Jacob Cressman Drive
- JCT_00386 – Intersection of Kropf Drive and Isaac Shantz Drive

Refer to **Figure 2.1 – Water Distribution Plan** for the location of the Regional nodes used in the model.

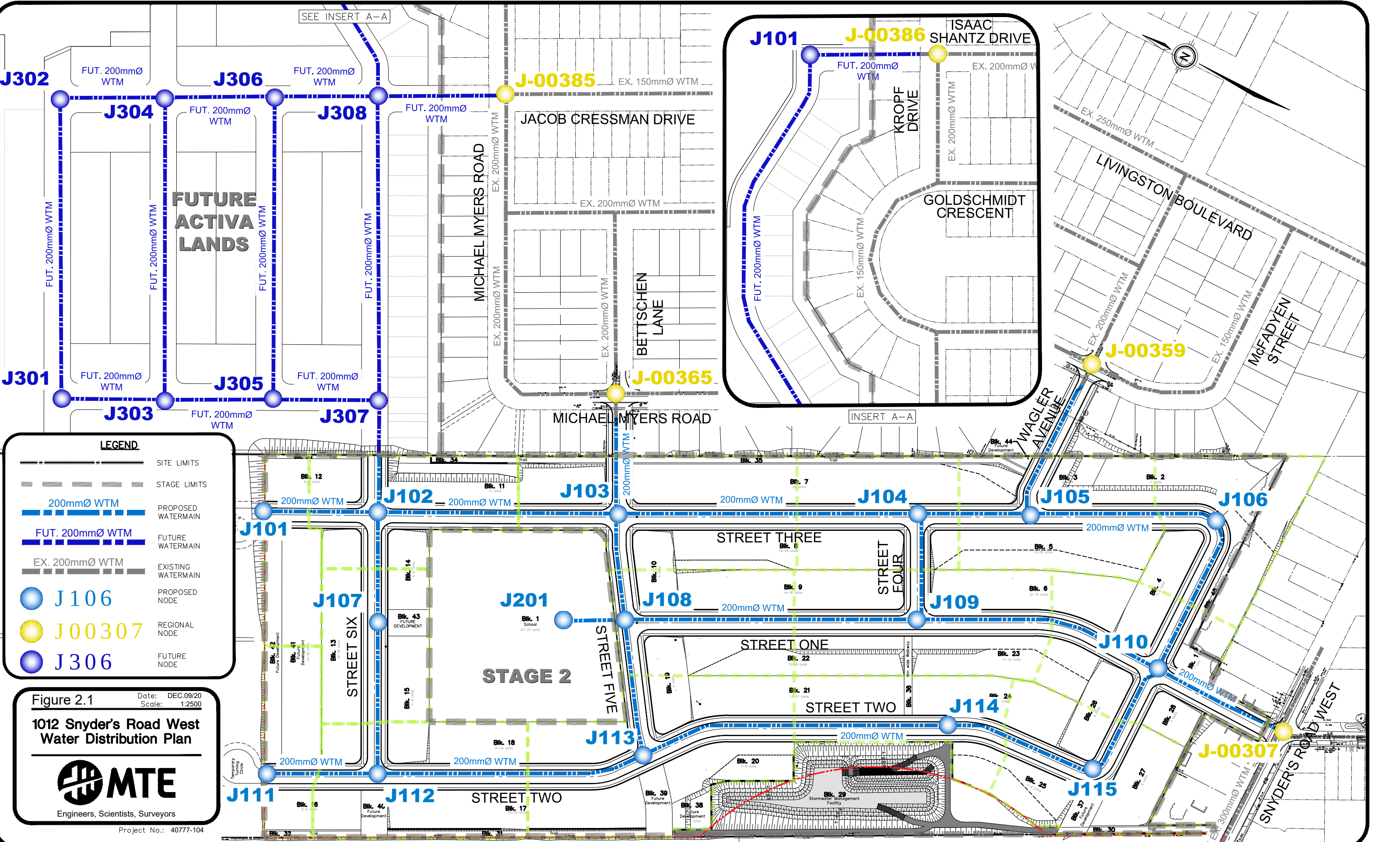
Hydraulic grade lines were determined for the average day, maximum day, peak hour, minimum hour, and maximum day plus fire flow scenarios under the 4 development conditions. **Table 2.1 to 2.8** provide a summary of the hydraulic grade lines used for the nodes in the analysis.

Table 2.1 – System Pressures for JCT_00365 (Scenarios 1A and 1B)

Demand Scenario	Discharge (L/s)	HGL (m)	Head (m)
Initial	0.00	399.30	38.50
Minimum Hour	0.45	398.49	37.69
Average Day	0.96	398.48	37.68
Maximum Day	1.88	398.25	37.45
Peak Hour	2.25	397.98	37.18
Max Day + 40.0L/s Fire Flow	41.88	396.70	35.90
Max Day + 80.0L/s Fire Flow	81.88	393.40	32.60
Max Day + 120.0L/s Fire Flow	121.88	388.50	27.70
Max Day + 160.0L/s Fire Flow	161.88	381.90	21.10
Max Day + 195.4L/s Fire Flow	197.28	374.80	14.00

Table 2.2 – System Pressures for JCT_00359 (Scenarios 1A and 1B)

Demand Scenario	Discharge (L/s)	HGL (m)	Head (m)
Initial	0.00	399.60	42.00
Minimum Hour	0.38	398.49	40.89
Average Day	0.82	398.48	40.88
Maximum Day	1.59	398.33	40.73
Peak Hour	1.90	397.99	40.39
Max Day + 40.0L/s Fire Flow	41.59	397.30	39.70
Max Day + 80.0L/s Fire Flow	81.59	395.50	37.90
Max Day + 120.0L/s Fire Flow	121.59	392.80	35.20
Max Day + 160.0L/s Fire Flow	161.59	389.30	31.70
Max Day + 200.0L/s Fire Flow	201.59	384.90	27.30
Max Day + 240.0L/s Fire Flow	241.59	379.80	22.20
Max Day + 280.0L/s Fire Flow	281.59	373.90	16.30
Max Day + 287.4L/s Fire Flow	288.99	372.70	15.10



LEGEND

	SITE LIMITS
	STAGE LIMITS
	200mmØ WTM
	FUT. 200mmØ WTM
	EX. 200mmØ WTM
	J 106
	J 00307
	J 306
	PROPOSED NODE
	REGIONAL NODE
	FUTURE NODE

Figure 2.1 Date: DEC.09/20 Scale: 1:2500

**1012 Snyder's Road West
Water Distribution Plan**

MTE
Engineers, Scientists, Surveyors

Project No.: 40777-104

Table 2.3 – System Pressures for JCT_00307 (Scenarios 1A and 1B)

Demand Scenario	Discharge (L/s)	HGL (m)	Head (m)
Initial	0.00	399.70	41.00
Minimum Hour	1.37	398.50	39.80
Average Day	2.90	398.33	39.63
Maximum Day	5.88	398.28	39.58
Peak Hour	7.04	398.05	39.35
Max Day + 100.0L/s Fire Flow	105.88	397.60	38.90
Max Day + 300.0L/s Fire Flow	305.88	394.80	36.10
Max Day + 500.0L/s Fire Flow	505.88	389.60	30.90
Max Day + 700.0L/s Fire Flow	705.88	382.20	23.50
Max Day + 900.0L/s Fire Flow	905.88	372.80	14.10
Max Day + 902.5L/s Fire Flow	908.38	372.70	14.00

Table 2.4 – System Pressures for JCT_00365 (Scenarios 2A and 2B)

Demand Scenario	Discharge (L/s)	HGL (m)	Head (m)
Initial	0.00	399.30	38.50
Minimum Hour	0.45	398.48	37.68
Average Day	1.09	398.37	37.57
Maximum Day	1.89	398.32	37.52
Peak Hour	2.25	397.98	37.17
Max Day + 40.0L/s Fire Flow	41.89	396.30	35.50
Max Day + 80.0L/s Fire Flow	81.89	392.80	32.00
Max Day + 120.0L/s Fire Flow	121.89	387.70	26.90
Max Day + 160.0L/s Fire Flow	161.89	381.00	20.20
Max Day + 190.8L/s Fire Flow	192.69	374.80	14.00

Table 2.5 – System Pressures for JCT_00359 (Scenarios 2A and 2B)

Demand Scenario	Discharge (L/s)	HGL (m)	Head (m)
Initial	0.00	399.60	42.00
Minimum Hour	0.38	398.48	40.88
Average Day	0.93	398.38	40.78
Maximum Day	1.59	398.26	40.66
Peak Hour	1.90	397.99	40.39
Max Day + 40.0L/s Fire Flow	41.59	396.90	39.30
Max Day + 80.0L/s Fire Flow	81.59	395.10	37.50
Max Day + 120.0L/s Fire Flow	121.59	392.30	34.70
Max Day + 160.0L/s Fire Flow	161.59	388.70	31.10
Max Day + 200.0L/s Fire Flow	201.59	384.20	26.60
Max Day + 240.0L/s Fire Flow	241.59	379.00	21.40
Max Day + 280.0L/s Fire Flow	281.59	373.00	15.40
Max Day + 281.0L/s Fire Flow	282.59	372.90	15.30

Table 2.6 – System Pressures for JCT_00307 (Scenarios 2A and 2B)

Demand Scenario	Discharge (L/s)	HGL (m)	Head (m)
Initial	0.00	399.70	41.00
Minimum Hour	1.37	398.49	39.79
Average Day	3.50	398.30	39.60
Maximum Day	5.88	398.28	39.58
Peak Hour	7.04	398.05	39.35
Max Day + 200.0L/s Fire Flow	205.88	396.30	37.60
Max Day + 400.0L/s Fire Flow	405.88	392.10	33.40
Max Day + 600.0L/s Fire Flow	605.88	385.80	27.10
Max Day + 800.0L/s Fire Flow	805.88	380.80	22.10
Max Day + 894.3L/s Fire Flow	900.18	372.70	14.00

Table 2.7 – System Pressures for JCT_00385 (Scenarios 2A and 2B)

Demand Scenario	Discharge (L/s)	HGL (m)	Head (m)
Initial	0.00	399.20	40.00
Minimum Hour	0.98	398.48	39.28
Average Day	2.08	398.23	39.03
Maximum Day	4.23	397.86	38.66
Peak Hour	6.27	397.64	38.44
Max Day + 40.0L/s Fire Flow	44.23	396.50	37.30
Max Day + 80.0L/s Fire Flow	84.23	393.40	34.20
Max Day + 120.0L/s Fire Flow	124.23	388.80	29.60
Max Day + 160.0L/s Fire Flow	164.23	382.70	23.50
Max Day + 200.0L/s Fire Flow	204.23	375.30	16.10
Max Day + 210.1L/s Fire Flow	214.33	373.20	14.00

Table 2.8 – System Pressures for JCT_00386 (Scenarios 2A and 2B)

Demand Scenario	Discharge (L/s)	HGL (m)	Head (m)
Initial	0.00	401.20	42.00
Minimum Hour	0.40	398.33	40.93
Average Day	1.09	398.23	40.83
Maximum Day	2.18	397.73	40.43
Peak Hour	3.26	397.65	40.25
Max Day + 40.0L/s Fire Flow	42.18	397.60	38.40
Max Day + 80.0L/s Fire Flow	82.18	393.00	33.80
Max Day + 120.0L/s Fire Flow	122.18	386.10	26.90
Max Day + 160.0L/s Fire Flow	162.18	377.00	17.80
Max Day + 174.4L/s Fire Flow	176.58	373.20	14.00

2.2 Design Criteria

The water network for the analysis was developed by assigning physical parameters to each node and pipe within the proposed ultimate build-out of the development. The model was run under five demand scenarios (average day, minimum hour, maximum day, peak hour, and maximum day plus fire flow) and each was checked against design guidelines for pressure, velocity, and fire flow availability. The parameters and criteria are outlined in the following sections.

2.2.1 Unit Count and Population

The population per unit modelled for the development was based on 3.25 persons per unit (medium density) and 2.44 persons per unit (high density) as specified in the Region of Waterloo's *2020 Water and Wastewater Monitoring Report* (Region, 2020). These densities are listed below in **Table 2.9**.

Table 2.9 – Population Densities

Structure Type	PPU
Single, detached	3.25
Townhouse	2.44

The Draft Plan of Subdivisions (subject lands and future Activa Lands) were used to determine the number of residential, multi-residential units corresponding to each node in the model.

The total unit count and appropriate densities listed above were used to estimate a population in Stage 1 of the subject lands of 1056.

As stated above, the school block within the subject lands has been zoned with the potential to be developed as a multi-residential block. The block was analyzed as both zoning designations in different scenarios to confirm adequate pressures and flows can be met. Stage 2 of the subject lands, if developed as multi-residential, may contain a population of 181.

For the future Activa development Draft Plan of Subdivision provided, there is approximately 192 single family dwelling and 238 multiple residential units, for a potential population of 1,205.

Therefore, there is a potential total design population of 2,261 people if Stage 2 is zoned as Institutional, or 2,442 if zoned as multi-residential. Refer to the Demand Calculations in **Appendix C** for more details regarding the units counts and population estimate.

2.2.2 System Demands

System demands for the proposed residential development were based on water usage rates of 227.7L/person/day from the *Tri-City Water Distribution Master Plan Final Report* (AECOM, 2009). Using the usage rate, residential water demands were calculated from the number of units contributing to each node within the model, multiplied by the number of persons per unit, multiplied by 227.7L/p/d, and then converted to L/s.

For Stage 2 of the subject lands, a separate demand junction was modelled within the block to determine the flows and pressures within the service connection. The proposed 2.04ha school site was modelled using 1.0L/s/ha demand. School demands were obtained from *City-Wide Sanitary Sewer System Capacity Study, City of Kitchener* (AECOM, 2011). The usage rates and demand calculations for each node are provided in **Appendix C**.

For the future Activa Lands, the same residential water usage rates were used. For the purpose of this report, the total demands for the future lands were distributed evenly throughout the nodes within the development to confirm adequate capacity under the ultimate development scenario.

2.2.3 Peaking Factors

Peaking factors were obtained from Chapter 33 of the *Design Guidelines for Drinking Water Systems* (MOE, 2008) for an ultimate population of the community of Baden of 3,001-10,000. **Table 2.10** summarizes the peaking factors used based on the population estimates from the combined development plans.

Table 2.10 – Peaking Factors

Demand Scenario	Factor
Average Day	1.00
Maximum Day	2.00
Peak Hour	3.00
Minimum Hour	0.50

2.2.4 Fire Flow Requirements

Various guidelines and references exist for calculating the required water supply for firefighting purposes. In Ontario, two standards/guidelines are most often referenced. They are:

- Ontario Building Code (*OBC*) – Provincial codes and guidelines published by the Ministry of Municipal Affairs and Housing for the Province of Ontario.
- The Fire Underwriter's Survey (*FUS*) – an insurance industry guideline.

Many municipalities in Ontario use both the *OBC* and the *FUS* fire flow requirements for assessing firefighting water supply requirements. Ideally, fire flow demands for new developments are calculated based on the *FUS* criteria, however, it is not reasonable to expect that the existing municipal watermain infrastructure always has the operational capacity to supply water at the rates prescribed in the *FUS* guidelines. As a result, at no time shall the available fire flow be less than that required by the Ontario Building Code.

The fire demand for the development was determined from the *Water Supply for Public Fire Protection, A Guide to Recommended Practice* (1999), *Fire Underwriter's Survey (FUS)*. Based on the *FUS* manual, the required fire flow is as follows:

Residential:

- Medium-density, contiguous multi-block townhomes – 8,000L/min (133L/s)
- Medium-density, single family homes < 3.0m separation – 6,000L/min (100L/s)

For the future Activa Lands, a fire flow of 133 L/s was modelled at each node. If the future Activa Lands are rezoned to a denser residential designation, fire flow analyses will need to be performed again to confirm adequate pressures and flows can be met.

Institutional, Commercial, Industrial (ICI):

NOTE: The following provides a range of typical fire flow requirements based on representative commercial and school site developments.

- School – Assumed non-combustible construction, with a 6,100 m² gross floor area (30% of Stage 2) – 13,000L/min (217 L/s)

Specific details are not currently available for the proposed school block. As such, the fire flow values should be confirmed when the information becomes available. At this time, a fire flow value of 217L/s was used for the school.

2.2.5 Friction Factors

As outlined in Section B2.3 of the *DGSSMS*, the watermain shall be designed using the Hazen-Williams friction C-factors listed in **Table 2.11**. A value of 150 for the PVC pipes was used in this analysis.

Table 2.11 – DGSSMS Hazen-Williams C-factors

Material	Factor
PVC/PVCO	150
DI	130
CPP	140
HDPE	140

2.2.6 Minor Losses

Minor Losses are caused by appurtenances and fittings along the length of the pipe in the system. For the purpose of this preliminary analysis, a conservative K-value of 1.0 was used for all pipes.

2.2.7 Pressure Requirements

As outlined in Section B2.4 of the *DGSSMS*, the pressure guidelines used for all demand scenarios are shown below in **Table 2.12**.

Table 2.12 – DGSSMS Pressure Guidelines

Demand Scenario	Pressure Guidelines (kPa)	
	Minimum	Maximum
Average Day	350	550
Maximum Day	350	550
Peak Hour	275	700
Minimum Hour	275	700
Max Day + Fire	140	700

The maximum static pressure in the watermain system should not exceed 700kPa (100psi) under any scenario.

2.2.8 Velocity Requirements

The *DGSSMS* recommends that velocities throughout the distribution not exceed a maximum of 5.0m/s under all flow conditions.

3.0 Results

The model was run to analyze the pipe sizes, system pressures, and available flows according to the design criteria under the various demands and fire flow scenarios. **Appendix D** provides the proposed network and a series of tables summarizing the output results of the WaterCAD analysis. **Table 3.1 to 3.4** provide a summary of the model results for the scenarios analyzed, identifying the system pressures for each demand scenario, as well as the maximum pipe velocities for the fire flow scenarios.

3.1 Daily Demand Scenarios

As shown in **Table 3.1 to 3.4**, the proposed water distribution system will be able to adequately provide the required daily water demands within the *DGSSMS*'s recommended minimum and maximum pressure range guidelines of 350kPa to 550kPa for the average and maximum day demand scenarios, and 275kPa to 700kPa for the minimum and peak hour demand scenarios.

Watermains were sized to be 200mm diameter for all streets. The fire flow analysis indicates instances where pipe velocities exceed the recommended maximum of 5.0m/s. However, these velocities are mostly found in the service stubs used to model flows into the school site, commercial block, and multiple residential blocks. As such, the pipe sizes have not been changed for the sole purpose of reducing the maximum velocity experienced under the rare fire flow condition, as this may create an environment for stagnant water conditions to arise under normal daily demands.

3.2 Fire Flow Limitations (School)

Building details for the future school block is not finalized at this time, thus detailed *FUS* fire flow calculations cannot be confirmed. However, as discussed in Section 2.2.4, typical *FUS* fire flows for representative commercial and school site developments may range anywhere from: 116L/s to 200L/s and 83L/s to 250L/s, respectively, depending on the building details. For this analysis, fire flows of 217L/s were selected to model the school site based on an assumed floor area within the block.

It should be noted that the modelled nodes provided by the Region provide fire flows up to 894.3 L/s (Node 00307) under Scenario 2. Therefore, if the school block requires additional fire flows in excess of what is modelled, we anticipate no issues due to the available fire flows present, and multiple external connections to the surrounding existing developments.

Table 3.1 – Modelling Results for Scenario 1A (Subject Lands with Stage 2 Multi-Residential Block)

Node	Elev. (m)	Pressure (kPa)				Maximum Day + Fire Flow				
		Average Day	Maximum Day	Minimum Hour	Peak Hour	Fire Flow Required (L/s)	Available Fire Flow (L/s)	Residual Pressure (kPa)	Velocity of Max Pipe (m/s)	Pipe with Max. Velocity
J-101	361.22	365	364	365	364	100.21	175.21	140	5.58	<i>P-1</i>
J-102	360.72	370	369	370	369	100.26	230.26	163	4.54	P-2
J-103	361.19	365	364	365	364	100.41	230.41	282	2.79	P-21
J-104	360.01	377	376	377	376	100.33	230.33	295	3.09	P-5
J-105	360.20	375	374	375	374	100.38	230.38	301	2.90	P-6
J-106	359.21	384	384	385	384	100.27	230.27	267	3.88	P-8
J-107	360.20	375	374	375	374	100.36	230.36	149	3.96	P-2
J-108	359.15	385	384	385	384	100.38	230.38	286	3.04	P-13
J-109	359.80	379	378	379	378	100.63	230.63	289	3.15	P-21
J-110	358.86	388	387	388	387	100.38	230.38	328	3.68	P-21
J-111	360.37	373	372	373	372	100.21	174.88	140	5.57	<i>P-11</i>
J-112	359.95	377	377	377	376	100.46	230.46	155	4.12	P-12
J-113	358.90	387	387	388	387	100.67	230.67	260	3.55	P-14
J-114	357.75	399	398	399	398	100.31	230.31	223	3.98	P-20
J-115	358.40	392	392	392	392	100.33	230.33	258	5.06	<i>P-20</i>
J-201	359.40	383	382	383	382	133.96	228.49	140	7.27	<i>P-201</i>

**Cells highlighted in yellow identify nodes in the model where the pressure is higher than the Region's recommended maximum pressure guideline of 550kPa for the average and maximum day demand scenarios, requiring a PRV. Cells that are bold and italicized identify pipes in the model where the maximum recommended velocity of 5.0m/s is exceeded.*

Table 3.2 – Modelling Results for Scenario 1B (Subject Lands with Stage 2 Institutional Block)

Node	Elev. (m)	Pressure (kPa)				Maximum Day + Fire Flow				
		Average Day	Maximum Day	Minimum Hour	Peak Hour	Fire Flow Required (L/s)	Available Fire Flow (L/s)	Residual Pressure (kPa)	Velocity of Max Pipe (m/s)	Pipe with Max. Velocity
J-101	361.22	364	364	365	364	100.21	174.59	140	5.56	<i>P-1</i>
J-102	360.72	369	369	370	369	100.26	230.26	161	4.54	P-2
J-103	361.19	365	364	365	364	100.41	230.41	280	2.83	P-21
J-104	360.01	376	376	377	376	100.33	230.33	294	3.11	P-5
J-105	360.20	375	374	375	374	100.38	230.38	300	2.92	P-6
J-106	359.21	384	384	384	384	100.27	230.27	266	3.87	P-8
J-107	360.20	374	374	375	374	100.36	230.36	147	3.96	P-2
J-108	359.15	385	384	385	384	100.38	230.38	283	3.08	P-13
J-109	359.80	378	378	379	378	100.63	230.63	288	3.18	P-21
J-110	358.86	388	387	388	387	100.38	230.38	327	3.71	P-21
J-111	360.37	373	372	373	372	100.21	174.30	140	5.55	<i>P-11</i>
J-112	359.95	377	376	377	376	100.46	230.46	153	4.12	P-12
J-113	358.90	387	387	387	387	100.67	230.67	258	3.54	P-14
J-114	357.75	398	398	399	398	100.31	230.31	221	3.98	P-20
J-115	358.40	392	392	392	392	100.33	230.33	257	5.06	P-20
J-201	359.40	382	382	383	381	221.08	228.48	140	7.27	<i>P-201</i>

**Cells highlighted in yellow identify nodes in the model where the pressure is higher than the Region's recommended maximum pressure guideline of 550kPa for the average and maximum day demand scenarios, requiring a PRV. Cells that are bold and italicized identify pipes in the model where the maximum recommended velocity of 5.0m/s is exceeded.*

Table 3.3 – Modelling Results for Scenario 2A (Subject Lands with Stage 2 Multi-Residential Block + Future Activa Lands)

Node	Elev. (m)	Pressure (kPa)				Maximum Day + Fire Flow				
		Average Day	Maximum Day	Minimum Hour	Peak Hour	Fire Flow Required (L/s)	Available Fire Flow (L/s)	Residual Pressure (kPa)	Velocity of Max Pipe (m/s)	Pipe with Max. Velocity
J-101	361.22	378	374	379	367	100.21	217.29	140	6.92	P-1
J-102	360.72	383	379	384	372	100.26	230.26	285	2.90	P-301
J-103	361.19	378	374	379	367	100.41	230.46	309	2.13	P-21
J-104	360.01	390	385	391	379	100.33	230.33	310	2.84	P-5
J-105	360.20	388	383	389	377	100.38	230.38	309	2.81	P-5
J-106	359.21	398	393	399	386	100.28	230.28	277	3.89	P-8
J-107	360.20	388	384	389	377	100.36	230.36	239	4.67	P-9
J-108	359.15	398	394	399	387	100.38	230.38	311	3.19	P-13
J-109	359.80	392	387	393	381	100.63	230.63	305	2.96	P-16
J-110	358.86	401	397	402	390	100.38	230.38	337	3.32	P-21
J-111	360.37	386	382	387	375	100.21	192.65	140	6.13	P-11
J-112	359.95	390	386	392	379	100.46	230.46	218	3.75	P-9
J-113	358.90	401	396	402	390	100.67	230.67	289	3.44	P-14
J-114	357.75	412	407	413	401	100.31	230.31	240	3.91	P-20
J-115	358.40	405	401	407	394	100.33	230.33	272	4.98	P-20
J-201	359.40	396	391	397	385	133.96	230.96	161	7.35	P-201
J-301	360.00	390	386	391	380	133.70	230.70	143	4.79	P-303
J-302	358.50	405	401	406	394	133.70	230.70	156	4.76	P-304
J-303	360.40	386	382	387	376	133.70	230.70	199	4.24	P-306
J-304	360.40	386	382	387	376	133.70	230.70	200	4.34	P-307
J-305	360.80	382	378	383	372	133.70	230.70	239	4.06	P-309
J-306	360.80	382	378	383	371	133.70	230.70	241	4.28	P-310
J-307	361.30	377	373	378	367	133.70	230.70	270	3.41	P-301
J-308	361.30	377	373	378	367	133.70	230.70	286	2.93	P-313
J-309	363.00	361	359	362	356	133.70	230.70	183	3.99	P-314

*Cells highlighted in yellow identify nodes in the model where the pressure is higher than the Region's recommended maximum pressure guideline of 550kPa for the average and maximum day demand scenarios, requiring a PRV. Cells that are bold and italicized identify pipes in the model where the maximum recommended velocity of 5.0m/s is exceeded.

**300 series nodes represent future Activa Lands. Elevations used within these nodes are conceptual.

Table 3.4 – Modelling Results for Scenario 2B (Subject Lands with Stage 2 Institutional Block + Future Activa Lands)

Node	Elev. (m)	Pressure (kPa)				Maximum Day + Fire Flow				
		Average Day	Maximum Day	Minimum Hour	Peak Hour	Fire Flow Required (L/s)	Available Fire Flow (L/s)	Residual Pressure (kPa)	Velocity of Max Pipe (m/s)	Pipe with Max. Velocity
J-101	361.22	377	370	379	365	100.21	216.89	140	6.90	P-1
J-102	360.72	382	375	384	370	100.26	230.26	285	2.91	P-301
J-103	361.19	377	370	379	365	100.41	230.41	308	2.16	P-21
J-104	360.01	389	382	391	376	100.33	230.33	309	2.85	P-5
J-105	360.20	387	380	389	374	100.38	230.38	308	2.80	P-5
J-106	359.21	397	390	399	384	100.28	230.28	276	3.89	P-8
J-107	360.20	387	380	389	375	100.36	230.36	239	4.67	P-9
J-108	359.15	397	390	399	385	100.38	230.38	309	3.23	P-13
J-109	359.80	391	384	393	378	100.63	230.63	304	2.96	P-16
J-110	358.86	400	393	402	387	100.38	230.38	336	3.34	P-21
J-111	360.37	385	379	387	373	100.21	192.24	140	6.12	P-11
J-112	359.95	389	383	391	377	100.46	230.46	217	3.75	P-9
J-113	358.90	400	393	402	387	100.67	230.67	288	3.42	P-14
J-114	357.75	411	404	413	398	100.31	230.31	239	3.91	P-20
J-115	358.40	405	398	406	392	100.33	230.33	271	4.98	P-20
J-201	359.40	395	388	397	382	221.08	234.08	155	7.45	P-201
J-301	360.00	389	383	391	377	133.70	230.70	142	4.79	P-303
J-302	358.50	404	398	406	392	133.70	230.70	156	4.76	P-304
J-303	360.40	385	379	387	373	133.70	230.70	199	4.24	P-306
J-304	360.40	385	379	387	374	133.70	230.70	200	4.34	P-307
J-305	360.80	381	375	383	370	133.70	230.70	239	4.06	P-309
J-306	360.80	381	375	383	370	133.70	230.70	241	4.28	P-310
J-307	361.30	376	370	378	365	133.70	230.70	270	3.40	P-301
J-308	361.30	377	371	378	365	133.70	230.70	286	2.94	P-313
J-309	363.00	361	358	362	355	133.70	230.70	183	4.00	P-314

*Cells highlighted in yellow identify nodes in the model where the pressure is higher than the Region's recommended maximum pressure guideline of 550kPa for the average and maximum day demand scenarios, requiring a PRV. Cells that are bold and italicized identify pipes in the model where the maximum recommended velocity of 5.0m/s is exceeded.

**300 series nodes represent future Activa Lands. Elevations used within these nodes are conceptual.

4.0 Conclusions and Recommendations

Based on the preliminary water distribution analysis, it is concluded that:

- Direct connection to the existing watermain (Regional Nodes 00365, 00359, and 00307) will adequately service the proposed water distribution network for the 1012 Snyder's Road West Subdivision.
- Additional Connections to the existing watermain in the adjacent development (Regional Nodes 00385, and 00386) will adequately provide capacity for the future Activa Lands as well as the 1012 Snyder's Road West Subdivisions.
- The proposed water distribution network will adequately provide the required daily water demands within the *DGSSMS* recommended minimum and maximum pressure range guidelines of 350kPa to 550kPa for both the average and maximum day demand scenarios, and 275kPa to 700kPa for the minimum and peak hour demand scenarios for all junctions.
- The proposed watermain is sized to be 200mm diameter. As such, pipe velocities were less than the *DGSSMS* maximum recommended 5.0m/s for most pipes under the fire flow conditions. However, pipe sizes were not increased for the sole purpose of reducing the maximum velocity experienced under the rare fire flow condition, as this may create an environment for stagnant water conditions to arise under normal daily demands.
- Water model results indicate that the proposed water distribution system will adequately provide the recommended *FUS* fire flows at the minimum MECP pressure of 140kPa.
- The proposed institutional (school site) development area can be adequately serviced during fire flow conditions. The resulting analysis indicates that flow to these areas will easily surpass the modelled demands of 217L/s. The fire flow values should be confirmed once the school block details are confirmed.

All of which is respectfully submitted,

MTE Consultants Inc.



Alex Cressman, E.I.T.
Designer
519-743-6500 ext. 1279
acressman@mte85.com



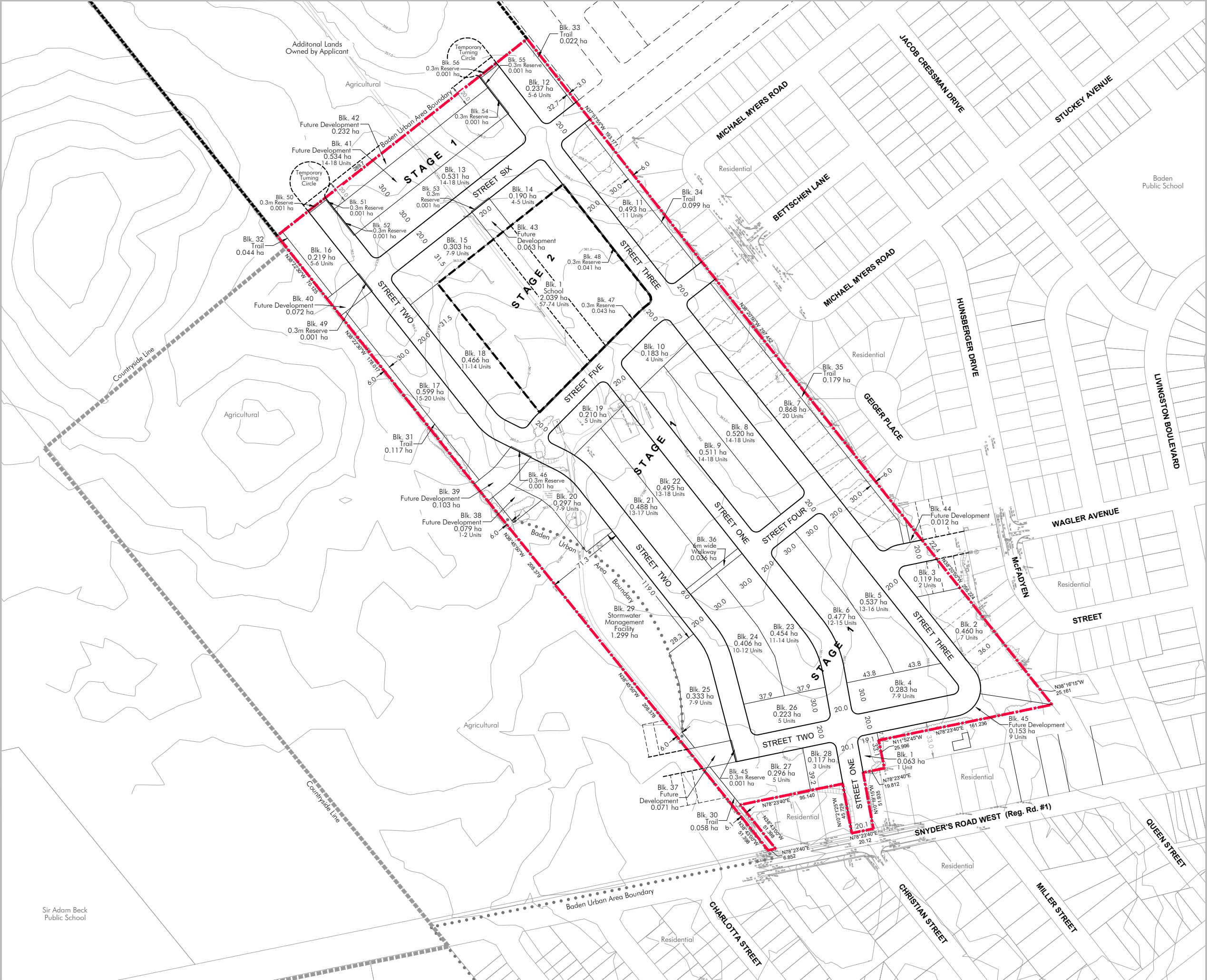
Jeff Martens, P.Eng.
Design Engineer
519-743-6500 ext. 1231
jmartens@mte85.com

Appendix A

Water Distribution Report

Draft Plans of Subdivision (Reduced)



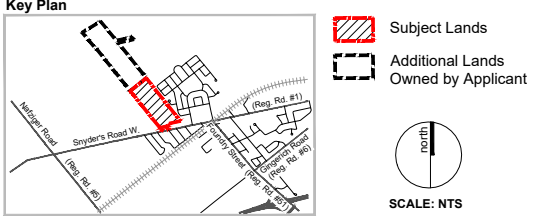


DRAFT PLAN OF SUBDIVISION

Legal Description
PART OF LOT 16, CONCESSION NORTH OF SNYDERS ROAD
TOWNSHIP OF WILMOT
REGION OF WATERLOO

Owner's Certificate
I HEREBY AUTHORIZE MACNAUGHTON HERMSEN BRITTON CLARKSON PLANNING LIMITED TO SUBMIT THIS PLAN FOR APPROVAL.
DATE: April 1, 2021
NICK GOUGOULIAS - PRESIDENT (SNYDER'S ROAD (BADEN) GP INC.)

Surveyor's Certificate
I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LAND TO BE SUBDIVIDED ON THIS PLAN AND THEIR RELATIONSHIP TO THE ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN.
DATE: MARCH 30, 2021
TREVOR D.A. McNEIL, OLS (MTE OLS LTD.)



Additional Information Required Under Section 51(17) of the Planning Act R.S.O. 1990, c.P.13 as Amended
A. AS SHOWN B. AS SHOWN C. AS SHOWN
D. RESIDENTIAL, SCHOOL, STORMWATER MANAGEMENT, TRAIL
E. AS SHOWN F. AS SHOWN
G. AS SHOWN H. MUNICIPAL WATER SUPPLY I. CLAY/SANDY LOAM
J. AS SHOWN K. ALL SERVICES AS REQUIRED L. AS SHOWN

Area Schedule		30T-			
Description*	Stage 1			Stage 2	
	Blocks	Units** (min/max)	Area (ha)	Block	Units** (min/max)
Residential	1-28	245-296	10.381		
School				1	57-74
Stormwater Management Facility	29		1.299		
Trail	30-35		0.519		
Walkway	36		0.036		
Future Development	37-45	24-29	1.319		
0.3m Reserves	46-57		0.094		
Roads			5.043		
	57	269-325	18.691	1	57-74
Total	58	326-399	20.730		2,039

*Blocks shown on Draft Plan are 'Residential' unless otherwise specified.
** For minimum unit yield 11.582 m (38 ft) wide lots are assumed. For maximum unit yield, 10.973 m (36 ft) wide lots are assumed and 30% townhomes (5m wide units/lots) where feasible. School Block assumes townhouse block and street towns for maximum unit yield and townhouse block and 11.582 m (38 ft) wide lots for minimum unit yield. Conceptual lotting assumed adjacent to existing development.

Notes
1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SHOWN.
2. SITE BOUNDARY AND LEGAL BASE PLAN PREPARED BY MTE OLS LTD.
3. TOPOGRAPHIC AND EXISTING FEATURES SURVEY COMPLETED BY MTE AND DATED APRIL 2019.
4. ADJACENT PARCEL FABRIC IS FROM REGION OF WATERLOO OPEN DATA AND IS APPROXIMATE.

Stage Limits Countryside Line Baden Urban Area Boundary

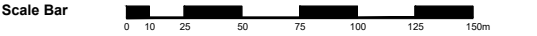
1. Mar. 31, 2021 For Submission/Draft Plan of Subdivision application; DGS
Revision No. Date Issued / Revision By

PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE
MHBC
200-540 BINGEMANS CENTRE DR. KITCHENER, ON N2B 3X9 | P: 519.576.3650 F: 519.576.0121 | WWW.MHBCPLAN.COM

Approval Stamp	Date March 31, 2021
File No.	1985A
Plan Scale	1:1,500 (24x36)
Drawn By	DGS
Checked By	PC

Project Snyder's Road Property
Applicant SNYDER'S ROAD (BADEN) GP INC.
91 Caldari Road, Unit 1
Concord, ON L4K 3Z9
P: 905.893.9997

File Name DRAFT PLAN OF SUBDIVISION



DRAFT PLAN OF SUBDIVISION

Legal Description
PART OF LOTS 14 AND 15,
GERMAN BLOCK NORTH OF SNYDERS ROAD
TOWNSHIP OF WILMOT
REGION OF WATERLOO

Owner's Certificate
I HEREBY AUTHORIZE MACNAUGHTON HERMSEN BRITTON CLARKSON PLANNING LIMITED
TO SUBMIT THIS PLAN FOR APPROVAL.

DATE: _____
LARRY MASEO - VICE PRESIDENT
PLANNING AND DEVELOPMENT
(ACTIVA GROUP INC.)

Surveyor's Certificate
I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LAND TO BE SUBDIVIDED ON THIS PLAN AND
THEIR RELATIONSHIP TO THE ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN.

DATE: _____
BRIAN CAMPBELL OLS
(STANTEC GEOMATICS LTD.)

Key Plan

Subject Lands
Additional Lands
Owned by Applicant

SCALE: NTS

Additional Information Required Under Section 51(17) of the Planning Act
R.S.O. 1990, c.P.13 as Amended
A. AS SHOWN B. AS SHOWN C. AS SHOWN
D. RESIDENTIAL, MULTIPLE RESIDENTIAL, STORMWATER MANAGEMENT E. AS SHOWN
F. AS SHOWN G. AS SHOWN H. MUNICIPAL WATER SUPPLY I. CLAY/SANDY LOAM
J. AS SHOWN K. ALL SERVICES AS REQUIRED L. AS SHOWN

Area Schedule				30T-
Description*	Blocks	Units** (min/max)	Area (ha)	
Residential	1-20	181-192	6.872	
Multiple Residential**	21,22	133-238	3.410	
Stormwater Management Facility	23		1.347	
Trail	24,25		0.108	
Trail/Drainage Corridor	26		0.259	
Drainage Corridor	27		0.321	
0.3m Reserves	28-33		0.011	
Roads			3.831	
Total	33	314-430	16.159	

*Blocks shown on Draft Plan are 'Residential' unless otherwise specified.
** For minimum unit yield 11,582 m (38 ft) wide lots are assumed and for maximum unit
yield, 10,973 m (36 ft) wide lots are assumed.
*** For the Multiple Residential block the max. number of units assumes 70 units/ha.

Notes
1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SHOWN.
2. SITE BOUNDARY AND LEGAL BASE PLAN PREPARED BY STANTEC GEOMATICS LTD.
3. TOPOGRAPHIC AND EXISTING FEATURES SURVEY COMPLETED BY STANTEC.
4. ADJACENT PARCEL FABRIC IS FROM REGION OF WATERLOO OPEN DATA AND IS APPROXIMATE.

Countryside Line
Baden Urban Area Boundary

1. Nov. 19, 2019 For Pre-application meeting with Region of Waterloo; DGS
Revision No. Date Issued / Revision By

PLANNING
URBAN DESIGN
& LANDSCAPE
ARCHITECTURE
MHBC
200-540 BINGEWAN CENTRE DR. #11 CHENER, ON. N2B 3K9 | P: 519.576.3650 F: 519.576.0121 | WWW.MHBCPLAN.COM

Approval Stamp	Date November 19, 2019
File No.	8784BB
Plan Scale	1:1,500 (24x36)
Drawn By	DGS
Checked By	PC

Project	Baden Lands	Other
Applicant	Activa Group Inc. 55 Columbia Street East, Suite 2 Waterloo, ON. P: 519-886-9400	

File Name DRAFT PLAN OF SUBDIVISION

Scale Bar 0 10 25 50 75 100 125 150m

Appendix B

Water Distribution Report

Region of Waterloo Modelling Simulation Results



TRANSPORTATION AND
ENVIRONMENTAL SERVICES
Water Services

150 Frederick Street
Kitchener ON Canada N2G 4J3
Telephone: (519) 575-4426
Fax: (519) 575-4452
www.region.waterloo.on.ca

Date: December 4, 2020
File #: E18-10/WI

Alex Cressman, E.I.T
Designer
MTE Consultants Inc.
520 Bingemans Centre Dr.
Kitchener, ON N2B 3X9
t. 519.743.6500 ext 1223
e. ACressman@mte85.com

Dear: Alex

Re: 1012 Snyder's Rd W., Baden

Please find the results of the modeling simulations for boundary conditions requested on Feb 5, 2020 and revised on Nov 9, 2020. Water Services resolved the issue that was draining the reservoir and causing questionable results.

The results included a figure showing the locations of the nodes from the Region's model. Attached are a series of spreadsheets containing results for Average Day, Maximum Day demands and available fire flows for nodes listed in Table 1 below as per your revised email of Nov 9, 2020.

There are two scenarios modelled 1B and 2B. They represent the scenarios with the higher demand with the institutional Block having demands located at Node 3 in your email. In addition, in Scenario 2B the demands assign to Node 4 were assigned to Node 5 as Node 4 does not exist in the existing Model.

Table 1 – Model Nodes

Location	Node	Description	Elev (mASL)
1	JCT_00365	Michael Myers Rd @ Bettschen Ln	360.8
2	JCT_00359	McFayden St @ Wagler Ave	357.6
3	JCT_00307	Street One @ Snyder's Rd W	358.7
5	JCT_00385	Michael Myers Rd @ Jacob Cressman Dr	359.2
6	JCT_00386	Kropf Dr @ Isaac Shantz Dr	357.4

The diurnal 24 hour demand distribution accounts for the minimum hour and peak hour peaking factors. The minimum hourly demand on the average day represents the minimum hour, and the maximum hourly demand on the maximum day represents the peak hour. Tables 2 and 3 below summarize the modeling results.

Table 2 – Modeling Results Scenario 1

Node	Elevation (mASL)	Demand		Fire Flow Results	
		Ave Day (L/s)	Max Day (L/s)	Design Flow (L/s)	Design Pressure (m)
JCT_00365	360.8	0.899	1.799	195.4	14.0
JCT_00359	357.6	0.737	1.473	287.4	15.1
JCT_00307	358.7	2.913	5.825	902.5	14.0

Table 3 – Modeling Results Scenario 2

Node	Elevation (mASL)	Demand		Fire Flow Results	
		Ave Day (L/s)	Max Day (L/s)	Design Flow (L/s)	Design Pressure (m)
JCT_00365	360.8	0.899	1.799	190.8	14.0
JCT_00359	357.6	0.737	1.473	281.0	15.3
JCT_00307	358.7	2.913	5.825	894.3	14.0
JCT_00385	359.2	2.116	4.234	210.1	14.0
JCT_00386	357.4	1.058	2.117	174.4	14.0

A fire flow analysis shows the maximum flow available at a node with an associated design pressure during the maximum day scenario while maintaining the minimum design pressure of 14 m (140 kPa) at all nodes within the pressure zone.

Please be advised the Region's Water Services will be about to undertake the Baden – New Hamburg Water and Wastewater Servicing Review (Review). Water Services will be engaging with all stakeholders as part of the Review. In previous studies, it was noted about a possibility for connecting the Foxboro Wastewater system to the Baden New Hamburg collection system. Should the Review determine recommendations to the collection and or distribution system, provisions within the draft plan would have to be made to accommodate those recommendations.

The Region's Project Manager for this Review is:

Kaoru Yajima, Senior Engineer
t: 519-575-4757 x 3349
e: kyajima@regionofwaterloo.ca

If you have any questions, please contact me.

A handwritten signature in black ink, appearing to read 'KD', with a long horizontal line extending to the right.

Kevin Dolishny P.Eng.

Senior Engineer

t. 226.751.4551

e-mail: kdolishny@regionofwaterloo.ca

cc John Holowackyj - Region of Waterloo
 Kaoru Yajima – Region of Waterloo
 Steve Peterson - MTE

ADMD JCT_00365

Baden New

Hamburg

Infowater

Location :Michael Myers Road at Bettschen Lane

JCT_00365 Average Day 24 Hour Simulation

Time	Demand (L/s)	Head (m)	Pressure (m)
00:00 hrs	0.45	398.49	37.69
01:00 hrs	0.35	398.35	37.55
02:00 hrs	0.47	398.23	37.43
03:00 hrs	0.50	398.08	37.28
04:00 hrs	0.49	398.07	37.27
05:00 hrs	0.71	398.20	37.40
06:00 hrs	1.13	398.30	37.50
07:00 hrs	1.39	398.45	37.65
08:00 hrs	1.28	398.58	37.78
09:00 hrs	1.20	398.71	37.91
10:00 hrs	1.14	398.85	38.05
11:00 hrs	1.03	398.99	38.19
12:00 hrs	0.95	399.03	38.23
13:00 hrs	1.11	398.89	38.09
14:00 hrs	0.95	398.75	37.95
15:00 hrs	0.96	398.62	37.82
16:00 hrs	0.96	398.48	37.68
17:00 hrs	1.09	398.34	37.54
18:00 hrs	1.26	398.18	37.38
19:00 hrs	1.41	398.01	37.21
20:00 hrs	1.41	398.06	37.26
21:00 hrs	1.19	398.19	37.39
22:00 hrs	0.94	398.33	37.53
23:00 hrs	0.63	398.50	37.70

Average Day HGL:

398.44

Minimum Hour:

399.03

JCT_00365 Maximum Day 24 Hour Simulation

Time	Demand (L/s)	Head (m)	Pressure (m)
00:00 hrs	0.88	398.67	37.87
01:00 hrs	0.68	398.76	37.96
02:00 hrs	0.92	398.88	38.08
03:00 hrs	0.98	398.96	38.16
04:00 hrs	0.96	399.03	38.23
05:00 hrs	1.40	399.08	38.28
06:00 hrs	2.22	399.05	38.25
07:00 hrs	2.74	398.78	37.98
08:00 hrs	2.51	398.51	37.71
09:00 hrs	2.37	398.24	37.44
10:00 hrs	2.25	397.98	37.18
11:00 hrs	2.03	398.00	37.20
12:00 hrs	1.87	398.06	37.26
13:00 hrs	2.19	398.12	37.32
14:00 hrs	1.87	398.18	37.38
15:00 hrs	1.88	398.25	37.45
16:00 hrs	1.89	398.32	37.52
17:00 hrs	2.15	398.38	37.58
18:00 hrs	2.49	398.41	37.61
19:00 hrs	2.77	398.41	37.61
20:00 hrs	2.78	398.40	37.60
21:00 hrs	2.34	398.42	37.62
22:00 hrs	1.84	398.47	37.67
23:00 hrs	1.24	398.56	37.76

Maximum Day HGL:

398.50

Peak Hour:

397.98

H_Curve_JCT_00365

Location :Michael Myers Road at Bettschen Lane

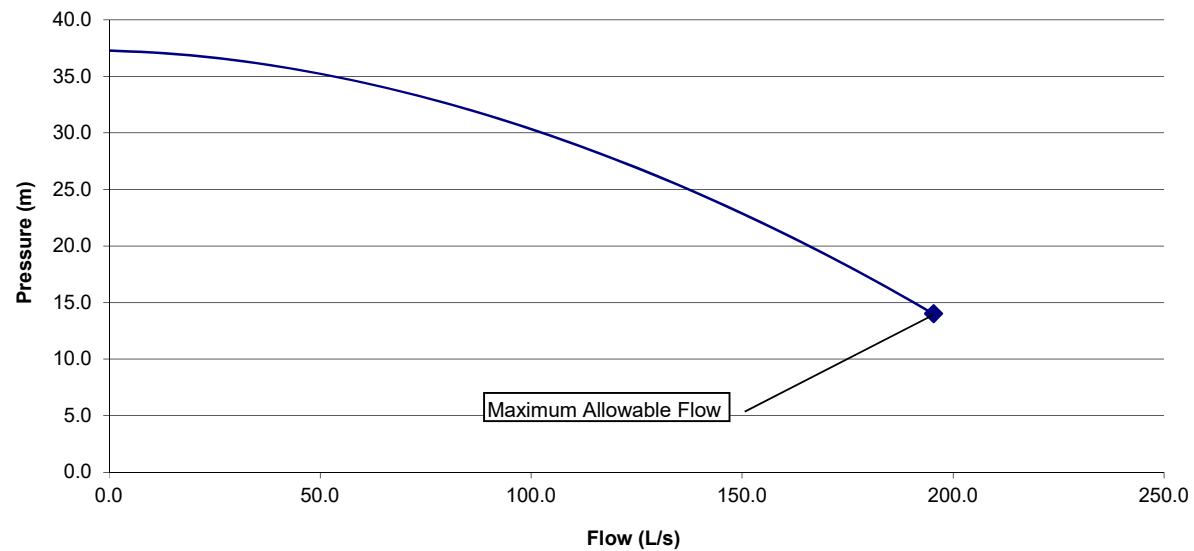
Fire Flow Analysis

Fire Flow Node:	JCT_00365
Design Flow (L/s):	195.4
Design Pressure (m)	14.0

The final adjusted flow at the node to maintain the minimum design pressure (14m (140 kPa)) at ALL locations within the pressure zone.

The lowest allowable pressure at the node to maintain the minimum design pressure (14m (140 kPa)) at ALL locations within the pressure zone.

The constraining node within the pressure zone that drops to the minimum design pressure of (14m (140 kPa)) during the design flow.



ADMD JCT_00359

Baden New

Hamburg

Infowater

Location :McFayden Street at Wagler Avenue

JCT_00359 Average Day 24 Hour Simulation

Time	Demand (L/s)	Head (m)	Pressure (m)
00:00 hrs	0.38	398.49	40.89
01:00 hrs	0.30	398.35	40.75
02:00 hrs	0.40	398.23	40.63
03:00 hrs	0.42	398.09	40.49
04:00 hrs	0.42	398.07	40.47
05:00 hrs	0.61	398.21	40.61
06:00 hrs	0.96	398.30	40.70
07:00 hrs	1.18	398.45	40.85
08:00 hrs	1.08	398.58	40.98
09:00 hrs	1.02	398.71	41.11
10:00 hrs	0.97	398.85	41.25
11:00 hrs	0.88	398.99	41.39
12:00 hrs	0.81	399.04	41.44
13:00 hrs	0.95	398.90	41.30
14:00 hrs	0.81	398.75	41.15
15:00 hrs	0.81	398.62	41.02
16:00 hrs	0.82	398.48	40.88
17:00 hrs	0.93	398.34	40.74
18:00 hrs	1.07	398.19	40.59
19:00 hrs	1.19	398.01	40.41
20:00 hrs	1.20	398.07	40.47
21:00 hrs	1.01	398.19	40.59
22:00 hrs	0.80	398.33	40.73
23:00 hrs	0.54	398.50	40.90

Average Day HGL:

398.45

Minimum Hour:

399.04

JCT_00359 Maximum Day 24 Hour Simulation

Time	Demand (L/s)	Head (m)	Pressure (m)
00:00 hrs	0.74	398.67	41.07
01:00 hrs	0.57	398.76	41.16
02:00 hrs	0.78	398.88	41.28
03:00 hrs	0.82	398.96	41.36
04:00 hrs	0.81	399.03	41.43
05:00 hrs	1.18	399.09	41.49
06:00 hrs	1.87	399.06	41.46
07:00 hrs	2.31	398.79	41.19
08:00 hrs	2.12	398.52	40.92
09:00 hrs	2.00	398.25	40.65
10:00 hrs	1.90	397.99	40.39
11:00 hrs	1.71	398.01	40.41
12:00 hrs	1.58	398.07	40.47
13:00 hrs	1.85	398.13	40.53
14:00 hrs	1.57	398.19	40.59
15:00 hrs	1.59	398.26	40.66
16:00 hrs	1.59	398.33	40.73
17:00 hrs	1.81	398.39	40.79
18:00 hrs	2.10	398.42	40.82
19:00 hrs	2.33	398.43	40.83
20:00 hrs	2.35	398.42	40.82
21:00 hrs	1.98	398.43	40.83
22:00 hrs	1.55	398.48	40.88
23:00 hrs	1.05	398.56	40.96

Maximum Day HGL:

398.50

Peak Hour:

397.99

H_Curve_JCT_00359

Location :McFayden Street at Wagler Avenue

Fire Flow Analysis

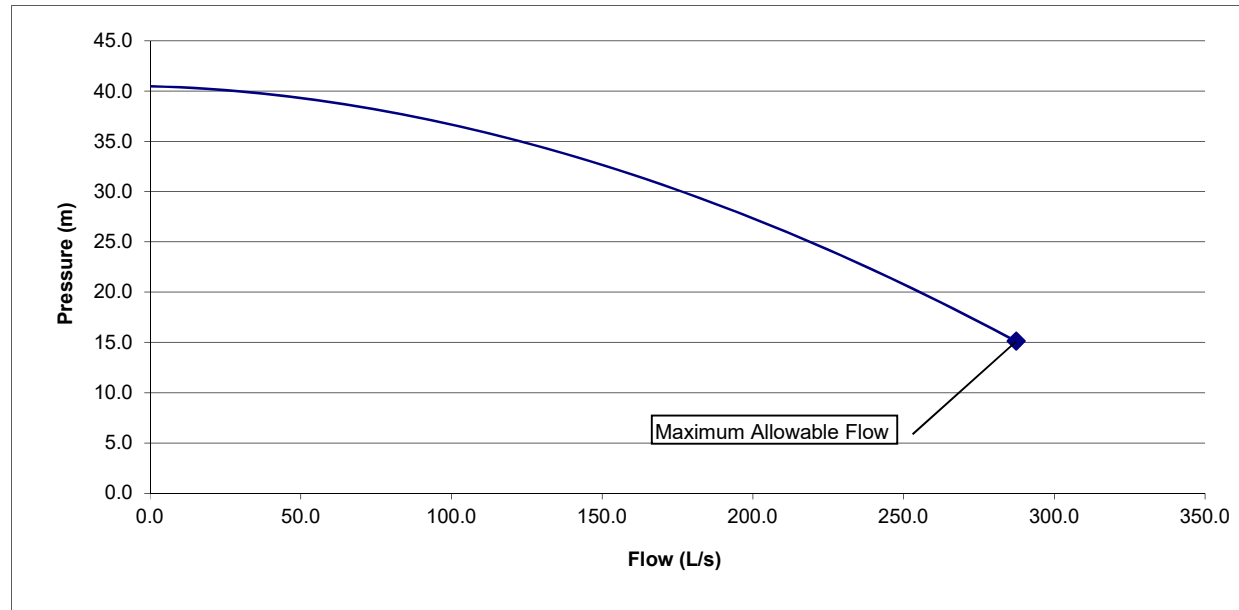
Fire Flow Node: JCT_00359
 Design Flow (L/s): 287.4
 Design Pressure (m): 15.1

The final adjusted flow at the node to maintain the minimum design pressure (14m (140 kPa)) at ALL locations within the pressure zone.

The lowest allowable pressure at the node to maintain the minimum design pressure (14m (140 kPa)) at ALL locations within the pressure zone.

The constraining node within the pressure zone that drops to the minimum design pressure of (14m (140 kPa)) during the design flow.

Available Flow (L/s)	Residual Pressure (m)
0.0	40.5
10.0	40.4
20.0	40.2
30.0	40.0
40.0	39.7
50.0	39.3
60.0	38.9
70.0	38.4
80.0	37.9
90.0	37.3
100.0	36.7
110.0	36.0
120.0	35.2
130.0	34.4
140.0	33.6
150.0	32.7
160.0	31.7
170.0	30.7
180.0	29.6
190.0	28.5
200.0	27.3
210.0	26.1
220.0	24.9
230.0	23.6
240.0	22.2
250.0	20.8
260.0	19.3
270.0	17.8
280.0	16.3
287.4	15.1



ADMD JCT_00307

Baden New

Hamburg

Infowater

Location :Street One @ Snyder's Road West

JCT_00307 Average Day 24 Hour Simulation

Time	Demand (L/s)	Head (m)	Pressure (m)
00:00 hrs	1.37	398.50	39.80
01:00 hrs	1.06	398.36	39.66
02:00 hrs	1.44	398.24	39.54
03:00 hrs	1.53	398.10	39.40
04:00 hrs	1.50	398.05	39.35
05:00 hrs	2.20	398.20	39.50
06:00 hrs	3.50	398.30	39.60
07:00 hrs	4.31	398.46	39.76
08:00 hrs	3.96	398.59	39.89
09:00 hrs	3.73	398.72	40.02
10:00 hrs	3.54	398.85	40.15
11:00 hrs	3.20	399.00	40.30
12:00 hrs	2.94	399.05	40.35
13:00 hrs	3.45	398.92	40.22
14:00 hrs	2.93	398.77	40.07
15:00 hrs	2.96	398.63	39.93
16:00 hrs	2.97	398.50	39.80
17:00 hrs	3.38	398.36	39.66
18:00 hrs	3.92	398.21	39.51
19:00 hrs	4.36	398.04	39.34
20:00 hrs	4.38	398.08	39.38
21:00 hrs	3.69	398.19	39.49
22:00 hrs	2.90	398.33	39.63
23:00 hrs	1.95	398.49	39.79

Average Day HGL:

398.46

Minimum Hour:

399.05

JCT_00307 Maximum Day 24 Hour Simulation

Time	Demand (L/s)	Head (m)	Pressure (m)
00:00 hrs	2.73	398.66	39.96
01:00 hrs	2.11	398.75	40.05
02:00 hrs	2.86	398.87	40.17
03:00 hrs	3.04	398.95	40.25
04:00 hrs	2.98	399.02	40.32
05:00 hrs	4.38	399.09	40.39
06:00 hrs	6.95	399.08	40.38
07:00 hrs	8.56	398.87	40.17
08:00 hrs	7.87	398.59	39.89
09:00 hrs	7.41	398.31	39.61
10:00 hrs	7.04	398.05	39.35
11:00 hrs	6.35	398.03	39.33
12:00 hrs	5.85	398.09	39.39
13:00 hrs	6.86	398.16	39.46
14:00 hrs	5.83	398.20	39.50
15:00 hrs	5.88	398.28	39.58
16:00 hrs	5.91	398.35	39.65
17:00 hrs	6.73	398.42	39.72
18:00 hrs	7.80	398.46	39.76
19:00 hrs	8.67	398.47	39.77
20:00 hrs	8.71	398.46	39.76
21:00 hrs	7.33	398.46	39.76
22:00 hrs	5.76	398.49	39.79
23:00 hrs	3.88	398.57	39.87

Maximum Day HGL:

398.53

Peak Hour:

398.03

H_Curve_JCT_00307

Location :Street One @ Snyder's Road West

Fire Flow Analysis

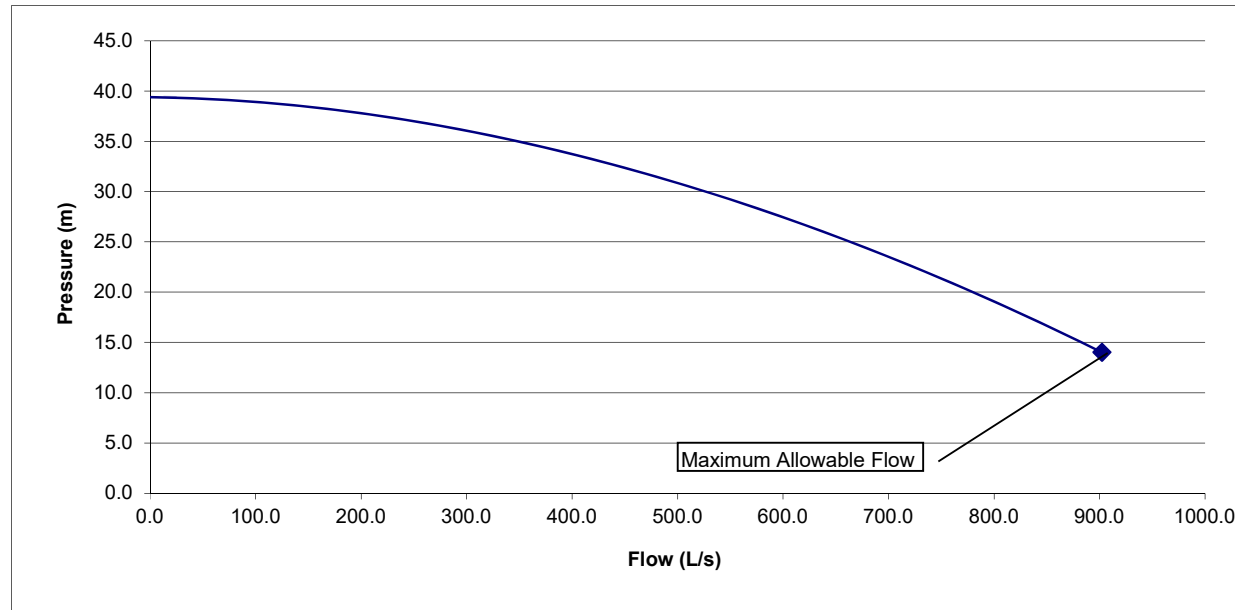
Fire Flow Node:	JCT_00307
Design Flow (L/s):	902.5
Design Pressure (m)	14.0

The final adjusted flow at the node to maintain the minimum design pressure (14m (140 kPa)) at ALL locations within the pressure zone.

The lowest allowable pressure at the node to maintain the minimum design pressure (14m (140 kPa)) at ALL locations within the pressure zone.

The constraining node within the pressure zone that drops to the minimum design pressure of (14m (140 kPa)) during the design flow.

Available Flow (L/s)	Residual Pressure (m)
0.0	39.4
25.0	39.4
50.0	39.3
75.0	39.1
100.0	38.9
125.0	38.7
150.0	38.5
175.0	38.1
200.0	37.8
225.0	37.4
250.0	37.0
275.0	36.6
300.0	36.1
325.0	35.5
350.0	35.0
375.0	34.4
400.0	33.7
425.0	33.1
450.0	32.4
475.0	31.6
500.0	30.9
525.0	30.1
550.0	29.2
575.0	28.4
600.0	27.5
625.0	26.5
650.0	25.6
675.0	24.6
700.0	23.5
725.0	22.5
750.0	21.4
775.0	20.2
800.0	19.1
825.0	17.9
850.0	16.7
875.0	15.4
900.0	14.1
902.5	14.0



ADMD JCT_00365

Baden New

Hamburg

Infowater

Location :Michael Myers Road at Bettschen Lane

JCT_00365 Average Day 24 Hour Simulation

Time	Demand (L/s)	Head (m)	Pressure (m)
00:00 hrs	0.45	398.48	37.68
01:00 hrs	0.35	398.33	37.53
02:00 hrs	0.47	398.20	37.40
03:00 hrs	0.50	398.04	37.24
04:00 hrs	0.49	398.09	37.29
05:00 hrs	0.71	398.21	37.41
06:00 hrs	1.13	398.27	37.47
07:00 hrs	1.39	398.38	37.58
08:00 hrs	1.28	398.49	37.69
09:00 hrs	1.20	398.59	37.79
10:00 hrs	1.14	398.70	37.90
11:00 hrs	1.03	398.82	38.02
12:00 hrs	0.95	398.96	38.16
13:00 hrs	1.11	399.02	38.22
14:00 hrs	0.95	398.86	38.06
15:00 hrs	0.96	398.70	37.90
16:00 hrs	0.96	398.54	37.74
17:00 hrs	1.09	398.37	37.57
18:00 hrs	1.26	398.18	37.38
19:00 hrs	1.41	397.96	37.16
20:00 hrs	1.41	398.00	37.20
21:00 hrs	1.19	398.10	37.30
22:00 hrs	0.94	398.23	37.43
23:00 hrs	0.63	398.38	37.58

Average Day HGL:

398.41

Minimum Hour:

399.02

JCT_00365 Maximum Day 24 Hour Simulation

Time	Demand (L/s)	Head (m)	Pressure (m)
00:00 hrs	0.88	398.67	37.87
01:00 hrs	0.68	398.76	37.96
02:00 hrs	0.92	398.88	38.08
03:00 hrs	0.98	398.96	38.16
04:00 hrs	0.96	399.03	38.23
05:00 hrs	1.40	399.08	38.28
06:00 hrs	2.22	399.05	38.25
07:00 hrs	2.74	398.78	37.98
08:00 hrs	2.51	398.51	37.71
09:00 hrs	2.37	398.24	37.44
10:00 hrs	2.25	397.98	37.18
11:00 hrs	2.03	398.00	37.20
12:00 hrs	1.87	398.06	37.26
13:00 hrs	2.19	398.12	37.32
14:00 hrs	1.87	398.18	37.38
15:00 hrs	1.88	398.25	37.45
16:00 hrs	1.89	398.32	37.52
17:00 hrs	2.15	398.38	37.58
18:00 hrs	2.49	398.41	37.61
19:00 hrs	2.77	398.41	37.61
20:00 hrs	2.78	398.40	37.60
21:00 hrs	2.34	398.42	37.62
22:00 hrs	1.84	398.47	37.67
23:00 hrs	1.24	398.56	37.76

Maximum Day HGL:

398.50

Peak Hour:

397.98

H_Curve_JCT_00365

Location :Michael Myers Road at Bettschen Lane

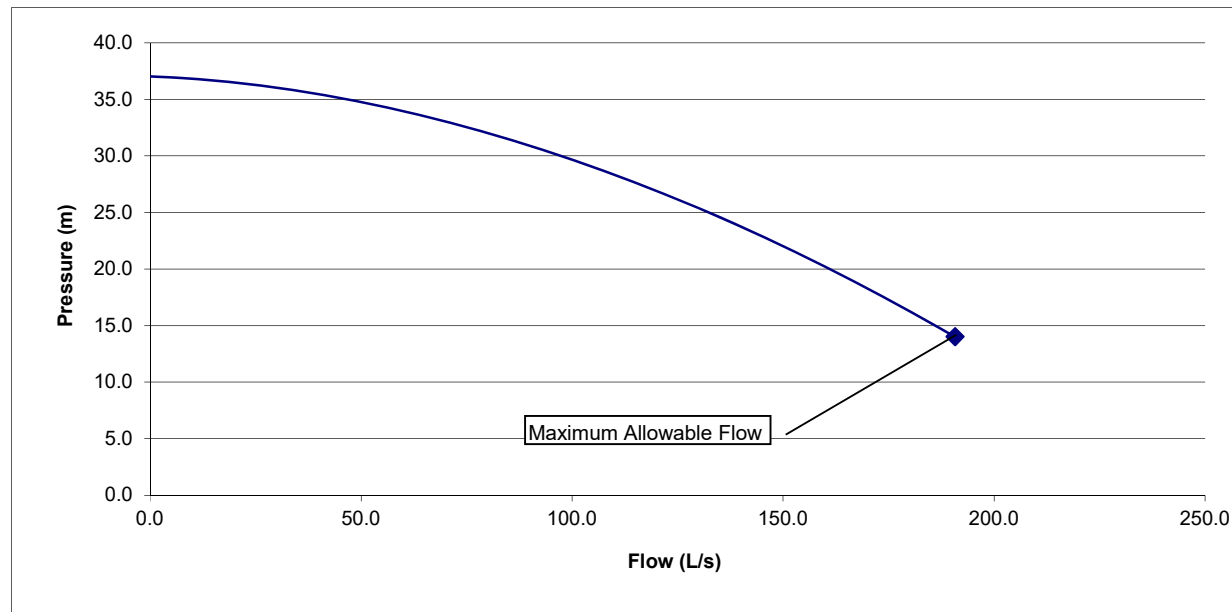
Fire Flow Analysis

Fire Flow Node:	JCT_00365
Design Flow (L/s):	190.8
Design Pressure (m)	14.0

The final adjusted flow at the node to maintain the minimum design pressure (14m (140 kPa)) at ALL locations within the pressure zone.

The lowest allowable pressure at the node to maintain the minimum design pressure (14m (140 kPa)) at ALL locations within the pressure zone.

The constraining node within the pressure zone that drops to the minimum design pressure of (14m (140 kPa)) during the design flow.



ADMD JCT_00359

Baden New

Hamburg

Infowater

Location :McFayden Street at Wagler Avenue

JCT_00359 Average Day 24 Hour Simulation

Time	Demand (L/s)	Head (m)	Pressure (m)
00:00 hrs	0.38	398.48	40.88
01:00 hrs	0.30	398.34	40.74
02:00 hrs	0.40	398.20	40.60
03:00 hrs	0.42	398.05	40.45
04:00 hrs	0.42	398.09	40.49
05:00 hrs	0.61	398.21	40.61
06:00 hrs	0.96	398.28	40.68
07:00 hrs	1.18	398.40	40.80
08:00 hrs	1.08	398.50	40.90
09:00 hrs	1.02	398.60	41.00
10:00 hrs	0.97	398.71	41.11
11:00 hrs	0.88	398.83	41.23
12:00 hrs	0.81	398.96	41.36
13:00 hrs	0.95	399.03	41.43
14:00 hrs	0.81	398.87	41.27
15:00 hrs	0.81	398.71	41.11
16:00 hrs	0.82	398.55	40.95
17:00 hrs	0.93	398.38	40.78
18:00 hrs	1.07	398.19	40.59
19:00 hrs	1.19	397.98	40.38
20:00 hrs	1.20	398.02	40.42
21:00 hrs	1.01	398.11	40.51
22:00 hrs	0.80	398.23	40.63
23:00 hrs	0.54	398.38	40.78

Average Day HGL:

398.42

Minimum Hour:

399.03

JCT_00359 Maximum Day 24 Hour Simulation

Time	Demand (L/s)	Head (m)	Pressure (m)
00:00 hrs	0.74	398.67	41.07
01:00 hrs	0.57	398.76	41.16
02:00 hrs	0.78	398.88	41.28
03:00 hrs	0.82	398.96	41.36
04:00 hrs	0.81	399.03	41.43
05:00 hrs	1.18	399.09	41.49
06:00 hrs	1.87	399.06	41.46
07:00 hrs	2.31	398.79	41.19
08:00 hrs	2.12	398.52	40.92
09:00 hrs	2.00	398.25	40.65
10:00 hrs	1.90	397.99	40.39
11:00 hrs	1.71	398.01	40.41
12:00 hrs	1.58	398.07	40.47
13:00 hrs	1.85	398.13	40.53
14:00 hrs	1.57	398.19	40.59
15:00 hrs	1.59	398.26	40.66
16:00 hrs	1.59	398.33	40.73
17:00 hrs	1.81	398.39	40.79
18:00 hrs	2.10	398.42	40.82
19:00 hrs	2.33	398.43	40.83
20:00 hrs	2.35	398.42	40.82
21:00 hrs	1.98	398.43	40.83
22:00 hrs	1.55	398.48	40.88
23:00 hrs	1.05	398.56	40.96

Maximum Day HGL:

398.50

Peak Hour:

397.99

H_Curve_JCT_00359

Location :McFayden Street at Wagler Avenue

Fire Flow Analysis

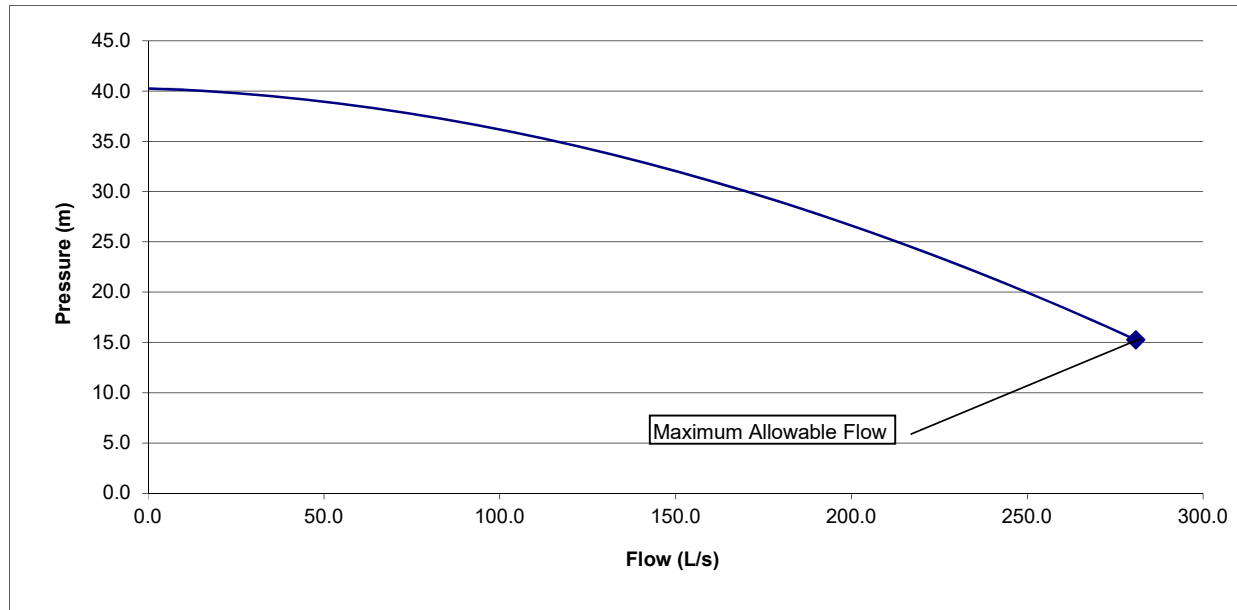
Fire Flow Node: JCT_00359
 Design Flow (L/s): 281.0
 Design Pressure (m): 15.3

The final adjusted flow at the node to maintain the minimum design pressure (14m (140 kPa)) at ALL locations within the pressure zone.

The lowest allowable pressure at the node to maintain the minimum design pressure (14m (140 kPa)) at ALL locations within the pressure zone.

The constraining node within the pressure zone that drops to the minimum design pressure of (14m (140 kPa)) during the design flow.

Available Flow (L/s)	Residual Pressure (m)
0.0	40.3
10.0	40.1
20.0	39.9
30.0	39.7
40.0	39.3
50.0	39.0
60.0	38.5
70.0	38.0
80.0	37.5
90.0	36.8
100.0	36.2
110.0	35.5
120.0	34.7
130.0	33.9
140.0	33.0
150.0	32.1
160.0	31.1
170.0	30.0
180.0	29.0
190.0	27.8
200.0	26.6
210.0	25.4
220.0	24.1
230.0	22.8
240.0	21.4
250.0	20.0
260.0	18.5
270.0	17.0
280.0	15.4
281.0	15.3



ADMD JCT_00307

Baden New

Hamburg

Infowater

Location :Street One @ Snyder's Road West

JCT_00307 Average Day 24 Hour Simulation

Time	Demand (L/s)	Head (m)	Pressure (m)
00:00 hrs	1.37	398.49	39.79
01:00 hrs	1.06	398.34	39.64
02:00 hrs	1.44	398.22	39.52
03:00 hrs	1.53	398.06	39.36
04:00 hrs	1.50	398.08	39.38
05:00 hrs	2.20	398.22	39.52
06:00 hrs	3.50	398.30	39.60
07:00 hrs	4.31	398.43	39.73
08:00 hrs	3.96	398.53	39.83
09:00 hrs	3.73	398.62	39.92
10:00 hrs	3.54	398.73	40.03
11:00 hrs	3.20	398.85	40.15
12:00 hrs	2.94	398.98	40.28
13:00 hrs	3.45	399.07	40.37
14:00 hrs	2.93	398.90	40.20
15:00 hrs	2.96	398.74	40.04
16:00 hrs	2.97	398.58	39.88
17:00 hrs	3.38	398.42	39.72
18:00 hrs	3.92	398.24	39.54
19:00 hrs	4.36	398.04	39.34
20:00 hrs	4.38	398.05	39.35
21:00 hrs	3.69	398.13	39.43
22:00 hrs	2.90	398.25	39.55
23:00 hrs	1.95	398.38	39.68

Average Day HGL:

398.44

Minimum Hour:

399.07

JCT_00307 Maximum Day 24 Hour Simulation

Time	Demand (L/s)	Head (m)	Pressure (m)
00:00 hrs	2.73	398.66	39.96
01:00 hrs	2.11	398.75	40.05
02:00 hrs	2.86	398.87	40.17
03:00 hrs	3.04	398.95	40.25
04:00 hrs	2.98	399.02	40.32
05:00 hrs	4.38	399.09	40.39
06:00 hrs	6.95	399.08	40.38
07:00 hrs	8.56	398.87	40.17
08:00 hrs	7.87	398.59	39.89
09:00 hrs	7.41	398.31	39.61
10:00 hrs	7.04	398.05	39.35
11:00 hrs	6.35	398.03	39.33
12:00 hrs	5.85	398.09	39.39
13:00 hrs	6.86	398.16	39.46
14:00 hrs	5.83	398.20	39.50
15:00 hrs	5.88	398.28	39.58
16:00 hrs	5.91	398.35	39.65
17:00 hrs	6.73	398.42	39.72
18:00 hrs	7.80	398.46	39.76
19:00 hrs	8.67	398.47	39.77
20:00 hrs	8.71	398.46	39.76
21:00 hrs	7.33	398.46	39.76
22:00 hrs	5.76	398.49	39.79
23:00 hrs	3.88	398.57	39.87

Maximum Day HGL:

398.53

Peak Hour:

398.03

H_Curve_JCT_00307

Location :Street One @ Snyder's Road West

Fire Flow Analysis

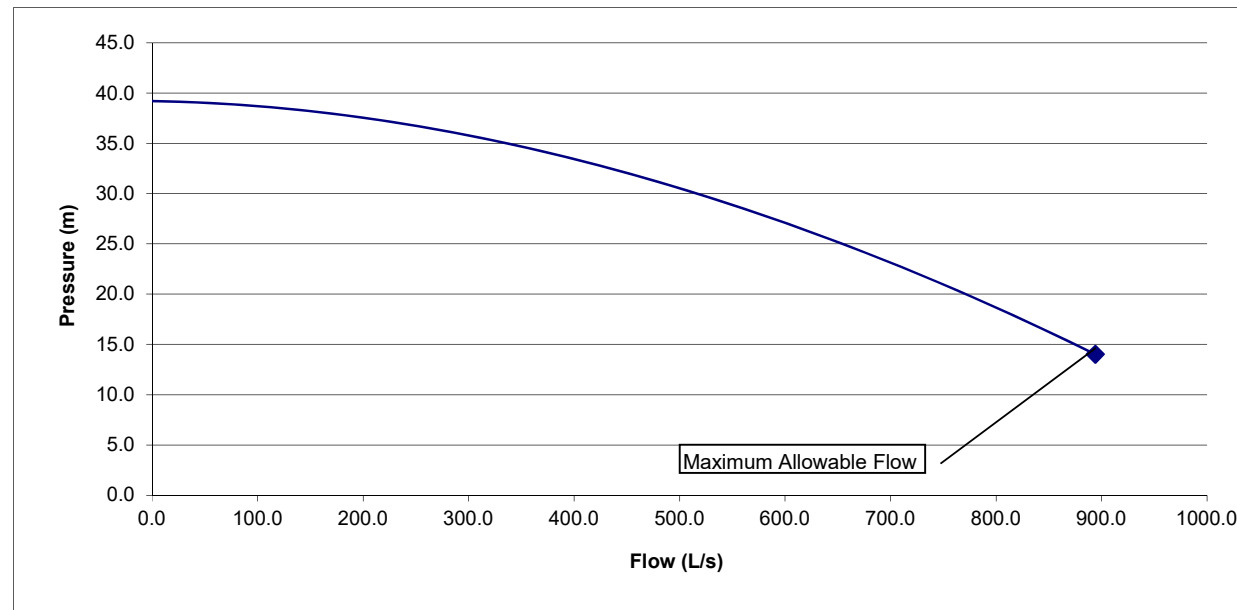
Fire Flow Node: JCT_00307
Design Flow (L/s): 894.3
Design Pressure (m): 14.0

The final adjusted flow at the node to maintain the minimum design pressure (14m (140 kPa)) at ALL locations within the pressure zone.

The lowest allowable pressure at the node to maintain the minimum design pressure (14m (140 kPa)) at ALL locations within the pressure zone.

The constraining node within the pressure zone that drops to the minimum design pressure of (14m (140 kPa)) during the design flow.

Available Flow (L/s)	Residual Pressure (m)
0.0	39.2
25.0	39.2
50.0	39.1
75.0	38.9
100.0	38.7
125.0	38.5
150.0	38.2
175.0	37.9
200.0	37.6
225.0	37.2
250.0	36.7
275.0	36.3
300.0	35.8
325.0	35.3
350.0	34.7
375.0	34.1
400.0	33.4
425.0	32.8
450.0	32.1
475.0	31.3
500.0	30.5
525.0	29.7
550.0	28.9
575.0	28.0
600.0	27.1
625.0	26.2
650.0	25.2
675.0	24.2
700.0	23.1
725.0	22.1
750.0	21.0
775.0	19.8
800.0	18.7
825.0	17.5
850.0	16.3
875.0	15.0
894.3	14.0



ADMD JCT_00385

Baden New

Hamburg

Infowater

Location :Michael Myers Rd @ Jacob Cressman Dr

JCT_00385 Average Day 24 Hour Simulation

Time	Demand (L/s)	Head (m)	Pressure (m)
00:00 hrs	0.98	398.48	39.28
01:00 hrs	0.76	398.33	39.13
02:00 hrs	1.03	398.20	39.00
03:00 hrs	1.10	398.04	38.84
04:00 hrs	1.08	398.09	38.89
05:00 hrs	1.58	398.21	39.01
06:00 hrs	2.51	398.27	39.07
07:00 hrs	3.09	398.38	39.18
08:00 hrs	2.84	398.48	39.28
09:00 hrs	2.68	398.59	39.39
10:00 hrs	2.54	398.70	39.50
11:00 hrs	2.29	398.82	39.62
12:00 hrs	2.11	398.95	39.75
13:00 hrs	2.48	399.02	39.82
14:00 hrs	2.10	398.86	39.66
15:00 hrs	2.12	398.70	39.50
16:00 hrs	2.13	398.54	39.34
17:00 hrs	2.43	398.37	39.17
18:00 hrs	2.81	398.18	38.98
19:00 hrs	3.13	397.96	38.76
20:00 hrs	3.14	398.00	38.80
21:00 hrs	2.65	398.10	38.90
22:00 hrs	2.08	398.23	39.03
23:00 hrs	1.40	398.38	39.18

Average Day HGL:

398.41

Minimum Hour:

399.02

JCT_00385 Maximum Day 24 Hour Simulation

Time	Demand (L/s)	Head (m)	Pressure (m)
00:00 hrs	1.96	398.79	39.59
01:00 hrs	1.52	398.87	39.67
02:00 hrs	2.06	398.96	39.76
03:00 hrs	2.19	399.02	39.82
04:00 hrs	2.15	399.06	39.86
05:00 hrs	3.15	398.80	39.60
06:00 hrs	5.00	398.39	39.19
07:00 hrs	6.17	398.02	38.82
08:00 hrs	5.66	397.81	38.61
09:00 hrs	5.34	397.79	38.59
10:00 hrs	5.07	397.77	38.57
11:00 hrs	4.57	397.79	38.59
12:00 hrs	4.21	397.81	38.61
13:00 hrs	4.94	397.80	38.60
14:00 hrs	4.20	397.83	38.63
15:00 hrs	4.23	397.86	38.66
16:00 hrs	4.25	397.88	38.68
17:00 hrs	4.84	397.87	38.67
18:00 hrs	5.61	397.82	38.62
19:00 hrs	6.24	397.72	38.52
20:00 hrs	6.27	397.64	38.44
21:00 hrs	5.28	397.64	38.44
22:00 hrs	4.15	397.68	38.48
23:00 hrs	2.79	397.76	38.56

Maximum Day HGL:

398.10

Peak Hour:

397.64

H_Curve_JCT_00385

Location :Michael Myers Rd @ Jacob Cressman Dr

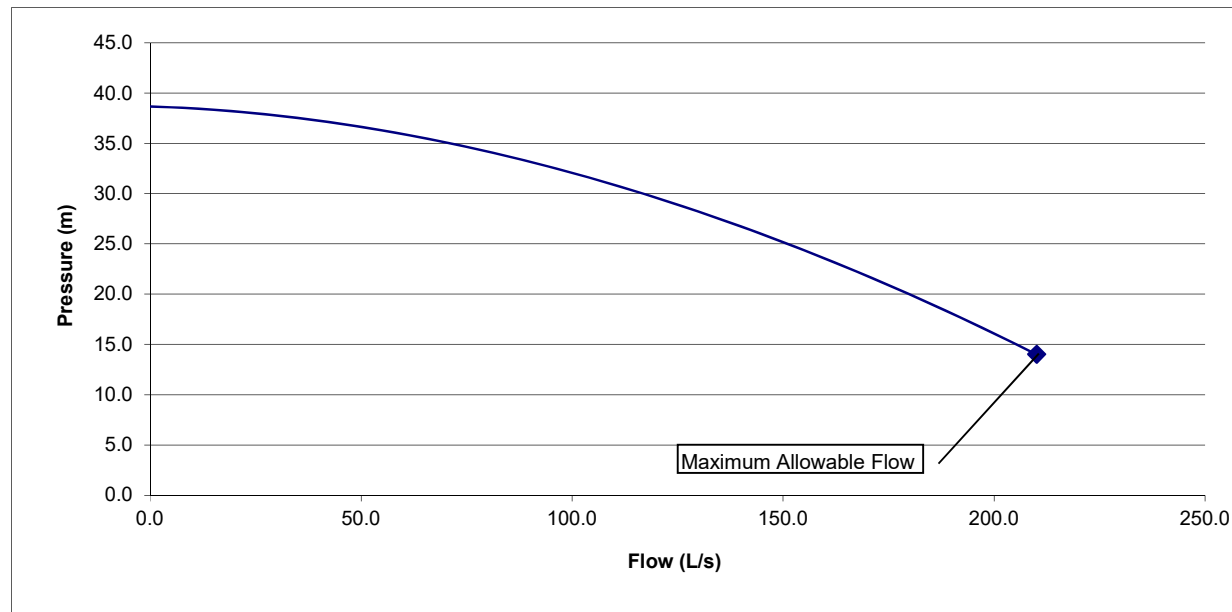
Fire Flow Analysis

Fire Flow Node:	JCT_00385
Design Flow (L/s):	210.1
Design Pressure (m)	14.0

The final adjusted flow at the node to maintain the minimum design pressure (14m (140 kPa)) at ALL locations within the pressure zone.

The lowest allowable pressure at the node to maintain the minimum design pressure (14m (140 kPa)) at ALL locations within the pressure zone.

The constraining node within the pressure zone that drops to the minimum design pressure of (14m (140 kPa)) during the design flow.



ADMD JCT_00386

Baden New

Hamburg

Infowater

Location :Kropf Dr @ Isaac Shantz Dr

JCT_00386 Average Day 24 Hour Simulation

Time	Demand (L/s)	Head (m)	Pressure (m)
00:00 hrs	0.52	398.48	41.08
01:00 hrs	0.40	398.33	40.93
02:00 hrs	0.55	398.20	40.80
03:00 hrs	0.58	398.04	40.64
04:00 hrs	0.57	398.09	40.69
05:00 hrs	0.83	398.21	40.81
06:00 hrs	1.32	398.27	40.87
07:00 hrs	1.62	398.38	40.98
08:00 hrs	1.49	398.48	41.08
09:00 hrs	1.41	398.59	41.19
10:00 hrs	1.33	398.70	41.30
11:00 hrs	1.20	398.82	41.42
12:00 hrs	1.11	398.95	41.55
13:00 hrs	1.30	399.02	41.62
14:00 hrs	1.11	398.86	41.46
15:00 hrs	1.12	398.70	41.30
16:00 hrs	1.12	398.54	41.14
17:00 hrs	1.28	398.37	40.97
18:00 hrs	1.48	398.18	40.78
19:00 hrs	1.64	397.96	40.56
20:00 hrs	1.65	398.00	40.60
21:00 hrs	1.39	398.10	40.70
22:00 hrs	1.09	398.23	40.83
23:00 hrs	0.74	398.38	40.98

Average Day HGL:

398.41

Minimum Hour:

399.02

JCT_00386 Maximum Day 24 Hour Simulation

Time	Demand (L/s)	Head (m)	Pressure (m)
00:00 hrs	1.02	398.79	41.39
01:00 hrs	0.79	398.87	41.47
02:00 hrs	1.07	398.96	41.56
03:00 hrs	1.14	399.02	41.62
04:00 hrs	1.12	399.06	41.66
05:00 hrs	1.64	398.80	41.40
06:00 hrs	2.60	398.39	40.99
07:00 hrs	3.20	398.03	40.63
08:00 hrs	2.94	397.81	40.41
09:00 hrs	2.77	397.79	40.39
10:00 hrs	2.63	397.78	40.38
11:00 hrs	2.38	397.79	40.39
12:00 hrs	2.19	397.82	40.42
13:00 hrs	2.57	397.80	40.40
14:00 hrs	2.18	397.83	40.43
15:00 hrs	2.20	397.86	40.46
16:00 hrs	2.21	397.88	40.48
17:00 hrs	2.52	397.87	40.47
18:00 hrs	2.92	397.82	40.42
19:00 hrs	3.24	397.73	40.33
20:00 hrs	3.26	397.65	40.25
21:00 hrs	2.74	397.64	40.24
22:00 hrs	2.16	397.68	40.28
23:00 hrs	1.45	397.76	40.36

Maximum Day HGL:

398.10

Peak Hour:

397.64

H_Curve_JCT_00386

Location :Kropf Dr @ Isaac Shantz Dr

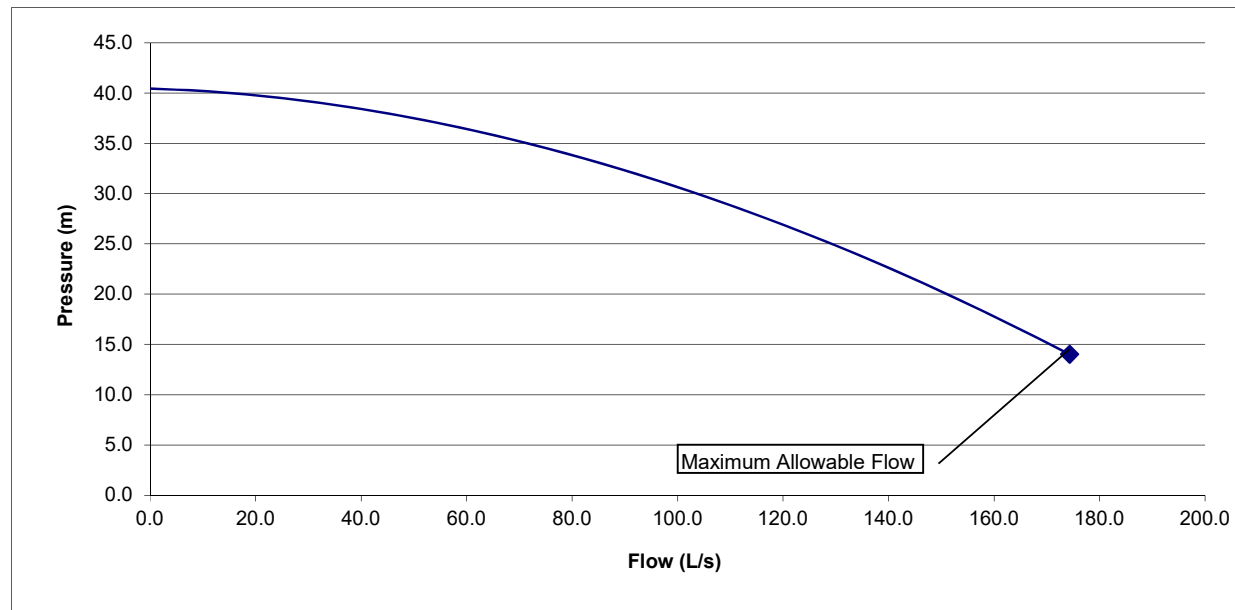
Fire Flow Analysis

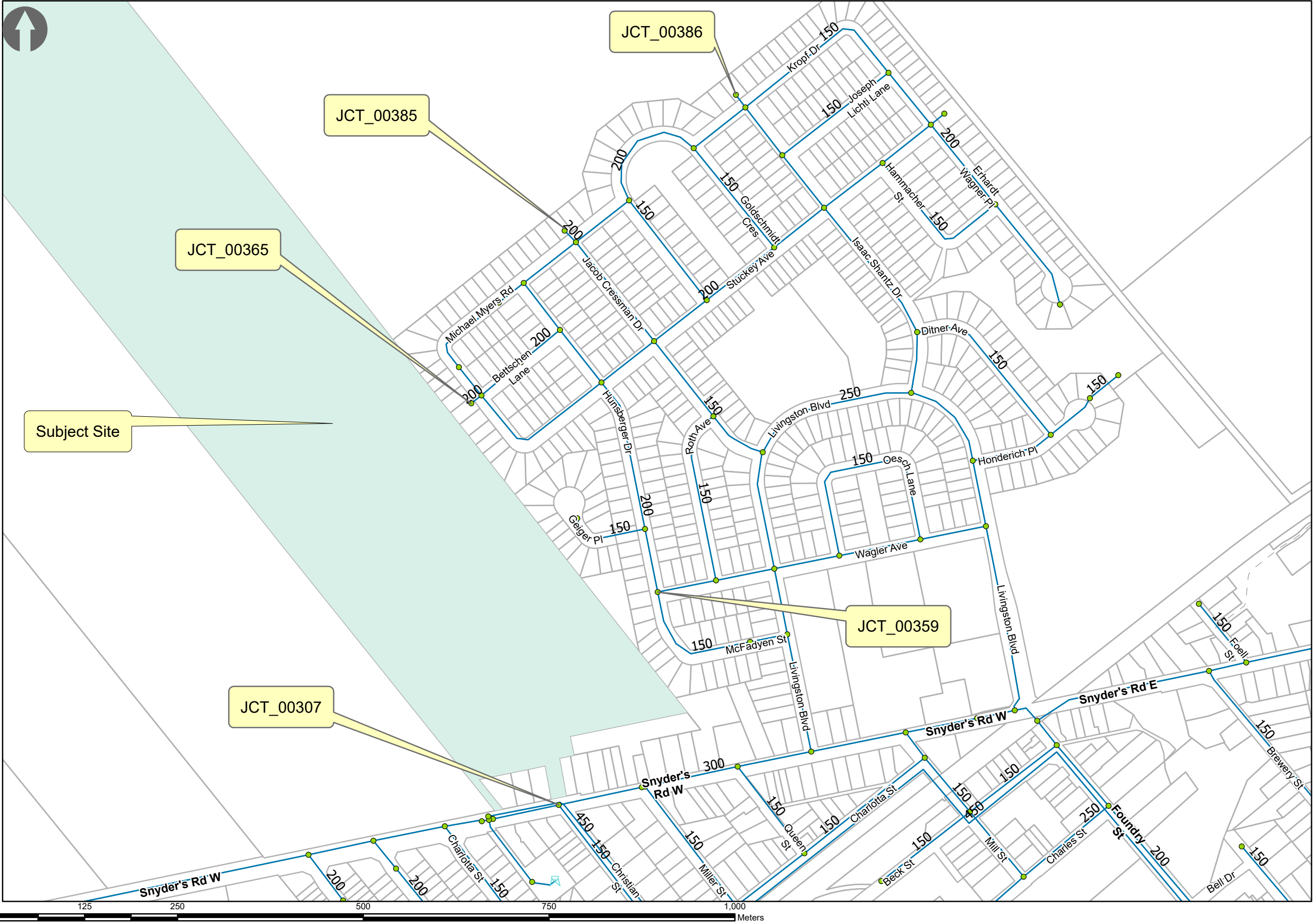
Fire Flow Node:	JCT_00386
Design Flow (L/s):	174.4
Design Pressure (m)	14.0

The final adjusted flow at the node to maintain the minimum design pressure (14m (140 kPa)) at ALL locations within the pressure zone.

The lowest allowable pressure at the node to maintain the minimum design pressure (14m (140 kPa)) at ALL locations within the pressure zone.

The constraining node within the pressure zone that drops to the minimum design pressure of (14m (140 kPa)) during the design flow.





Region of Waterloo

TRANSPORTATION AND ENVIRONMENTAL SERVICES
Water Services
150 Frederick Street
Kitchener ON Canada N2G 4J3
Telephone: (519) 575-4426
Fax: (519) 575-4452
www.regionofwaterloo.ca

Legend

Junction
TYPE
● Active
● Domain

Tank
TYPE
□ Active
□ Domain

Reservoir
TYPE
□ Active
□ Domain

Pump
TYPE
□ Active
□ Domain

Valve
TYPE
● Active
● Domain

Pipe
TYPE
— Active
— Domain

Roads
— Highway
— Arterial/Collector
— Local
— Private

Layer2
□ Assessment Parcels (MPAC)
□ Subject Site

1012 Snyders Rd W,
Baden

Appendix C

Water Distribution Report

Usage Rates, Water Demands, and Design Values



1012 Snyder's Road West

Township of Wilmot
Project No: 40777-104
Date: April 9, 2021
By: AJC



Demand Calculations (Scenario B shown - Stage 2 Institutional Block)

Node No.	Residential				Institutional		Final Demand ⁴					Road Elevation (m)
	Medium Density - Single Family ¹				Area (ha)	Demand ² (l/s)	Avg Day	Max Day	Min Hour	Peak Hour	Max Day + Fire	
	# SF Units (3.25 per unit)	# MR Units (2.44 per unit)	# Persons	Demand ² (l/s)			Demand Q _{avg} (l/s)	Demand Q _{max.day} (l/s)	Demand Q _{min.hr} (l/s)	Demand Q _{peak} (l/s)	Flow Demand ⁴ Q _{max.d+fire} (l/s)	
101	12		39	0.103		0.000	0.103	0.206	0.051	0.308	100.21	361.22
102	15		49	0.128		0.000	0.128	0.257	0.064	0.385	100.26	360.72
103	24		78	0.206		0.000	0.206	0.411	0.103	0.617	100.41	361.19
104	19		62	0.163		0.000	0.163	0.325	0.081	0.488	100.33	360.01
105	22		72	0.188		0.000	0.188	0.377	0.094	0.565	100.38	360.20
106	16		52	0.137		0.000	0.137	0.274	0.069	0.411	100.27	359.21
107	21		68	0.180		0.000	0.180	0.360	0.090	0.540	100.36	360.20
108	22		72	0.188		0.000	0.188	0.377	0.094	0.565	100.38	359.15
109	37		120	0.317		0.000	0.317	0.634	0.158	0.951	100.63	359.80
110	22		72	0.188		0.000	0.188	0.377	0.094	0.565	100.38	358.86
111	12		39	0.103		0.000	0.103	0.206	0.051	0.308	100.21	360.37
112	27		88	0.231		0.000	0.231	0.463	0.116	0.694	100.46	359.95
113	39		127	0.334		0.000	0.334	0.668	0.167	1.002	100.67	358.90
114	18		59	0.154		0.000	0.154	0.308	0.077	0.463	100.31	357.75
115	19		62	0.163		0.000	0.163	0.325	0.081	0.488	100.33	358.40
201*			0	0.000	2.039	2.039	2.039	4.078	1.020	6.117	221.08	359.40
Future**	192	238	1205	3.175		0.000	3.175	6.350	1.587	9.525	139.68	
Totals	517	238	2261	5.959	0.000	2.039	7.998	15.995	3.999	23.993	-	-
Total Units =				755	Total Flow ICI Avg. Day =		7.998					
Total Population =				2,261	Total Flow ICI Max. Day =		15.995					

*Scenario A flows modelled as 74 multi-residential units for total unit count of 2,442

**Unit Counts for future Aactiva Lands (called "Baden Lands") taken from Draft Plan provided by MHBC (dated November 19, 2019)

1. Unit Count

Unit Type	Persons per Unit
Single Family (SF)	3.25
Multiple Residential (MR)	2.44

Reference: Persons per unit from *Water and Wastewater Monitoring Report (Region of Waterloo, 2020)*, Section 2.4
Unit count based on MHBC Documents: Draft Plan (August 4, 2020)

2. Water Demand

Development Type	Design Flow
Residential	227.7 l/d/person 0.0026 l/s/person
School	1.00 l/s/ha

Reference: *Residential Demands - Tri-City Distribution System Study (AECOM, May 2009)*

Reference: *Commercial and Industrial Demands - Design Guidelines for Drinking Water Systems (MOE, 2008)*. Section 3.4.3 - Commercial and Institutional Water Demands

3. Peaking Factors

Demand Scenario	Factor
Average Day	1.00
Maximum Day	2.00
Minimum Hour	0.50
Peak Hour	3.00

Reference: *Design Guidelines for Drinking Water Systems (MOE, 2008)*. Table 3.1

4. Fire Flow

Development Type	Fire Flow
Townhomes (continuous)	8,000 l/min 133 l/s
Single Family <3m separation	6,000 l/min 100 l/s
Institutional - School*	13,000 l/min 217 l/s

Reference: *Water Supply for Public Fire Protection, A Guide to Recommended Practice (1999)*, Fire Underwriter's Survey (FUS)

1012 SNYDER'S ROAD WEST
Community of BADEN
Pump Curve Design Sheet

Project No.: 40777-104
 Date: 7-Dec-20
 Design By: AJC
 File: Q:\40777\104\PRELIMINARY\Water Distribution\40777-104_Region Pressures & Pump Curves.xlsx



Node JCT_00365 Michael Myer's Road @ Bettchen Lane (Scenario 1)
Elevation = 360.80 m

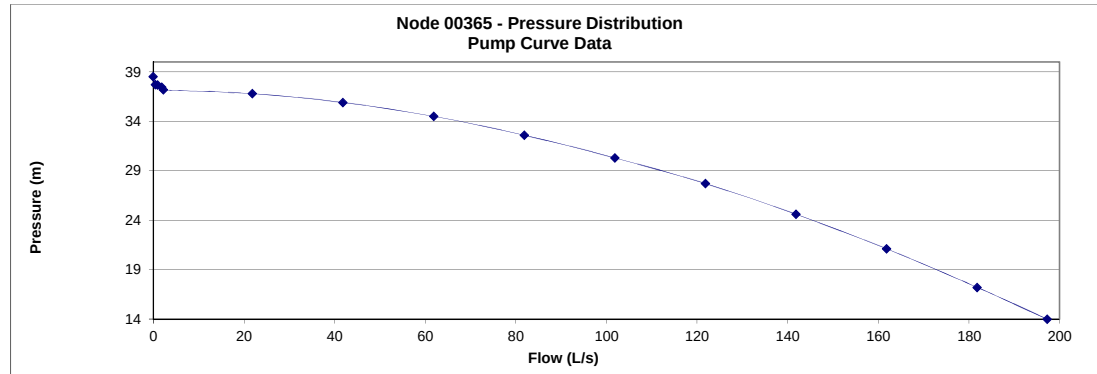
Average Day				
Time	Flow (L/s)	Head (m)	Residual Pressure (m)	
00:00 hrs	0.45	398.49	37.69	Min Hr
01:00 hrs	0.35	398.35	37.55	
02:00 hrs	0.47	398.23	37.43	
03:00 hrs	0.50	398.08	37.28	
04:00 hrs	0.49	398.07	37.27	
05:00 hrs	0.71	398.20	37.40	
06:00 hrs	1.13	398.30	37.50	
07:00 hrs	1.39	398.45	37.65	
08:00 hrs	1.28	398.58	37.78	
09:00 hrs	1.20	398.71	37.91	
10:00 hrs	1.14	398.85	38.05	
11:00 hrs	1.03	398.99	38.19	
12:00 hrs	0.95	399.03	38.23	
13:00 hrs	1.11	398.89	38.09	
14:00 hrs	0.95	398.75	37.95	
15:00 hrs	0.96	398.62	37.82	Avg Day
16:00 hrs	0.96	398.48	37.68	
17:00 hrs	1.09	398.34	37.54	
18:00 hrs	1.26	398.18	37.38	
19:00 hrs	1.41	398.01	37.21	
20:00 hrs	1.41	398.06	37.26	
21:00 hrs	1.19	398.19	37.39	
22:00 hrs	0.94	398.33	37.53	
23:00 hrs	0.63	398.50	37.70	
Average =	0.96	398.45	37.65	
Minimum =	0.35	399.03	38.23	

Maximum Day				
Time	Flow (L/s)	Head (m)	Residual Pressure (m)	
00:00 hrs	0.88	398.67	37.87	Min Hr
01:00 hrs	0.68	398.76	37.96	
02:00 hrs	0.92	398.88	38.08	
03:00 hrs	0.98	398.96	38.16	
04:00 hrs	0.96	399.03	38.23	
05:00 hrs	1.40	399.08	38.28	
06:00 hrs	2.22	399.05	38.25	
07:00 hrs	2.74	398.78	37.98	
08:00 hrs	2.51	398.51	37.71	
09:00 hrs	2.37	398.24	37.44	
10:00 hrs	2.25	397.98	37.18	
11:00 hrs	2.03	398.00	37.20	
12:00 hrs	1.87	398.06	37.26	
13:00 hrs	2.19	398.12	37.32	
14:00 hrs	1.87	398.18	37.38	
15:00 hrs	1.88	398.25	37.45	Max Day
16:00 hrs	1.89	398.32	37.52	
17:00 hrs	2.15	398.38	37.58	
18:00 hrs	2.49	398.41	37.61	
19:00 hrs	2.77	398.41	37.61	
20:00 hrs	2.78	398.40	37.60	
21:00 hrs	2.34	398.42	37.62	
22:00 hrs	1.84	398.47	37.67	
23:00 hrs	1.24	398.56	37.76	
Max Day =	1.89	398.50	37.70	
Peak Hour =	2.78	397.98	37.18	

Fire Flow Analysis		
Available Flow (L/s)	Head (m)	Residual Pressure (m)
0.0	398.10	37.30
10.0	397.90	37.10
20.0	397.60	36.80
30.0	397.20	36.40
40.0	396.70	35.90
50.0	396.00	35.20
60.0	395.30	34.50
70.0	394.40	33.60
80.0	393.40	32.60
90.0	392.30	31.50
100.0	391.10	30.30
110.0	389.90	29.10
120.0	388.50	27.70
130.0	387.00	26.20
140.0	385.40	24.60
150.0	383.70	22.90
160.0	381.90	21.10
170.0	380.00	19.20
180.0	378.00	17.20
190.0	376.00	15.20
195.4	374.80	14.00

Fire Flow Analysis Adjusted for Maximum Day Flows		
Available Flow (L/s)	Head (m)	Residual Pressure (m)
1.9	398.10	37.30
11.9	397.90	37.10
21.9	397.60	36.80
31.9	397.20	36.40
41.9	396.70	35.90
51.9	396.00	35.20
61.9	395.30	34.50
71.9	394.40	33.60
81.9	393.40	32.60
91.9	392.30	31.50
101.9	391.10	30.30
111.9	389.90	29.10
121.9	388.50	27.70
131.9	387.00	26.20
141.9	385.40	24.60
151.9	383.70	22.90
161.9	381.90	21.10
171.9	380.00	19.20
181.9	378.00	17.20
191.9	376.00	15.20
197.3	374.80	14

Node 00365 - Pump Curve Pressure Distribution			
Demand Scenario	Discharge (L/s)	HGL (m)	Head (m)
0 (Est.)	0.00	399.30	38.50
Minimum Hour	0.45	398.49	37.69
Average Day	0.96	398.48	37.68
Maximum Day	1.88	398.25	37.45
Peak Hour	2.25	397.98	37.18
Max Day + 20 L/s Fire Flow	21.88	397.60	36.80
Max Day + 40 L/s Fire Flow	41.88	396.70	35.90
Max Day + 60 L/s Fire Flow	61.88	395.30	34.50
Max Day + 80 L/s Fire Flow	81.88	393.40	32.60
Max Day + 100 L/s Fire Flow	101.88	391.10	30.30
Max Day + 120 L/s Fire Flow	121.88	388.50	27.70
Max Day + 140 L/s Fire Flow	141.88	385.40	24.60
Max Day + 160 L/s Fire Flow	161.88	381.90	21.10
Max Day + 180 L/s Fire Flow	181.88	378.00	17.20
Max Day + 195.4 L/s Fire Flow	197.28	374.80	14.00



1012 SNYDER'S ROAD WEST
Community of BADEN
Pump Curve Design Sheet

Project No.: 40777-104
 Date: 7-Dec-20
 Design By: AJC
 File: Q:\40777\104\PRELIMINARY\Water Distribution\40777-104_Region Pressures & Pump Curves.xlsx



Node JCT_00359 **McFayden Street @ Wagler Avenue (Scenario 1)**
 Elevation = **357.60** m

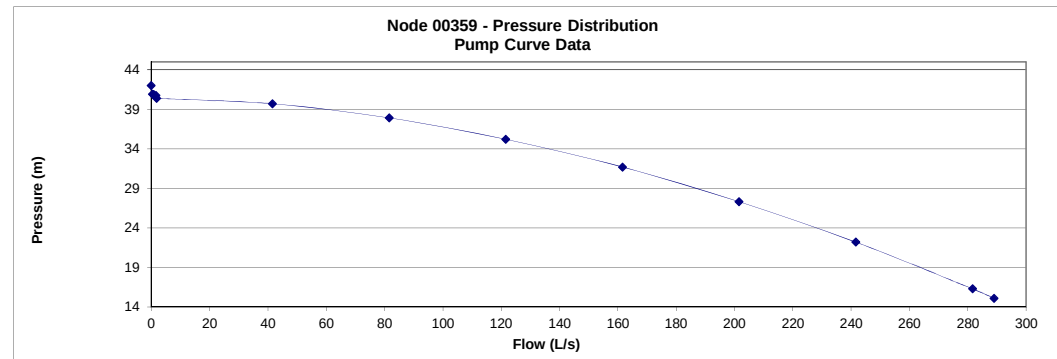
Average Day			
Time	Flow (L/s)	Head (m)	Residual Pressure (m)
00:00 hrs	0.38	398.49	40.89
01:00 hrs	0.30	398.35	40.75
02:00 hrs	0.40	398.23	40.63
03:00 hrs	0.42	398.09	40.49
04:00 hrs	0.42	398.07	40.47
05:00 hrs	0.61	398.21	40.61
06:00 hrs	0.96	398.30	40.70
07:00 hrs	1.18	398.45	40.85
08:00 hrs	1.08	398.58	40.98
09:00 hrs	1.02	398.71	41.11
10:00 hrs	0.97	398.85	41.25
11:00 hrs	0.88	398.99	41.39
12:00 hrs	0.81	399.04	41.44
13:00 hrs	0.95	398.90	41.30
14:00 hrs	0.81	398.75	41.15
15:00 hrs	0.81	398.62	41.02
16:00 hrs	0.82	398.48	40.88
17:00 hrs	0.93	398.34	40.74
18:00 hrs	1.07	398.19	40.59
19:00 hrs	1.19	398.01	40.41
20:00 hrs	1.20	398.07	40.47
21:00 hrs	1.01	398.19	40.59
22:00 hrs	0.80	398.33	40.73
23:00 hrs	0.54	398.50	40.90
Average =	0.82	398.45	40.85
Minimum =	0.30	399.04	41.44

Maximum Day			
Time	Flow (L/s)	Head (m)	Residual Pressure (m)
00:00 hrs	0.74	398.67	41.07
01:00 hrs	0.57	398.76	41.16
02:00 hrs	0.78	398.88	41.28
03:00 hrs	0.82	398.96	41.36
04:00 hrs	0.81	399.03	41.43
05:00 hrs	1.18	399.09	41.49
06:00 hrs	1.87	399.06	41.46
07:00 hrs	2.31	398.79	41.19
08:00 hrs	2.12	398.52	40.92
09:00 hrs	2.00	398.25	40.65
10:00 hrs	1.90	397.99	40.39
11:00 hrs	1.71	398.01	40.41
12:00 hrs	1.58	398.07	40.47
13:00 hrs	1.85	398.13	40.53
14:00 hrs	1.57	398.19	40.59
15:00 hrs	1.59	398.26	40.66
16:00 hrs	1.59	398.33	40.73
17:00 hrs	1.81	398.39	40.79
18:00 hrs	2.10	398.42	40.82
19:00 hrs	2.33	398.43	40.83
20:00 hrs	2.35	398.42	40.82
21:00 hrs	1.98	398.43	40.83
22:00 hrs	1.55	398.48	40.88
23:00 hrs	1.05	398.56	40.96
Max Day =	1.59	398.51	40.91
Peak Hour =	2.35	397.99	40.39

Fire Flow Analysis		
Available Flow (L/s)	Head (m)	Residual Pressure (m)
0.0	398.10	40.50
10.0	398.00	40.40
20.0	397.80	40.20
30.0	397.60	40.00
40.0	397.30	39.70
50.0	396.90	39.30
60.0	396.50	38.90
70.0	396.00	38.40
80.0	395.50	37.90
90.0	394.90	37.30
100.0	394.30	36.70
110.0	393.60	36.00
120.0	392.80	35.20
130.0	392.00	34.40
140.0	391.20	33.60
150.0	390.30	32.70
160.0	389.30	31.70
170.0	388.30	30.70
180.0	387.20	29.60
190.0	386.10	28.50
200.0	384.90	27.30
210.0	383.70	26.10
220.0	382.50	24.90
230.0	381.20	23.60
240.0	379.80	22.20
250.0	378.40	20.80
260.0	376.90	19.30
270.0	375.40	17.80
280.0	373.90	16.30
287.4	372.70	15.10

Fire Flow Analysis Adjusted for Maximum Day Flows		
Available Flow (L/s)	Head (m)	Residual Pressure (m)
1.6	398.10	40.50
11.6	398.00	40.40
21.6	397.80	40.20
31.6	397.60	40.00
41.6	397.30	39.70
51.6	396.90	39.30
61.6	396.50	38.90
71.6	396.00	38.40
81.6	395.50	37.90
91.6	394.90	37.30
101.6	394.30	36.70
111.6	393.60	36.00
121.6	392.80	35.20
131.6	392.00	34.40
141.6	391.20	33.60
151.6	390.30	32.70
161.6	389.30	31.70
171.6	388.30	30.70
181.6	387.20	29.60
191.6	386.10	28.50
201.6	384.90	27.30
211.6	383.70	26.10
221.6	382.50	24.90
231.6	381.20	23.60
241.6	379.80	22.20
251.6	378.40	20.80
261.6	376.90	19.30
271.6	375.40	17.80
281.6	373.90	16.30
289.0	372.70	15.10

Node 00359 - Pump Curve Pressure Distribution			
Demand Scenario	Discharge (L/s)	HGL (m)	Head (m)
0 (Est.)	0.00	399.60	42.00
Minimum Hour	0.38	398.49	40.89
Average Day	0.82	398.48	40.88
Maximum Day	1.59	398.33	40.73
Peak Hour	1.90	397.99	40.39
Max Day + 40 L/s Fire Flow	41.59	397.30	39.70
Max Day + 80 L/s Fire Flow	81.59	395.50	37.90
Max Day + 120 L/s Fire Flow	121.59	392.80	35.20
Max Day + 160 L/s Fire Flow	161.59	389.30	31.70
Max Day + 200 L/s Fire Flow	201.59	384.90	27.30
Max Day + 240 L/s Fire Flow	241.59	379.80	22.20
Max Day + 280 L/s Fire Flow	281.59	373.90	16.30
Max Day + 287.4 L/s Fire Flow	288.99	372.70	15.10



1012 SNYDER'S ROAD WEST
Community of BADEN
Pump Curve Design Sheet

Project No.: 40777-104
 Date: 7-Dec-20
 Design By: AJC
 File: Q:\40777\104\PRELIMINARY\Water Distribution\40777-104_Region Pressures & Pump Curves.xlsx



Node JCT_00307 Street One @ Snyder's Road West (Scenario 1)
Elevation = 358.70 m

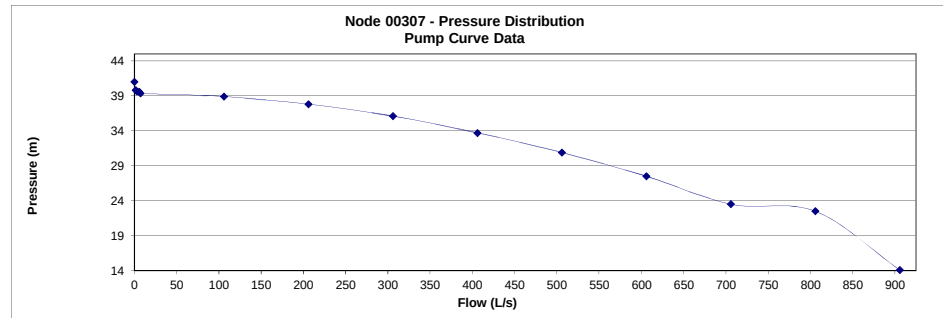
Average Day			
Time	Flow (L/s)	Head (m)	Residual Pressure (m)
00:00 hrs	1.37	398.50	39.80
01:00 hrs	1.06	398.36	39.66
02:00 hrs	1.44	398.24	39.54
03:00 hrs	1.53	398.10	39.40
04:00 hrs	1.50	398.05	39.35
05:00 hrs	2.20	398.20	39.50
06:00 hrs	3.50	398.30	39.60
07:00 hrs	4.31	398.46	39.76
08:00 hrs	3.96	398.59	39.89
09:00 hrs	3.73	398.72	40.02
10:00 hrs	3.54	398.85	40.15
11:00 hrs	3.20	399.00	40.30
12:00 hrs	2.94	399.05	40.35
13:00 hrs	3.45	398.92	40.22
14:00 hrs	2.93	398.77	40.07
15:00 hrs	2.96	398.63	39.93
16:00 hrs	2.97	398.50	39.80
17:00 hrs	3.38	398.36	39.66
18:00 hrs	3.92	398.21	39.51
19:00 hrs	4.36	398.04	39.34
20:00 hrs	4.38	398.08	39.38
21:00 hrs	3.69	398.19	39.49
22:00 hrs	2.90	398.33	39.63
23:00 hrs	1.95	398.49	39.79
Average = 2.97			
Minimum = 1.06			

Maximum Day			
Time	Flow (L/s)	Head (m)	Residual Pressure (m)
00:00 hrs	2.73	398.66	39.96
01:00 hrs	2.11	398.75	40.05
02:00 hrs	2.86	398.87	40.17
03:00 hrs	3.04	398.95	40.25
04:00 hrs	2.98	399.02	40.32
05:00 hrs	4.38	399.09	40.39
06:00 hrs	6.95	399.08	40.38
07:00 hrs	8.56	398.87	40.17
08:00 hrs	7.87	398.59	39.89
09:00 hrs	7.41	398.31	39.61
10:00 hrs	7.04	398.05	39.35
11:00 hrs	6.35	398.03	39.33
12:00 hrs	5.85	398.09	39.39
13:00 hrs	6.86	398.16	39.46
14:00 hrs	5.83	398.20	39.50
15:00 hrs	5.88	398.28	39.58
16:00 hrs	5.91	398.35	39.65
17:00 hrs	6.73	398.42	39.72
18:00 hrs	7.80	398.46	39.76
19:00 hrs	8.67	398.47	39.77
20:00 hrs	8.71	398.46	39.76
21:00 hrs	7.33	398.46	39.76
22:00 hrs	5.76	398.49	39.79
23:00 hrs	3.88	398.57	39.87
Max Day = 5.90			
Peak Hour = 8.71			

Fire Flow Analysis		
Available Flow (L/s)	Head (m)	Residual Pressure (m)
0.0	398.10	39.40
25.0	398.10	39.40
50.0	398.00	39.30
75.0	397.80	39.10
100.0	397.60	38.90
125.0	397.40	38.70
150.0	397.20	38.50
175.0	396.80	38.10
200.0	396.50	37.80
225.0	396.10	37.40
250.0	395.70	37.00
275.0	395.30	36.60
300.0	394.80	36.10
325.0	394.20	35.50
350.0	393.70	35.00
375.0	393.10	34.40
400.0	392.40	33.70
425.0	391.80	33.10
450.0	391.10	32.40
475.0	390.30	31.60
500.0	389.60	30.90
525.0	388.80	30.10
550.0	387.90	29.20
575.0	387.10	28.40
600.0	386.20	27.50
625.0	385.20	26.50
650.0	384.30	25.60
675.0	383.30	24.60
700.0	382.20	23.50
725.0	381.20	22.50
750.0	380.10	21.40
775.0	378.90	20.20
800.0	377.80	19.10
825.0	376.60	17.90
850.0	375.40	16.70
875.0	374.10	15.40
900.0	372.80	14.10
902.5	372.70	14.00

Fire Flow Analysis Adjusted for Maximum Day Flows		
Available Flow (L/s)	Head (m)	Residual Pressure (m)
5.9	398.10	39.40
30.9	398.10	39.40
55.9	398.00	39.30
80.9	397.80	39.10
105.9	397.60	38.90
130.9	397.40	38.70
155.9	397.20	38.50
180.9	396.80	38.10
205.9	396.50	37.80
230.9	396.10	37.40
255.9	395.70	37.00
280.9	395.30	36.60
305.9	394.80	36.10
330.9	394.20	35.50
355.9	393.70	35.00
380.9	393.10	34.40
405.9	392.40	33.70
430.9	391.80	33.10
455.9	391.10	32.40
480.9	390.30	31.60
505.9	389.60	30.90
530.9	388.80	30.10
555.9	387.90	29.20
580.9	387.10	28.40
605.9	386.20	27.50
630.9	385.20	26.50
655.9	384.30	25.60
680.9	383.30	24.60
705.9	382.20	23.50
730.9	381.20	22.50
755.9	380.10	21.40
780.9	378.90	20.20
805.9	377.80	19.10
830.9	376.60	17.90
855.9	375.40	16.70
880.9	374.10	15.40
905.9	372.80	14.10
908.4	372.70	14.00

Node 00307 - Pump Curve Pressure Distribution			
Demand Scenario	Discharge (L/s)	HGL (m)	Head (m)
0 (Est.)	0.00	399.70	41.00
Minimum Hour	1.37	398.50	39.80
Average Day	2.90	398.33	39.63
Maximum Day	5.88	398.28	39.58
Peak Hour	7.04	398.05	39.35
Max Day + 100 L/s Fire Flow	105.88	397.60	38.90
Max Day + 200 L/s Fire Flow	205.88	396.50	37.80
Max Day + 300 L/s Fire Flow	305.88	394.80	36.10
Max Day + 400 L/s Fire Flow	405.88	392.40	33.70
Max Day + 500 L/s Fire Flow	505.88	389.60	30.90
Max Day + 600 L/s Fire Flow	605.88	386.20	27.50
Max Day + 700 L/s Fire Flow	705.88	382.20	23.50
Max Day + 800 L/s Fire Flow	805.88	381.20	22.50
Max Day + 900 L/s Fire Flow	905.88	372.80	14.10
Max Day + 902.5 L/s Fire Flow	908.38	372.70	14.00



1012 SNYDER'S ROAD WEST
Community of BADEN
Pump Curve Design Sheet

Project No.: 40777-104
 Date: 7-Dec-20
 Design By: AJC
 File: Q:\40777\104\PRELIMINARY\Water Distribution\40777-104_Region Pressures & Pump Curves.xlsx



Node JCT_00365 Michael Myer's Road @ Bettschen Lane (Scenario 2)
Elevation = 360.80 m

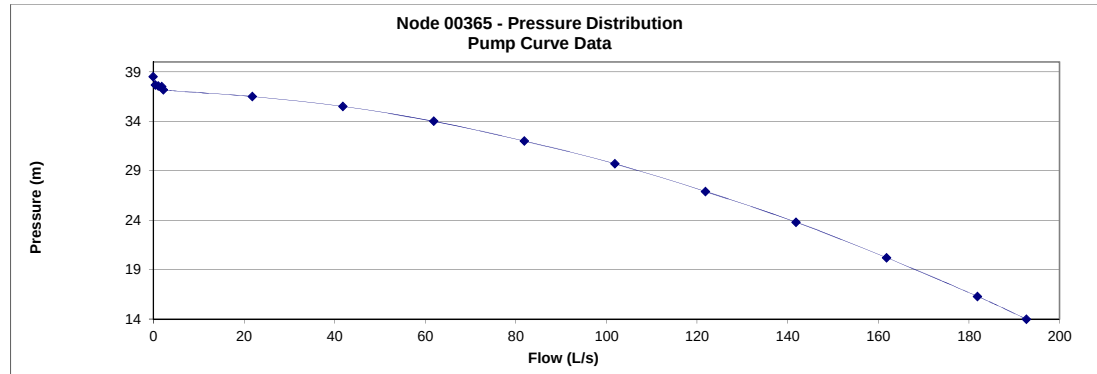
Average Day			
Time	Flow (L/s)	Head (m)	Residual Pressure (m)
00:00 hrs	0.45	398.48	37.68
01:00 hrs	0.35	398.33	37.53
02:00 hrs	0.47	398.20	37.40
03:00 hrs	0.50	398.04	37.24
04:00 hrs	0.49	398.09	37.29
05:00 hrs	0.71	398.21	37.41
06:00 hrs	1.13	398.27	37.47
07:00 hrs	1.39	398.38	37.58
08:00 hrs	1.28	398.49	37.69
09:00 hrs	1.20	398.59	37.79
10:00 hrs	1.14	398.70	37.90
11:00 hrs	1.03	398.82	38.02
12:00 hrs	0.95	398.96	38.16
13:00 hrs	1.11	399.02	38.22
14:00 hrs	0.95	398.86	38.06
15:00 hrs	0.96	398.70	37.90
16:00 hrs	0.96	398.54	37.74
17:00 hrs	1.09	398.37	37.57
18:00 hrs	1.26	398.18	37.38
19:00 hrs	1.41	397.96	37.16
20:00 hrs	1.41	398.00	37.20
21:00 hrs	1.19	398.10	37.30
22:00 hrs	0.94	398.23	37.43
23:00 hrs	0.63	398.38	37.58
Average =	0.96	398.41	37.61
Minimum =	0.35	399.02	38.22

Maximum Day			
Time	Flow (L/s)	Head (m)	Residual Pressure (m)
00:00 hrs	0.88	398.67	37.87
01:00 hrs	0.68	398.76	38.96
02:00 hrs	0.92	398.88	38.08
03:00 hrs	0.98	398.96	38.16
04:00 hrs	0.96	399.03	38.23
05:00 hrs	1.40	399.08	38.28
06:00 hrs	2.22	399.05	38.25
07:00 hrs	2.74	398.78	37.98
08:00 hrs	2.51	398.51	37.71
09:00 hrs	2.37	398.24	37.44
10:00 hrs	2.25	397.98	37.17
11:00 hrs	2.03	398.00	37.20
12:00 hrs	1.87	398.06	37.26
13:00 hrs	2.19	398.12	37.32
14:00 hrs	1.87	398.18	37.38
15:00 hrs	1.88	398.25	37.45
16:00 hrs	1.89	398.32	37.52
17:00 hrs	2.15	398.38	37.58
18:00 hrs	2.49	398.41	37.61
19:00 hrs	2.77	398.41	37.61
20:00 hrs	2.78	398.40	37.60
21:00 hrs	2.34	398.42	37.62
22:00 hrs	1.84	398.47	37.67
23:00 hrs	1.24	398.56	37.76
Max Day =	1.89	398.50	37.74
Peak Hour =	2.78	397.98	37.17

Fire Flow Analysis		
Available Flow (L/s)	Head (m)	Residual Pressure (m)
0.0	397.80	37.00
10.0	397.60	36.80
20.0	397.30	36.50
30.0	396.80	36.00
40.0	396.30	35.50
50.0	395.60	34.80
60.0	394.80	34.00
70.0	393.80	33.00
80.0	392.80	32.00
90.0	391.70	30.90
100.0	390.50	29.70
110.0	389.10	28.30
120.0	387.70	26.90
130.0	386.20	25.40
140.0	384.60	23.80
150.0	382.80	22.00
160.0	381.00	20.20
170.0	379.10	18.30
180.0	377.10	16.30
190.0	375.00	14.20
190.8	374.80	14.00

Fire Flow Analysis Adjusted for Maximum Day Flows		
Available Flow (L/s)	Head (m)	Residual Pressure (m)
1.9	397.80	37.00
11.9	397.60	36.80
21.9	397.30	36.50
31.9	396.80	36.00
41.9	396.30	35.50
51.9	395.60	34.80
61.9	394.80	34.00
71.9	393.80	33.00
81.9	392.80	32.00
91.9	391.70	30.90
101.9	390.50	29.70
111.9	389.10	28.30
121.9	387.70	26.90
131.9	386.20	25.40
141.9	384.60	23.80
151.9	382.80	22.00
161.9	381.00	20.20
171.9	379.10	18.30
181.9	377.10	16.30
191.9	375.00	14.20
192.7	374.80	14

Node 00365 - Pump Curve Pressure Distribution			
Demand Scenario	Discharge (L/s)	HGL (m)	Head (m)
0 (Est.)	0.00	399.30	38.50
Minimum Hour	0.45	398.48	37.68
Average Day	1.09	398.37	37.57
Maximum Day	1.89	398.32	37.52
Peak Hour	2.25	397.98	37.17
Max Day + 20 L/s Fire Flow	21.89	397.30	36.50
Max Day + 40 L/s Fire Flow	41.89	396.30	35.50
Max Day + 60 L/s Fire Flow	61.89	394.80	34.00
Max Day + 80 L/s Fire Flow	81.89	392.80	32.00
Max Day + 100 L/s Fire Flow	101.89	390.50	29.70
Max Day + 120 L/s Fire Flow	121.89	387.70	26.90
Max Day + 140 L/s Fire Flow	141.89	384.60	23.80
Max Day + 160 L/s Fire Flow	161.89	381.00	20.20
Max Day + 180 L/s Fire Flow	181.89	377.10	16.30
Max Day + 190.8 L/s Fire Flow	192.69	374.80	14.00



1012 SNYDER'S ROAD WEST
Community of BADEN
Pump Curve Design Sheet

Project No.: 40777-104
 Date: 7-Dec-20
 Design By: AJC
 File: Q:\40777\104\PRELIMINARY\Water Distribution\40777-104_Region Pressures & Pump Curves.xlsx



Node JCT_00359 **McFayden Street @ Wagler Avenue (Scenario 2)**
 Elevation = **357.60** m

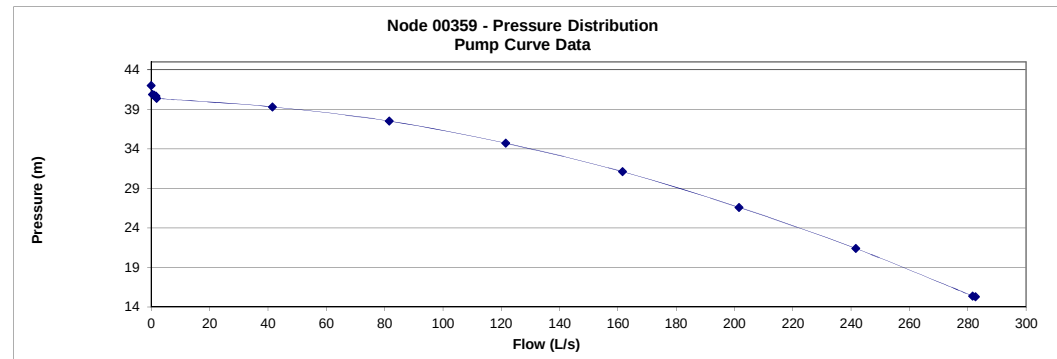
Average Day			
Time	Flow (L/s)	Head (m)	Residual Pressure (m)
00:00 hrs	0.38	398.48	40.88
01:00 hrs	0.30	398.34	40.74
02:00 hrs	0.40	398.20	40.60
03:00 hrs	0.42	398.05	40.45
04:00 hrs	0.42	398.09	40.49
05:00 hrs	0.61	398.21	40.61
06:00 hrs	0.96	398.28	40.68
07:00 hrs	1.18	398.40	40.80
08:00 hrs	1.08	398.50	40.90
09:00 hrs	1.02	398.60	41.00
10:00 hrs	0.97	398.71	41.11
11:00 hrs	0.88	398.83	41.23
12:00 hrs	0.81	398.96	41.36
13:00 hrs	0.95	399.03	41.43
14:00 hrs	0.81	398.87	41.27
15:00 hrs	0.81	398.71	41.11
16:00 hrs	0.82	398.55	40.95
17:00 hrs	0.93	398.38	40.78
18:00 hrs	1.07	398.19	40.59
19:00 hrs	1.19	397.98	40.38
20:00 hrs	1.20	398.02	40.42
21:00 hrs	1.01	398.11	40.51
22:00 hrs	0.80	398.23	40.63
23:00 hrs	0.54	398.38	40.78
Average =	0.82	398.42	40.82
Minimum =	0.30	399.03	41.43

Maximum Day			
Time	Flow (L/s)	Head (m)	Residual Pressure (m)
00:00 hrs	0.74	398.67	41.07
01:00 hrs	0.57	398.76	41.16
02:00 hrs	0.78	398.88	41.28
03:00 hrs	0.82	398.96	41.36
04:00 hrs	0.81	399.03	41.43
05:00 hrs	1.18	399.09	41.49
06:00 hrs	1.87	399.06	41.46
07:00 hrs	2.31	398.79	41.19
08:00 hrs	2.12	398.52	40.92
09:00 hrs	2.00	398.25	40.65
10:00 hrs	1.90	397.99	40.39
11:00 hrs	1.71	398.01	40.41
12:00 hrs	1.58	398.07	40.47
13:00 hrs	1.85	398.13	40.53
14:00 hrs	1.57	398.19	40.59
15:00 hrs	1.59	398.26	40.66
16:00 hrs	1.59	398.33	40.73
17:00 hrs	1.81	398.39	40.79
18:00 hrs	2.10	398.42	40.82
19:00 hrs	2.33	398.43	40.83
20:00 hrs	2.35	398.42	40.82
21:00 hrs	1.98	398.43	40.83
22:00 hrs	1.55	398.48	40.88
23:00 hrs	1.05	398.56	40.96
Max Day =	1.59	398.51	40.91
Peak Hour =	2.35	397.99	40.39

Fire Flow Analysis		
Available Flow (L/s)	Head (m)	Residual Pressure (m)
0.0	397.90	40.30
10.0	397.70	40.10
20.0	397.50	39.90
30.0	397.30	39.70
40.0	396.90	39.30
50.0	396.60	39.00
60.0	396.10	38.50
70.0	395.60	38.00
80.0	395.10	37.50
90.0	394.40	36.80
100.0	393.80	36.20
110.0	393.10	35.50
120.0	392.30	34.70
130.0	391.50	33.90
140.0	390.60	33.00
150.0	389.70	32.10
160.0	388.70	31.10
170.0	387.60	30.00
180.0	386.60	29.00
190.0	385.40	27.80
200.0	384.20	26.60
210.0	383.00	25.40
220.0	381.70	24.10
230.0	380.40	22.80
240.0	379.00	21.40
250.0	377.60	20.00
260.0	376.10	18.50
270.0	374.60	17.00
280.0	373.00	15.40
281.0	372.90	15.30

Fire Flow Analysis Adjusted for Maximum Day Flows		
Available Flow (L/s)	Head (m)	Residual Pressure (m)
1.6	397.90	40.30
11.6	397.70	40.10
21.6	397.50	39.90
31.6	397.30	39.70
41.6	396.90	39.30
51.6	396.60	39.00
61.6	396.10	38.50
71.6	395.60	38.00
81.6	395.10	37.50
91.6	394.40	36.80
101.6	393.80	36.20
111.6	393.10	35.50
121.6	392.30	34.70
131.6	391.50	33.90
141.6	390.60	33.00
151.6	389.70	32.10
161.6	388.70	31.10
171.6	387.60	30.00
181.6	386.60	29.00
191.6	385.40	27.80
201.6	384.20	26.60
211.6	383.00	25.40
221.6	381.70	24.10
231.6	380.40	22.80
241.6	379.00	21.40
251.6	377.60	20.00
261.6	376.10	18.50
271.6	374.60	17.00
281.6	373.00	15.40
282.6	372.90	15.30

Node 00359 - Pump Curve Pressure Distribution			
Demand Scenario	Discharge (L/s)	HGL (m)	Head (m)
0 (Est.)	0.00	399.60	42.00
Minimum Hour	0.38	398.48	40.88
Average Day	0.93	398.38	40.78
Maximum Day	1.59	398.26	40.66
Peak Hour	1.90	397.99	40.39
Max Day + 40 L/s Fire Flow	41.59	396.90	39.30
Max Day + 80 L/s Fire Flow	81.59	395.10	37.50
Max Day + 120 L/s Fire Flow	121.59	392.30	34.70
Max Day + 160 L/s Fire Flow	161.59	388.70	31.10
Max Day + 200 L/s Fire Flow	201.59	384.20	26.60
Max Day + 240 L/s Fire Flow	241.59	379.00	21.40
Max Day + 280 L/s Fire Flow	281.59	373.00	15.40
Max Day + 281.0 L/s Fire Flow	282.59	372.90	15.30



1012 SNYDER'S ROAD WEST
Community of BADEN
Pump Curve Design Sheet

Project No.: 40777-104
 Date: 7-Dec-20
 Design By: AJC
 File: Q:\40777\104\PRELIMINARY\Water Distribution\40777-104_Region Pressures & Pump Curves.xlsx



Node JCT_00307 Street One @ Snyder's Road West (Scenario 2)
 Elevation = **358.70** m

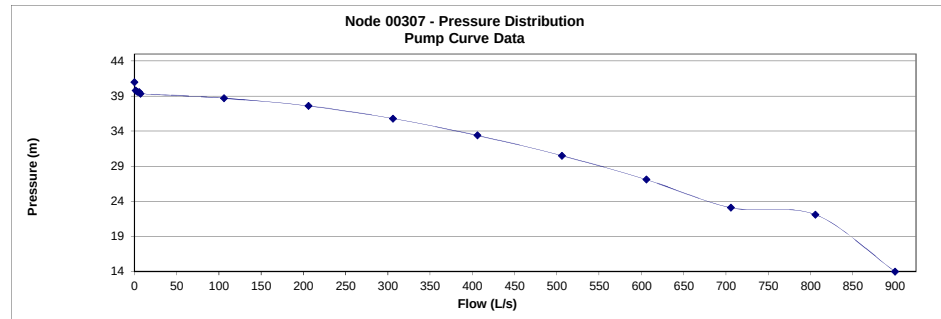
Average Day			
Time	Flow (L/s)	Head (m)	Residual Pressure (m)
00:00 hrs	1.37	398.49	39.79
01:00 hrs	1.06	398.34	39.64
02:00 hrs	1.44	398.22	39.52
03:00 hrs	1.53	398.06	39.36
04:00 hrs	1.50	398.08	39.38
05:00 hrs	2.20	398.22	39.52
06:00 hrs	3.50	398.30	39.60
07:00 hrs	4.31	398.43	39.73
08:00 hrs	3.96	398.53	39.83
09:00 hrs	3.73	398.62	39.92
10:00 hrs	3.54	398.73	40.03
11:00 hrs	3.20	398.85	40.15
12:00 hrs	2.94	398.98	40.28
13:00 hrs	3.45	399.07	40.38
14:00 hrs	2.93	398.90	40.20
15:00 hrs	2.96	398.74	40.04
16:00 hrs	2.97	398.58	39.88
17:00 hrs	3.38	398.42	39.72
18:00 hrs	3.92	398.24	39.54
19:00 hrs	4.36	398.04	39.34
20:00 hrs	4.38	398.05	39.35
21:00 hrs	3.69	398.13	39.43
22:00 hrs	2.90	398.25	39.55
23:00 hrs	1.95	398.38	39.68
Average =	2.97	398.44	39.74
Minimum =	1.06	399.07	40.38

Maximum Day			
Time	Flow (L/s)	Head (m)	Residual Pressure (m)
00:00 hrs	2.73	398.66	39.96
01:00 hrs	2.11	398.75	40.05
02:00 hrs	2.86	398.87	40.17
03:00 hrs	3.04	398.95	40.25
04:00 hrs	2.98	399.02	40.32
05:00 hrs	4.38	399.09	40.39
06:00 hrs	6.95	399.08	40.38
07:00 hrs	8.56	398.87	40.17
08:00 hrs	7.87	398.59	39.89
09:00 hrs	7.41	398.31	39.61
10:00 hrs	7.04	398.05	39.35
11:00 hrs	6.35	398.03	39.33
12:00 hrs	5.85	398.09	39.39
13:00 hrs	6.86	398.16	39.46
14:00 hrs	5.83	398.20	39.50
15:00 hrs	5.88	398.28	39.58
16:00 hrs	5.91	398.35	39.65
17:00 hrs	6.73	398.42	39.72
18:00 hrs	7.80	398.46	39.76
19:00 hrs	8.67	398.47	39.77
20:00 hrs	8.71	398.46	39.76
21:00 hrs	7.33	398.46	39.76
22:00 hrs	5.76	398.49	39.79
23:00 hrs	3.88	398.57	39.87
Max Day =	5.90	398.53	39.83
Peak Hour =	8.71	398.03	39.33

Fire Flow Analysis		
Available Flow (L/s)	Head (m)	Residual Pressure (m)
0.0	397.90	39.20
25.0	397.90	39.20
50.0	397.80	39.10
75.0	397.60	38.90
100.0	397.40	38.70
125.0	397.20	38.50
150.0	396.90	38.20
175.0	396.60	37.90
200.0	396.30	37.60
225.0	395.90	37.20
250.0	395.40	36.70
275.0	395.00	36.30
300.0	394.50	35.80
325.0	394.00	35.30
350.0	393.40	34.70
375.0	392.80	34.10
400.0	392.10	33.40
425.0	391.50	32.80
450.0	390.80	32.10
475.0	390.00	31.30
500.0	389.20	30.50
525.0	388.40	29.70
550.0	387.60	28.90
575.0	386.70	28.00
600.0	385.80	27.10
625.0	384.90	26.20
650.0	383.90	25.20
675.0	382.90	24.20
700.0	381.80	23.10
725.0	380.80	22.10
750.0	379.70	21.00
775.0	378.50	19.80
800.0	377.40	18.70
825.0	376.20	17.50
850.0	375.00	16.30
875.0	373.70	15.00
894.3	372.70	14.00

Fire Flow Analysis Adjusted for Maximum Day Flows		
Available Flow (L/s)	Head (m)	Residual Pressure (m)
5.9	397.90	39.20
30.9	397.90	39.20
55.9	397.80	39.10
80.9	397.60	38.90
105.9	397.40	38.70
130.9	397.20	38.50
155.9	396.90	38.20
180.9	396.60	37.90
205.9	396.30	37.60
230.9	395.90	37.20
255.9	395.40	36.70
280.9	395.00	36.30
305.9	394.50	35.80
330.9	394.00	35.30
355.9	393.40	34.70
380.9	392.80	34.10
405.9	392.10	33.40
430.9	391.50	32.80
455.9	390.80	32.10
480.9	390.00	31.30
505.9	389.20	30.50
530.9	388.40	29.70
555.9	387.60	28.90
580.9	386.70	28.00
605.9	385.80	27.10
630.9	384.90	26.20
655.9	383.90	25.20
680.9	382.90	24.20
705.9	381.80	23.10
730.9	380.80	22.10
755.9	379.70	21.00
780.9	378.50	19.80
805.9	377.40	18.70
830.9	376.20	17.50
855.9	375.00	16.30
880.9	373.70	15.00
900.2	372.70	14.00

Node 00307 - Pump Curve Pressure Distribution			
Demand Scenario	Discharge (L/s)	HGL (m)	Head (m)
0 (Est.)	0.00	399.70	41.00
Minimum Hour	1.37	398.49	39.79
Average Day	3.50	398.30	39.60
Maximum Day	5.88	398.28	39.58
Peak Hour	7.04	398.05	39.35
Max Day + 100 L/s Fire Flow	105.88	397.40	38.70
Max Day + 200 L/s Fire Flow	205.88	396.30	37.60
Max Day + 300 L/s Fire Flow	305.88	394.50	35.80
Max Day + 400 L/s Fire Flow	405.88	392.10	33.40
Max Day + 500 L/s Fire Flow	505.88	389.20	30.50
Max Day + 600 L/s Fire Flow	605.88	385.80	27.10
Max Day + 700 L/s Fire Flow	705.88	381.80	23.10
Max Day + 800 L/s Fire Flow	805.88	380.80	22.10
Max Day + 894.3 L/s Fire Flow	900.18	372.70	14.00



1012 SNYDER'S ROAD WEST
Community of BADEN
Pump Curve Design Sheet

Project No.: 40777-104
 Date: 7-Dec-20
 Design By: AJC
 File: Q:\40777\104\PRELIMINARY\Water Distribution\40777-104_Region Pressures & Pump Curves.xlsx



Node JCT_00385 Michael Myers Road @ Jacob Cressman Drive (Scenario 2)
Elevation = 359.20 m

Average Day			
Time	Flow (L/s)	Head (m)	Residual Pressure (m)
00:00 hrs	0.98	398.48	39.28
01:00 hrs	0.76	398.33	39.13
02:00 hrs	1.03	398.20	39.00
03:00 hrs	1.10	398.04	38.84
04:00 hrs	1.08	398.09	38.89
05:00 hrs	1.58	398.21	39.01
06:00 hrs	2.51	398.27	39.07
07:00 hrs	3.09	398.38	39.18
08:00 hrs	2.84	398.48	39.28
09:00 hrs	2.68	398.59	39.39
10:00 hrs	2.54	398.70	39.50
11:00 hrs	2.29	398.82	39.62
12:00 hrs	2.11	398.95	39.75
13:00 hrs	2.48	399.02	39.82
14:00 hrs	2.10	398.86	39.66
15:00 hrs	2.12	398.70	39.50
16:00 hrs	2.13	398.54	39.34
17:00 hrs	2.43	398.37	39.17
18:00 hrs	2.81	398.18	38.98
19:00 hrs	3.13	397.96	38.76
20:00 hrs	3.14	398.00	38.80
21:00 hrs	2.65	398.10	38.90
22:00 hrs	2.08	398.23	39.03
23:00 hrs	1.40	398.38	39.18

Average = 2.13
 Minimum = 0.76

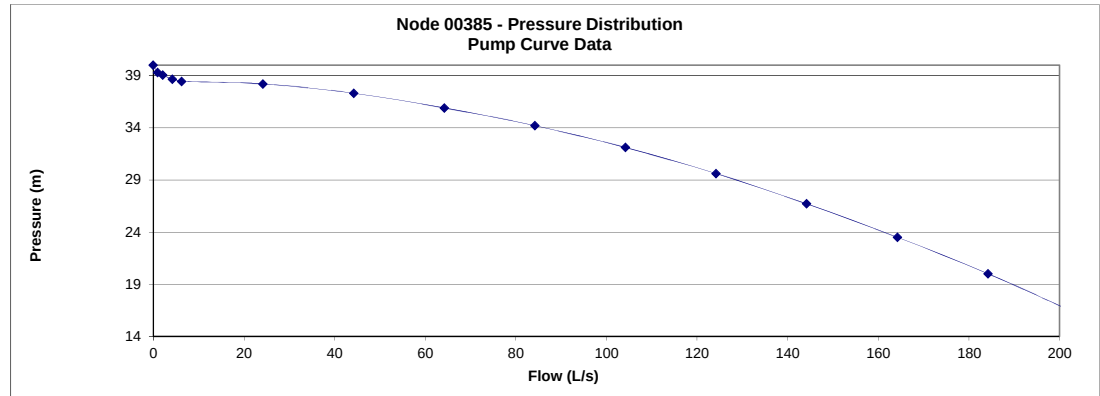
Maximum Day			
Time	Flow (L/s)	Head (m)	Residual Pressure (m)
00:00 hrs	1.96	398.79	39.59
01:00 hrs	1.52	398.87	39.67
02:00 hrs	2.06	398.96	39.76
03:00 hrs	2.19	399.02	39.82
04:00 hrs	2.15	399.06	39.86
05:00 hrs	3.15	398.80	39.60
06:00 hrs	5.00	398.39	39.19
07:00 hrs	6.17	398.02	38.82
08:00 hrs	5.66	397.81	38.61
09:00 hrs	5.34	397.79	38.59
10:00 hrs	5.07	397.77	38.57
11:00 hrs	4.57	397.79	38.59
12:00 hrs	4.21	397.81	38.61
13:00 hrs	4.94	397.80	38.60
14:00 hrs	4.20	397.83	38.63
15:00 hrs	4.23	397.86	38.66
16:00 hrs	4.25	397.88	38.68
17:00 hrs	4.84	397.87	38.67
18:00 hrs	5.61	397.82	38.62
19:00 hrs	6.24	397.72	38.52
20:00 hrs	6.27	397.64	38.44
21:00 hrs	5.28	397.64	38.44
22:00 hrs	4.15	397.68	38.48
23:00 hrs	2.78	397.76	38.56

Max Day = 4.24
 Peak Hour = 6.27

Fire Flow Analysis		
Available Flow (L/s)	Head (m)	Residual Pressure (m)
0.0	397.90	38.70
10.0	397.70	38.50
20.0	397.40	38.20
30.0	397.00	37.80
40.0	396.50	37.30
50.0	395.80	36.60
60.0	395.10	35.90
70.0	394.30	35.10
80.0	393.40	34.20
90.0	392.40	33.20
100.0	391.30	32.10
110.0	390.10	30.90
120.0	388.80	29.60
130.0	387.40	28.20
140.0	385.90	26.70
150.0	384.40	25.20
160.0	382.70	23.50
170.0	381.00	21.80
180.0	379.20	20.00
190.0	377.30	18.10
200.0	375.30	16.10
210.0	373.20	14
210.1	373.20	14

Fire Flow Analysis Adjusted for Maximum Day Flows		
Available Flow (L/s)	Head (m)	Residual Pressure (m)
4.2	397.90	38.70
14.2	397.70	38.50
24.2	397.40	38.20
34.2	397.00	37.80
44.2	396.50	37.30
54.2	395.80	36.60
64.2	395.10	35.90
74.2	394.30	35.10
84.2	393.40	34.20
94.2	392.40	33.20
104.2	391.30	32.10
114.2	390.10	30.90
124.2	388.80	29.60
134.2	387.40	28.20
144.2	385.90	26.70
154.2	384.40	25.20
164.2	382.70	23.50
174.2	381.00	21.80
184.2	379.20	20.00
194.2	377.30	18.10
204.2	375.30	16.10
214.2	373.20	14.00
214.3	373.20	14.00

Node 00385 - Pump Curve Pressure Distribution			
Demand Scenario	Discharge (L/s)	HGL (m)	Head (m)
0 (Est.)	0.00	399.20	40.00
Minimum Hour	0.98	398.48	39.28
Average Day	2.08	398.23	39.03
Maximum Day	4.23	397.86	38.66
Peak Hour	6.27	397.64	38.44
Max Day + 20 L/s Fire Flow	24.23	397.40	38.20
Max Day + 40 L/s Fire Flow	44.23	396.50	37.30
Max Day + 60 L/s Fire Flow	64.23	395.10	35.90
Max Day + 80 L/s Fire Flow	84.23	393.40	34.20
Max Day + 100 L/s Fire Flow	104.23	391.30	32.10
Max Day + 120 L/s Fire Flow	124.23	388.80	29.60
Max Day + 140 L/s Fire Flow	144.23	385.90	26.70
Max Day + 160 L/s Fire Flow	164.23	382.70	23.50
Max Day + 180 L/s Fire Flow	184.23	379.20	20.00
Max Day + 200 L/s Fire Flow	204.23	375.30	16.10
Max Day + 210.1 L/s Fire Flow	214.33	373.20	14.00



1012 SNYDER'S ROAD WEST
Community of BADEN
Pump Curve Design Sheet

Project No.: 40777-104
 Date: 7-Dec-20
 Design By: AJC
 File: Q:\40777\104\PRELIMINARY\Water Distribution\40777-104_Region Pressures & Pump Curves.xlsx



Node JCT_00386 Kropf Drive @ Isaac Shantz Drive (Scenario 2)
Elevation = 359.20 m

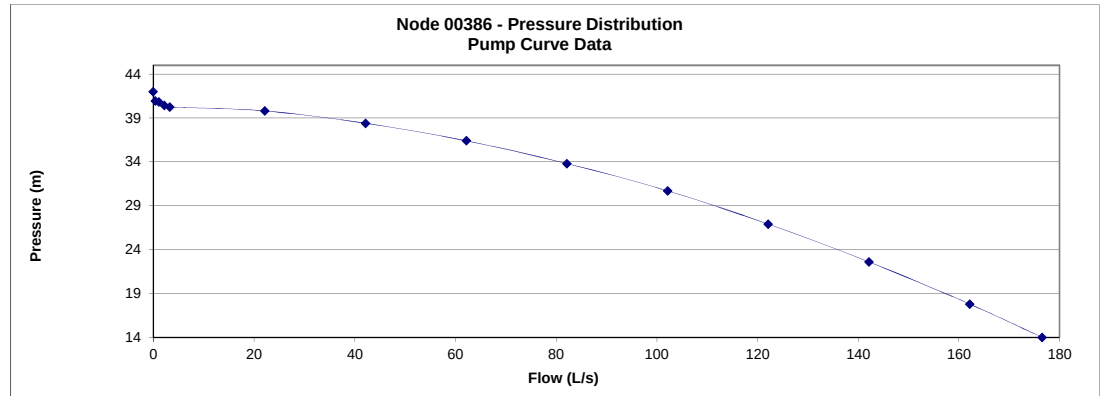
Average Day			
Time	Flow (L/s)	Head (m)	Residual Pressure (m)
00:00 hrs	0.52	398.48	41.08
01:00 hrs	0.40	398.33	40.93
02:00 hrs	0.55	398.20	40.80
03:00 hrs	0.58	398.04	40.64
04:00 hrs	0.57	398.09	40.69
05:00 hrs	0.83	398.21	40.81
06:00 hrs	1.32	398.27	40.87
07:00 hrs	1.62	398.38	40.98
08:00 hrs	1.49	398.48	41.08
09:00 hrs	1.41	398.59	41.19
10:00 hrs	1.33	398.70	41.30
11:00 hrs	1.20	398.82	41.42
12:00 hrs	1.11	398.95	41.55
13:00 hrs	1.30	399.02	41.62
14:00 hrs	1.11	398.86	41.46
15:00 hrs	1.12	398.70	41.30
16:00 hrs	1.12	398.54	41.14
17:00 hrs	1.28	398.37	40.97
18:00 hrs	1.48	398.18	40.78
19:00 hrs	1.64	397.96	40.56
20:00 hrs	1.65	398.00	40.60
21:00 hrs	1.39	398.10	40.70
22:00 hrs	1.09	398.23	40.83
23:00 hrs	0.74	398.38	40.89
Average = 1.12			
Minimum = 0.40			

Maximum Day			
Time	Flow (L/s)	Head (m)	Residual Pressure (m)
00:00 hrs	1.02	398.79	41.39
01:00 hrs	0.79	398.87	41.47
02:00 hrs	1.07	398.96	41.56
03:00 hrs	1.14	399.02	41.62
04:00 hrs	1.12	399.06	41.66
05:00 hrs	1.64	398.80	41.40
06:00 hrs	2.60	398.39	40.99
07:00 hrs	3.20	398.03	40.63
08:00 hrs	2.94	397.81	40.41
09:00 hrs	2.77	397.79	40.39
10:00 hrs	2.63	397.78	40.38
11:00 hrs	2.38	397.79	40.39
12:00 hrs	2.19	397.82	40.42
13:00 hrs	2.57	397.80	40.40
14:00 hrs	2.18	397.73	40.43
15:00 hrs	2.20	397.86	40.46
16:00 hrs	2.21	397.88	40.48
17:00 hrs	2.52	397.87	40.47
18:00 hrs	2.92	397.82	40.42
19:00 hrs	3.24	397.73	40.33
20:00 hrs	3.26	397.65	40.25
21:00 hrs	2.74	397.64	40.24
22:00 hrs	2.16	397.68	40.28
23:00 hrs	1.45	397.76	40.36
Max Day = 2.21			
Peak Hour = 3.26			

Fire Flow Analysis		
Available Flow (L/s)	Head (m)	Residual Pressure (m)
0.0	399.60	40.40
10.0	399.40	40.20
20.0	399.00	39.80
30.0	398.40	39.20
40.0	397.60	38.40
50.0	396.70	37.50
60.0	395.60	36.40
70.0	394.40	35.20
80.0	393.00	33.80
90.0	391.50	32.30
100.0	389.90	30.70
110.0	388.10	28.90
120.0	386.10	26.90
130.0	384.00	24.80
140.0	381.80	22.60
150.0	379.50	20.30
160.0	377.00	17.80
170.0	374.40	15.20
174.4	373.20	14.00

Fire Flow Analysis Adjusted for Maximum Day Flows		
Available Flow (L/s)	Head (m)	Residual Pressure (m)
2.2	399.60	40.40
12.2	399.40	40.20
22.2	399.00	39.80
32.2	398.40	39.20
42.2	397.60	38.40
52.2	396.70	37.50
62.2	395.60	36.40
72.2	394.40	35.20
82.2	393.00	33.80
92.2	391.50	32.30
102.2	389.90	30.70
112.2	388.10	28.90
122.2	386.10	26.90
132.2	384.00	24.80
142.2	381.80	22.60
152.2	379.50	20.30
162.2	377.00	17.80
172.2	374.40	15.20
176.6	373.20	14.00

Node 00386 - Pump Curve Pressure Distribution			
Demand Scenario	Discharge (L/s)	HGL (m)	Head (m)
0 (Est.)	0.00	401.20	42.00
Minimum Hour	0.40	398.33	40.93
Average Day	1.09	398.23	40.83
Maximum Day	2.18	397.73	40.43
Peak Hour	3.26	397.65	40.25
Max Day + 20 L/s Fire Flow	22.18	399.00	39.80
Max Day + 40 L/s Fire Flow	42.18	397.60	38.40
Max Day + 60 L/s Fire Flow	62.18	395.60	36.40
Max Day + 80 L/s Fire Flow	82.18	393.00	33.80
Max Day + 100 L/s Fire Flow	102.18	389.90	30.70
Max Day + 120 L/s Fire Flow	122.18	386.10	26.90
Max Day + 140 L/s Fire Flow	142.18	381.80	22.60
Max Day + 160 L/s Fire Flow	162.18	377.00	17.80
Max Day + 174.4 L/s Fire Flow	176.58	373.20	14.00



Appendix D

Water Distribution Report

WaterCAD Output Files



Scenario 1A (Multi-Res)
Active Scenario: Average Day

Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (kPa)
J-101	361.22	0.10	398.48	365
J-102	360.72	0.13	398.48	370
J-103	361.19	0.21	398.48	365
J-104	360.01	0.16	398.48	377
J-105	360.20	0.19	398.49	375
J-106	359.21	0.14	398.49	384
J-107	360.20	0.18	398.48	375
J-108	359.15	0.19	398.48	385
J-109	359.80	0.32	398.48	379
J-110	358.86	0.19	398.48	388
J-111	360.37	0.10	398.48	373
J-112	359.95	0.23	398.48	377
J-113	358.90	0.33	398.48	387
J-114	357.75	0.15	398.48	399
J-115	358.40	0.16	398.48	392
J-201	359.40	0.48	398.48	383
J-00307	358.72	0.00	398.48	389
J-00359	357.59	0.00	398.50	400
J-00365	360.78	0.00	398.48	369

Scenario 1A (Multi-Res)
Active Scenario: Max Day

Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (kPa)
J-101	361.22	0.21	398.43	364
J-102	360.72	0.26	398.43	369
J-103	361.19	0.41	398.43	364
J-104	360.01	0.33	398.43	376
J-105	360.20	0.38	398.44	374
J-106	359.21	0.27	398.44	384
J-107	360.20	0.36	398.43	374
J-108	359.15	0.38	398.43	384
J-109	359.80	0.63	398.43	378
J-110	358.86	0.38	398.43	387
J-111	360.37	0.21	398.43	372
J-112	359.95	0.46	398.43	377
J-113	358.90	0.67	398.43	387
J-114	357.75	0.31	398.43	398
J-115	358.40	0.33	398.43	392
J-201	359.40	0.96	398.43	382
J-00307	358.72	0.00	398.43	389
J-00359	357.59	0.00	398.47	400
J-00365	360.78	0.00	398.43	368

Scenario 1A (Multi-Res)
Active Scenario: Min Hour

Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (kPa)
J-101	361.22	0.05	398.50	365
J-102	360.72	0.06	398.50	370
J-103	361.19	0.10	398.50	365
J-104	360.01	0.08	398.50	377
J-105	360.20	0.09	398.50	375
J-106	359.21	0.07	398.50	385
J-107	360.20	0.09	398.50	375
J-108	359.15	0.09	398.50	385
J-109	359.80	0.16	398.50	379
J-110	358.86	0.09	398.50	388
J-111	360.37	0.05	398.50	373
J-112	359.95	0.12	398.50	377
J-113	358.90	0.17	398.50	388
J-114	357.75	0.08	398.50	399
J-115	358.40	0.08	398.50	392
J-201	359.40	0.24	398.50	383
J-00307	358.72	0.00	398.50	389
J-00359	357.59	0.00	398.50	400
J-00365	360.78	0.00	398.50	369

Scenario 1A (Multi-Res)
Active Scenario: Peak Hour

Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (kPa)
J-101	361.22	0.31	398.41	364
J-102	360.72	0.38	398.41	369
J-103	361.19	0.62	398.41	364
J-104	360.01	0.49	398.42	376
J-105	360.20	0.56	398.43	374
J-106	359.21	0.41	398.43	384
J-107	360.20	0.54	398.41	374
J-108	359.15	0.56	398.41	384
J-109	359.80	0.95	398.42	378
J-110	358.86	0.56	398.42	387
J-111	360.37	0.31	398.41	372
J-112	359.95	0.69	398.41	376
J-113	358.90	1.00	398.41	387
J-114	357.75	0.46	398.42	398
J-115	358.40	0.49	398.42	392
J-201	359.40	1.44	398.41	382
J-00307	358.72	0.00	398.43	389
J-00359	357.59	0.00	398.47	400
J-00365	360.78	0.00	398.41	368

Scenario 1A (Multi-Res)

Active Scenario: Max Day + Fire

Label	Satisfies Fire Flow Constraints?	Fire Flow (Needed) (L/s)	Flow (Total Needed) (L/s)	Flow (Total Available) (L/s)	Pressure (Calculated Residual) (kPa)	Junction w/ Minimum Pressure (System)	Hydraulic Grade (m)	Pipe w/ Maximum Velocity	Velocity of Maximum Pipe (m/s)
J-101	True	100.00	100.21	175.21	140	J-102	398.43	P-1	5.58
J-102	True	100.00	100.26	230.26	163	J-101	398.43	P-2	4.54
J-103	True	100.00	100.41	230.41	282	J-101	398.43	P-21	2.79
J-104	True	100.00	100.33	230.33	295	J-101	398.43	P-5	3.09
J-105	True	100.00	100.38	230.38	301	J-104	398.44	P-6	2.90
J-106	True	100.00	100.27	230.27	267	J-101	398.44	P-8	3.88
J-107	True	100.00	100.36	230.36	149	J-101	398.43	P-2	3.96
J-108	True	100.00	100.38	230.38	286	J-201	398.43	P-13	3.04
J-109	True	100.00	100.63	230.63	289	J-101	398.43	P-21	3.15
J-110	True	100.00	100.38	230.38	328	J-101	398.43	P-21	3.68
J-111	True	100.00	100.21	174.88	140	J-112	398.43	P-11	5.57
J-112	True	100.00	100.46	230.46	155	J-111	398.43	P-12	4.12
J-113	True	100.00	100.67	230.67	260	J-111	398.43	P-14	3.55
J-114	True	100.00	100.31	230.31	223	J-115	398.43	P-20	3.98
J-115	True	100.00	100.33	230.33	258	J-114	398.43	P-20	5.06
J-201	True	133.00	133.96	228.49	140	J-108	398.43	P-201	7.27
J-00307	True	100.00	100.00	230.00	374	J-101	398.43	P-21	1.17
J-00359	True	100.00	100.00	230.00	328	J-105	398.47	P-6	2.82
J-00365	True	100.00	100.00	230.00	273	J-103	398.43	P-3	3.51

Scenario 1B (Institutional)
Active Scenario: Average Day

Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (kPa)
J-101	361.22	0.10	398.46	364
J-102	360.72	0.13	398.46	369
J-103	361.19	0.21	398.46	365
J-104	360.01	0.16	398.46	376
J-105	360.20	0.19	398.47	375
J-106	359.21	0.14	398.46	384
J-107	360.20	0.18	398.46	374
J-108	359.15	0.19	398.46	385
J-109	359.80	0.32	398.46	378
J-110	358.86	0.19	398.46	388
J-111	360.37	0.10	398.46	373
J-112	359.95	0.23	398.46	377
J-113	358.90	0.33	398.46	387
J-114	357.75	0.15	398.46	398
J-115	358.40	0.16	398.46	392
J-201	359.40	2.04	398.46	382
J-00307	358.72	0.00	398.46	389
J-00359	357.59	0.00	398.49	400
J-00365	360.78	0.00	398.46	369

Scenario 1B (Institutional)

Active Scenario: Max Day

Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (kPa)
J-101	361.22	0.21	398.41	364
J-102	360.72	0.26	398.41	369
J-103	361.19	0.41	398.41	364
J-104	360.01	0.33	398.42	376
J-105	360.20	0.38	398.43	374
J-106	359.21	0.27	398.43	384
J-107	360.20	0.36	398.41	374
J-108	359.15	0.38	398.41	384
J-109	359.80	0.63	398.42	378
J-110	358.86	0.38	398.42	387
J-111	360.37	0.21	398.41	372
J-112	359.95	0.46	398.41	376
J-113	358.90	0.67	398.41	387
J-114	357.75	0.31	398.42	398
J-115	358.40	0.33	398.42	392
J-201	359.40	4.08	398.40	382
J-00307	358.72	0.00	398.43	389
J-00359	357.59	0.00	398.47	400
J-00365	360.78	0.00	398.41	368

Scenario 1B (Institutional)

Active Scenario: Min Hour

Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (kPa)
J-101	361.22	0.05	398.49	365
J-102	360.72	0.06	398.49	370
J-103	361.19	0.10	398.49	365
J-104	360.01	0.08	398.49	377
J-105	360.20	0.09	398.49	375
J-106	359.21	0.07	398.49	384
J-107	360.20	0.09	398.49	375
J-108	359.15	0.09	398.49	385
J-109	359.80	0.16	398.49	379
J-110	358.86	0.09	398.49	388
J-111	360.37	0.05	398.49	373
J-112	359.95	0.12	398.49	377
J-113	358.90	0.17	398.49	387
J-114	357.75	0.08	398.49	399
J-115	358.40	0.08	398.49	392
J-201	359.40	1.02	398.49	383
J-00307	358.72	0.00	398.49	389
J-00359	357.59	0.00	398.50	400
J-00365	360.78	0.00	398.49	369

Scenario 1B (Institutional)
Active Scenario: Peak Hour

Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (kPa)
J-101	361.22	0.31	398.39	364
J-102	360.72	0.38	398.39	369
J-103	361.19	0.62	398.40	364
J-104	360.01	0.49	398.41	376
J-105	360.20	0.56	398.42	374
J-106	359.21	0.41	398.42	384
J-107	360.20	0.54	398.39	374
J-108	359.15	0.56	398.39	384
J-109	359.80	0.95	398.41	378
J-110	358.86	0.56	398.41	387
J-111	360.37	0.31	398.39	372
J-112	359.95	0.69	398.39	376
J-113	358.90	1.00	398.39	387
J-114	357.75	0.46	398.40	398
J-115	358.40	0.49	398.41	392
J-201	359.40	6.12	398.38	381
J-00307	358.72	0.00	398.43	389
J-00359	357.59	0.00	398.46	400
J-00365	360.78	0.00	398.40	368

Scenario 1B (Institutional)
Active Scenario: Max Day + Fire

Label	Satisfies Fire Flow Constraints?	Fire Flow (Needed) (L/s)	Flow (Total Needed) (L/s)	Flow (Total Available) (L/s)	Pressure (Calculated Residual) (kPa)	Junction w/ Minimum Pressure (System)	Hydraulic Grade (m)	Pipe w/ Maximum Velocity	Velocity of Maximum Pipe (m/s)
J-101	True	100.00	100.21	174.59	140	J-102	398.41	P-1	5.56
J-102	True	100.00	100.26	230.26	161	J-101	398.41	P-2	4.54
J-103	True	100.00	100.41	230.41	280	J-101	398.41	P-21	2.83
J-104	True	100.00	100.33	230.33	294	J-101	398.42	P-5	3.11
J-105	True	100.00	100.38	230.38	300	J-104	398.43	P-6	2.92
J-106	True	100.00	100.27	230.27	266	J-101	398.43	P-8	3.87
J-107	True	100.00	100.36	230.36	147	J-101	398.41	P-2	3.96
J-108	True	100.00	100.38	230.38	283	J-201	398.41	P-13	3.08
J-109	True	100.00	100.63	230.63	288	J-101	398.42	P-21	3.18
J-110	True	100.00	100.38	230.38	327	J-101	398.42	P-21	3.71
J-111	True	100.00	100.21	174.30	140	J-112	398.41	P-11	5.55
J-112	True	100.00	100.46	230.46	153	J-111	398.41	P-12	4.12
J-113	True	100.00	100.67	230.67	258	J-111	398.41	P-14	3.54
J-114	True	100.00	100.31	230.31	221	J-115	398.42	P-20	3.98
J-115	True	100.00	100.33	230.33	257	J-114	398.42	P-20	5.06
J-201	True	217.00	221.08	228.48	140	J-108	398.40	P-201	7.27
J-00307	True	100.00	100.00	230.00	374	J-101	398.43	P-21	1.14
J-00359	True	100.00	100.00	230.00	328	J-105	398.47	P-6	2.81
J-00365	True	100.00	100.00	230.00	272	J-103	398.41	P-3	3.49

Scenario 2A (Future Activa + Multi-Residential)

Active Scenario: Average Day

Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (kPa)
J-101	361.22	0.10	399.84	378
J-102	360.72	0.13	399.84	383
J-103	361.19	0.21	399.83	378
J-104	360.01	0.16	399.83	390
J-105	360.20	0.19	399.83	388
J-106	359.21	0.14	399.83	398
J-107	360.20	0.18	399.84	388
J-108	359.15	0.19	399.83	398
J-109	359.80	0.32	399.83	392
J-110	358.86	0.19	399.83	401
J-111	360.37	0.10	399.83	386
J-112	359.95	0.23	399.83	390
J-113	358.90	0.33	399.83	401
J-114	357.75	0.15	399.83	412
J-115	358.40	0.16	399.83	405
J-201	359.40	0.48	399.83	396
J-301	360.00	0.35	399.84	390
J-302	358.50	0.35	399.84	405
J-303	360.40	0.35	399.84	386
J-304	360.40	0.35	399.84	386
J-305	360.80	0.35	399.84	382
J-306	360.80	0.35	399.85	382
J-00307	358.72	0.00	399.83	402
J-307	361.30	0.35	399.84	377
J-308	361.30	0.35	399.85	377
J-309	363.00	0.35	399.92	361
J-00359	357.59	0.00	399.83	413
J-00365	360.78	0.00	399.83	382
J-00385	359.20	0.00	399.85	398
J-00386	359.20	0.00	399.93	399

Scenario 2A (Future Activa + Multi-Residential)

Active Scenario: Max Day

Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (kPa)
J-101	361.22	0.21	399.40	374
J-102	360.72	0.26	399.40	379
J-103	361.19	0.41	399.38	374
J-104	360.01	0.33	399.38	385
J-105	360.20	0.38	399.38	383
J-106	359.21	0.28	399.38	393
J-107	360.20	0.36	399.39	384
J-108	359.15	0.38	399.38	394
J-109	359.80	0.63	399.38	387
J-110	358.86	0.38	399.38	397
J-111	360.37	0.21	399.39	382
J-112	359.95	0.46	399.39	386
J-113	358.90	0.67	399.38	396
J-114	357.75	0.31	399.38	407
J-115	358.40	0.33	399.38	401
J-201	359.40	0.96	399.38	391
J-301	360.00	0.70	399.42	386
J-302	358.50	0.70	399.42	401
J-303	360.40	0.70	399.42	382
J-304	360.40	0.70	399.42	382
J-305	360.80	0.70	399.42	378
J-306	360.80	0.70	399.43	378
J-00307	358.72	0.00	399.38	398
J-307	361.30	0.70	399.42	373
J-308	361.30	0.70	399.45	373
J-309	363.00	0.70	399.69	359
J-00359	357.59	0.00	399.38	409
J-00365	360.78	0.00	399.38	378
J-00385	359.20	0.00	399.45	394
J-00386	359.20	0.00	399.74	397

Scenario 2A (Future Activa + Multi-Residential)

Active Scenario: Min Hour

Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (kPa)
J-101	361.22	0.05	399.96	379
J-102	360.72	0.06	399.96	384
J-103	361.19	0.10	399.96	379
J-104	360.01	0.08	399.96	391
J-105	360.20	0.09	399.96	389
J-106	359.21	0.07	399.96	399
J-107	360.20	0.09	399.96	389
J-108	359.15	0.09	399.96	399
J-109	359.80	0.16	399.96	393
J-110	358.86	0.09	399.96	402
J-111	360.37	0.05	399.96	387
J-112	359.95	0.12	399.96	392
J-113	358.90	0.17	399.96	402
J-114	357.75	0.08	399.96	413
J-115	358.40	0.08	399.96	407
J-201	359.40	0.24	399.96	397
J-301	360.00	0.18	399.96	391
J-302	358.50	0.18	399.96	406
J-303	360.40	0.18	399.96	387
J-304	360.40	0.18	399.96	387
J-305	360.80	0.18	399.96	383
J-306	360.80	0.18	399.96	383
J-00307	358.72	0.00	399.96	404
J-307	361.30	0.18	399.96	378
J-308	361.30	0.18	399.97	378
J-309	363.00	0.18	399.98	362
J-00359	357.59	0.00	399.96	415
J-00365	360.78	0.00	399.96	383
J-00385	359.20	0.00	399.97	399
J-00386	359.20	0.00	399.99	399

Scenario 2A (Future Activa + Multi-Residential)

Active Scenario: Peak Hour

Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (kPa)
J-101	361.22	0.31	398.73	367
J-102	360.72	0.38	398.73	372
J-103	361.19	0.62	398.70	367
J-104	360.01	0.49	398.70	379
J-105	360.20	0.56	398.70	377
J-106	359.21	0.42	398.70	386
J-107	360.20	0.54	398.72	377
J-108	359.15	0.56	398.70	387
J-109	359.80	0.95	398.70	381
J-110	358.86	0.56	398.70	390
J-111	360.37	0.31	398.71	375
J-112	359.95	0.69	398.71	379
J-113	358.90	1.00	398.70	390
J-114	357.75	0.46	398.70	401
J-115	358.40	0.49	398.70	394
J-201	359.40	1.44	398.70	385
J-301	360.00	1.05	398.78	380
J-302	358.50	1.05	398.79	394
J-303	360.40	1.05	398.78	376
J-304	360.40	1.05	398.79	376
J-305	360.80	1.05	398.78	372
J-306	360.80	1.05	398.80	372
J-00307	358.72	0.00	398.70	391
J-307	361.30	1.05	398.78	367
J-308	361.30	1.05	398.84	367
J-309	363.00	1.05	399.35	356
J-00359	357.59	0.00	398.70	402
J-00365	360.78	0.00	398.70	371
J-00385	359.20	0.00	398.84	388
J-00386	359.20	0.00	399.46	394

Scenario 2A (Future Activa + Multi-Residential)

Active Scenario: Max Day + Fire

Label	Satisfies Fire Flow Constraints?	Fire Flow (Needed) (L/s)	Flow (Total Needed) (L/s)	Flow (Total Available) (L/s)	Pressure (Calculated Residual) (kPa)	Junction w/ Minimum Pressure (System)	Hydraulic Grade (m)	Pipe w/ Maximum Velocity	Velocity of Maximum Pipe (m/s)
J-101	True	100.00	100.21	217.29	140	J-102	399.40	P-1	6.92
J-102	True	100.00	100.26	230.26	285	J-101	399.40	P-301	2.90
J-103	True	100.00	100.41	230.41	309	J-101	399.38	P-21	2.13
J-104	True	100.00	100.33	230.33	310	J-103	399.38	P-5	2.84
J-105	True	100.00	100.38	230.38	309	J-104	399.38	P-5	2.81
J-106	True	100.00	100.28	230.28	277	J-105	399.38	P-8	3.89
J-107	True	100.00	100.36	230.36	239	J-111	399.39	P-9	4.67
J-108	True	100.00	100.38	230.38	311	J-201	399.38	P-13	3.19
J-109	True	100.00	100.63	230.63	305	J-104	399.38	P-16	2.96
J-110	True	100.00	100.38	230.38	337	J-103	399.38	P-21	3.32
J-111	True	100.00	100.21	192.65	140	J-112	399.39	P-11	6.13
J-112	True	100.00	100.46	230.46	218	J-111	399.39	P-9	3.75
J-113	True	100.00	100.67	230.67	289	J-111	399.38	P-14	3.44
J-114	True	100.00	100.31	230.31	240	J-115	399.38	P-20	3.91
J-115	True	100.00	100.33	230.33	272	J-114	399.38	P-20	4.98
J-201	True	133.00	133.96	230.96	161	J-108	399.38	P-201	7.35
J-301	True	133.00	133.70	230.70	143	J-303	399.42	P-303	4.79
J-302	True	133.00	133.70	230.70	156	J-301	399.42	P-304	4.76
J-303	True	133.00	133.70	230.70	199	J-301	399.42	P-306	4.24
J-304	True	133.00	133.70	230.70	200	J-302	399.42	P-307	4.34
J-305	True	133.00	133.70	230.70	239	J-303	399.42	P-309	4.06
J-306	True	133.00	133.70	230.70	241	J-304	399.43	P-310	4.28
J-00307	True	100.00	100.00	230.00	372	J-309	399.38	P-21	1.37
J-307	True	133.00	133.70	230.70	270	J-305	399.42	P-301	3.41
J-308	True	133.00	133.70	230.70	286	J-306	399.45	P-313	2.93
J-309	True	133.00	133.70	230.70	183	J-00386	399.69	P-314	3.99
J-00359	True	100.00	100.00	230.00	327	J-105	399.38	P-6	2.99
J-00365	True	100.00	100.00	230.00	283	J-103	399.38	P-3	3.91
J-00385	True	100.00	100.00	230.00	300	J-308	399.45	P-313	3.64
J-00386	True	100.00	100.00	230.00	232	J-309	399.74	P-312	2.98

Scenario 2B (Future Activa + Institutional)

Active Scenario: Average Day

Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (kPa)
J-101	361.22	0.10	399.74	377
J-102	360.72	0.13	399.74	382
J-103	361.19	0.21	399.74	377
J-104	360.01	0.16	399.74	389
J-105	360.20	0.19	399.74	387
J-106	359.21	0.14	399.74	397
J-107	360.20	0.18	399.74	387
J-108	359.15	0.19	399.74	397
J-109	359.80	0.32	399.74	391
J-110	358.86	0.19	399.74	400
J-111	360.37	0.10	399.74	385
J-112	359.95	0.23	399.74	389
J-113	358.90	0.33	399.74	400
J-114	357.75	0.15	399.74	411
J-115	358.40	0.16	399.74	405
J-201	359.40	2.04	399.73	395
J-301	360.00	0.35	399.76	389
J-302	358.50	0.35	399.76	404
J-303	360.40	0.35	399.76	385
J-304	360.40	0.35	399.76	385
J-305	360.80	0.35	399.76	381
J-306	360.80	0.35	399.76	381
J-00307	358.72	0.00	399.74	401
J-307	361.30	0.35	399.76	376
J-308	361.30	0.35	399.77	377
J-309	363.00	0.35	399.87	361
J-00359	357.59	0.00	399.74	412
J-00365	360.78	0.00	399.74	381
J-00385	359.20	0.00	399.77	397
J-00386	359.20	0.00	399.89	398

Scenario 2B (Future Activa + Institutional)

Active Scenario: Max Day

Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (kPa)
J-101	361.22	0.21	399.07	370
J-102	360.72	0.26	399.07	375
J-103	361.19	0.41	399.05	370
J-104	360.01	0.33	399.04	382
J-105	360.20	0.38	399.04	380
J-106	359.21	0.28	399.04	390
J-107	360.20	0.36	399.07	380
J-108	359.15	0.38	399.04	390
J-109	359.80	0.63	399.04	384
J-110	358.86	0.38	399.04	393
J-111	360.37	0.21	399.06	379
J-112	359.95	0.46	399.06	383
J-113	358.90	0.67	399.04	393
J-114	357.75	0.31	399.04	404
J-115	358.40	0.33	399.04	398
J-201	359.40	4.08	399.03	388
J-301	360.00	0.70	399.13	383
J-302	358.50	0.70	399.13	398
J-303	360.40	0.70	399.13	379
J-304	360.40	0.70	399.13	379
J-305	360.80	0.70	399.13	375
J-306	360.80	0.70	399.14	375
J-00307	358.72	0.00	399.04	395
J-307	361.30	0.70	399.12	370
J-308	361.30	0.70	399.17	371
J-309	363.00	0.70	399.54	358
J-00359	357.59	0.00	399.04	406
J-00365	360.78	0.00	399.05	375
J-00385	359.20	0.00	399.17	391
J-00386	359.20	0.00	399.61	396

Scenario 2B (Future Activa + Institutional)

Active Scenario: Min Hour

Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (kPa)
J-101	361.22	0.05	399.94	379
J-102	360.72	0.06	399.94	384
J-103	361.19	0.10	399.93	379
J-104	360.01	0.08	399.93	391
J-105	360.20	0.09	399.93	389
J-106	359.21	0.07	399.93	399
J-107	360.20	0.09	399.94	389
J-108	359.15	0.09	399.93	399
J-109	359.80	0.16	399.93	393
J-110	358.86	0.09	399.93	402
J-111	360.37	0.05	399.93	387
J-112	359.95	0.12	399.93	391
J-113	358.90	0.17	399.93	402
J-114	357.75	0.08	399.93	413
J-115	358.40	0.08	399.93	406
J-201	359.40	1.02	399.93	397
J-301	360.00	0.18	399.94	391
J-302	358.50	0.18	399.94	406
J-303	360.40	0.18	399.94	387
J-304	360.40	0.18	399.94	387
J-305	360.80	0.18	399.94	383
J-306	360.80	0.18	399.94	383
J-00307	358.72	0.00	399.93	403
J-307	361.30	0.18	399.94	378
J-308	361.30	0.18	399.94	378
J-309	363.00	0.18	399.97	362
J-00359	357.59	0.00	399.93	414
J-00365	360.78	0.00	399.93	383
J-00385	359.20	0.00	399.94	399
J-00386	359.20	0.00	399.98	399

Scenario 2B (Future Activa + Institutional)

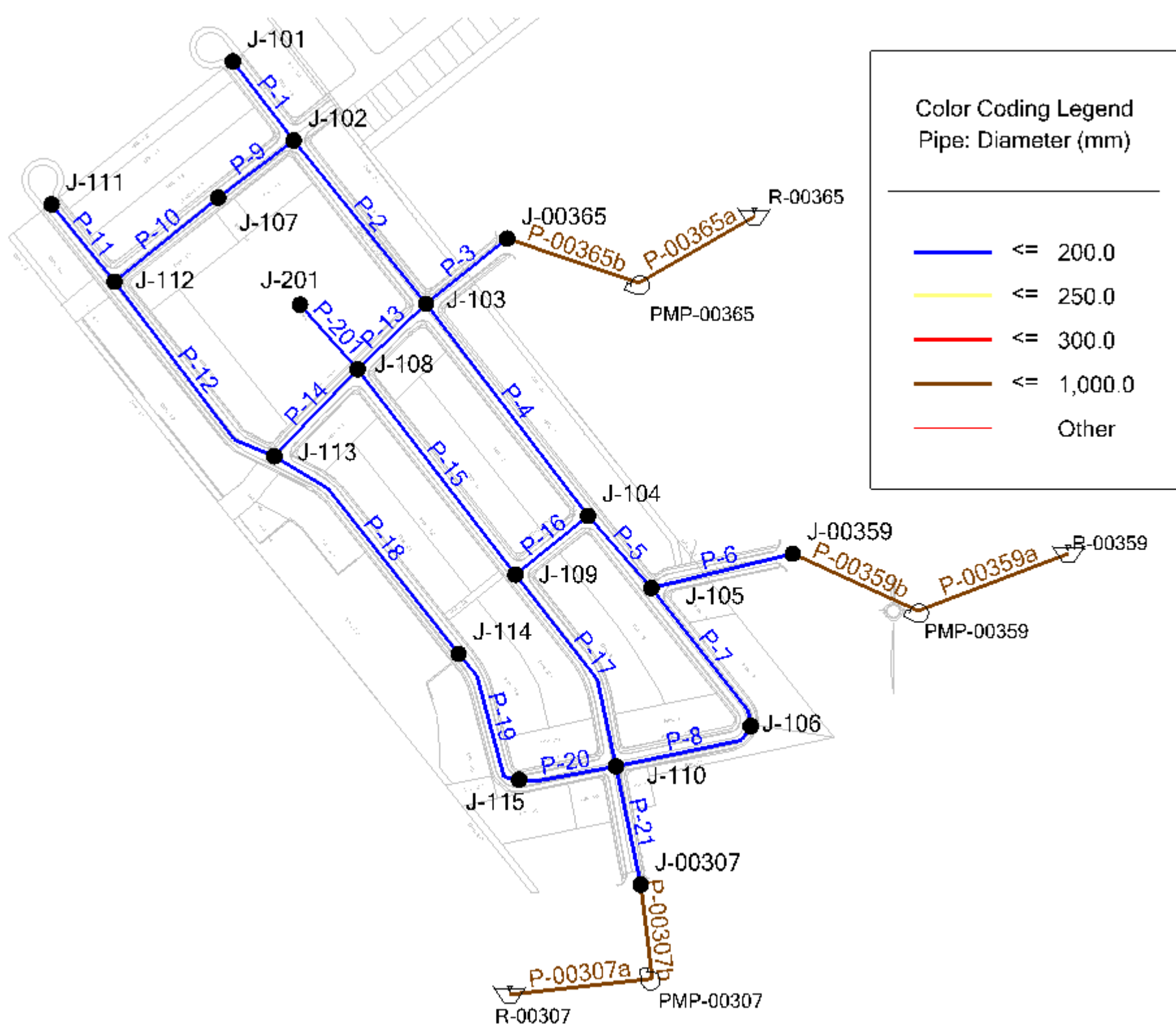
Active Scenario: Peak Hour

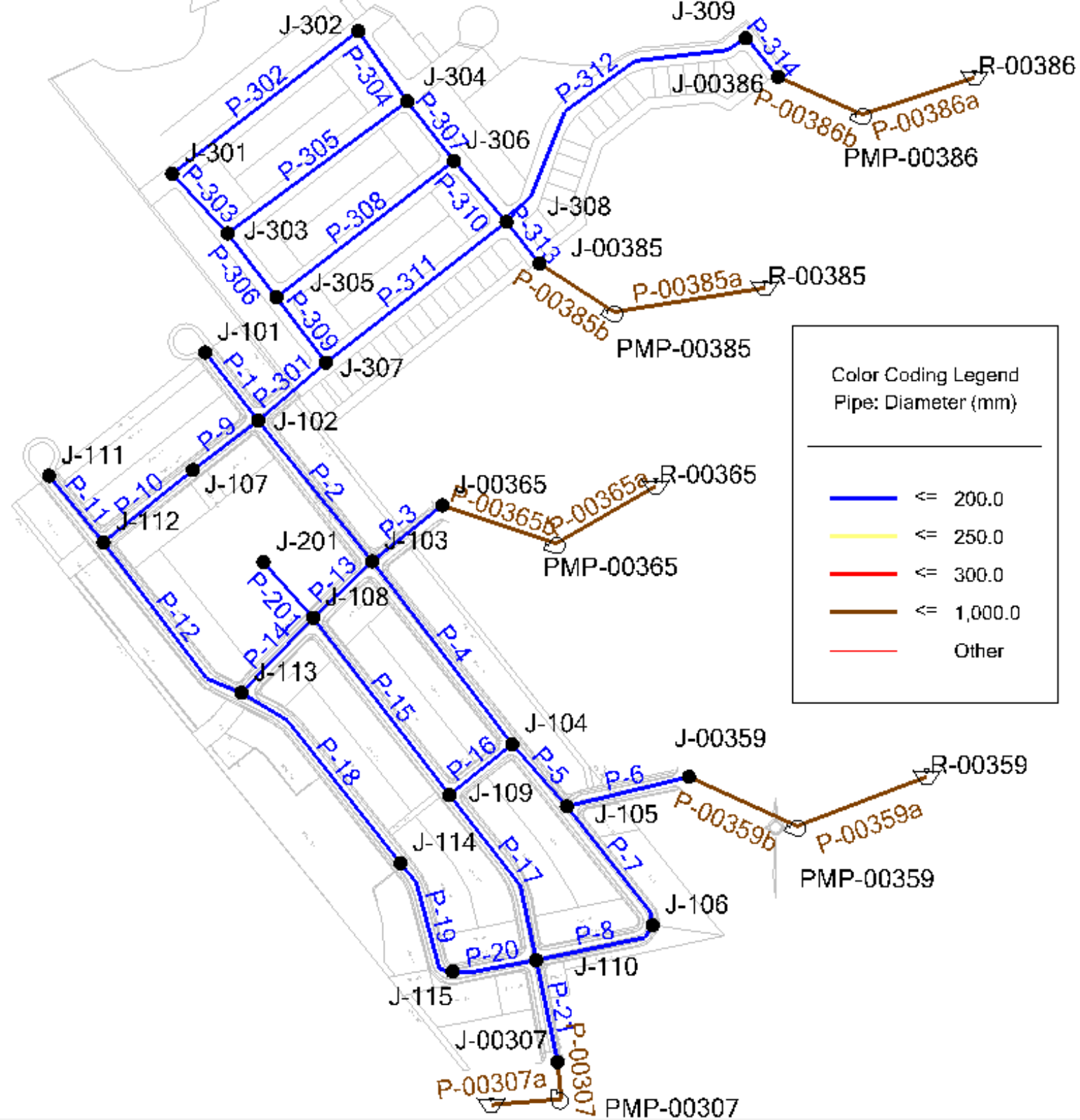
Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (kPa)
J-101	361.22	0.31	398.48	365
J-102	360.72	0.38	398.48	370
J-103	361.19	0.62	398.45	365
J-104	360.01	0.49	398.44	376
J-105	360.20	0.56	398.44	374
J-106	359.21	0.42	398.44	384
J-107	360.20	0.54	398.47	375
J-108	359.15	0.56	398.44	385
J-109	359.80	0.95	398.44	378
J-110	358.86	0.56	398.44	387
J-111	360.37	0.31	398.46	373
J-112	359.95	0.69	398.46	377
J-113	358.90	1.00	398.44	387
J-114	357.75	0.46	398.44	398
J-115	358.40	0.49	398.44	392
J-201	359.40	6.12	398.42	382
J-301	360.00	1.05	398.56	377
J-302	358.50	1.05	398.56	392
J-303	360.40	1.05	398.56	373
J-304	360.40	1.05	398.57	374
J-305	360.80	1.05	398.56	370
J-306	360.80	1.05	398.58	370
J-00307	358.72	0.00	398.45	389
J-307	361.30	1.05	398.55	365
J-308	361.30	1.05	398.63	365
J-309	363.00	1.05	399.24	355
J-00359	357.59	0.00	398.44	400
J-00365	360.78	0.00	398.45	369
J-00385	359.20	0.00	398.63	386
J-00386	359.20	0.00	399.36	393

Scenario 2B (Future Activa + Institutional)

Active Scenario: Max Day + Fire

Label	Satisfies Fire Flow Constraints?	Fire Flow (Needed) (L/s)	Flow (Total Needed) (L/s)	Flow (Total Available) (L/s)	Pressure (Calculated Residual) (kPa)	Junction w/ Minimum Pressure (System)	Hydraulic Grade (m)	Pipe w/ Maximum Velocity	Velocity of Maximum Pipe (m/s)
J-101	True	100.00	100.21	216.89	140	J-102	399.07	P-1	6.90
J-102	True	100.00	100.26	230.26	285	J-101	399.07	P-301	2.91
J-103	True	100.00	100.41	230.41	308	J-101	399.05	P-21	2.16
J-104	True	100.00	100.33	230.33	309	J-103	399.04	P-5	2.85
J-105	True	100.00	100.38	230.38	308	J-104	399.04	P-5	2.80
J-106	True	100.00	100.28	230.28	276	J-105	399.04	P-8	3.89
J-107	True	100.00	100.36	230.36	239	J-111	399.07	P-9	4.67
J-108	True	100.00	100.38	230.38	309	J-201	399.04	P-13	3.23
J-109	True	100.00	100.63	230.63	304	J-104	399.04	P-16	2.96
J-110	True	100.00	100.38	230.38	336	J-103	399.04	P-21	3.34
J-111	True	100.00	100.21	192.24	140	J-112	399.06	P-11	6.12
J-112	True	100.00	100.46	230.46	217	J-111	399.06	P-9	3.75
J-113	True	100.00	100.67	230.67	288	J-111	399.04	P-14	3.42
J-114	True	100.00	100.31	230.31	239	J-115	399.04	P-20	3.91
J-115	True	100.00	100.33	230.33	271	J-114	399.04	P-20	4.98
J-201	True	217.00	221.08	234.08	155	J-108	399.03	P-201	7.45
J-301	True	133.00	133.70	230.70	142	J-303	399.13	P-303	4.79
J-302	True	133.00	133.70	230.70	156	J-301	399.13	P-304	4.76
J-303	True	133.00	133.70	230.70	199	J-301	399.13	P-306	4.24
J-304	True	133.00	133.70	230.70	200	J-302	399.13	P-307	4.34
J-305	True	133.00	133.70	230.70	239	J-303	399.13	P-309	4.06
J-306	True	133.00	133.70	230.70	241	J-304	399.14	P-310	4.28
J-00307	True	100.00	100.00	230.00	372	J-309	399.04	P-21	1.34
J-307	True	133.00	133.70	230.70	270	J-305	399.12	P-301	3.40
J-308	True	133.00	133.70	230.70	286	J-306	399.17	P-313	2.94
J-309	True	133.00	133.70	230.70	183	J-00386	399.54	P-314	4.00
J-00359	True	100.00	100.00	230.00	327	J-105	399.04	P-6	2.99
J-00365	True	100.00	100.00	230.00	282	J-103	399.05	P-3	3.90
J-00385	True	100.00	100.00	230.00	300	J-308	399.17	P-313	3.64
J-00386	True	100.00	100.00	230.00	232	J-309	399.61	P-312	2.98





Appendix F

Storm Sewer Analysis

1012 SNYDER'S ROAD WEST

Community of Baden

Project Number: 40777-104
Date: 10/29/2020
Design By: AJC
Checked By: JEM
File: Q:\40777\104\PRELIMINARY\Storm\40777-104 Preliminary Storm Design.xlsx

STORM SEWER DESIGN SHEET

ENGINEERING AND PUBLIC WORKS

Drainage Area Plan No:

Design Parameters

5 YEAR STORM

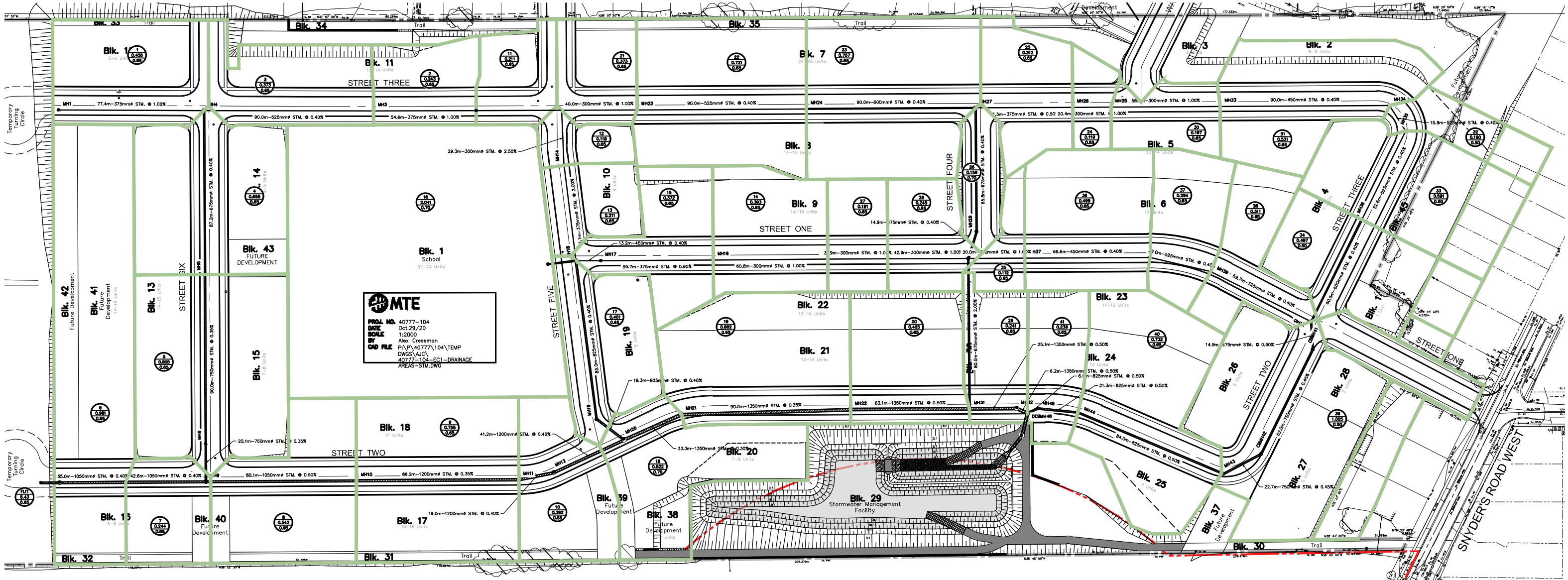
Q=kAIC, k=0.00278
Intensity (I) = a/(tc+b)^c
a = 1593
b = 11
c = 0.8789
Manning's "n" 0.013
Min. Velocity 0.800 m/s
Max. Velocity 6.000 m/s



LOCATION				STORMWATER FLOW								DESIGN					
STREET	AREA NUMBER	MANHOLE LOCATION		AREA (A)	RUNOFF COEFF. (C)	A x C	CUMUL. A x C	CONCENTRATION TIME		RAIN INTENSITY (I)	FLOW (Q)	PIPE SIZE	LENGTH	SLOPE	CAPACITY	FULL FLOW VELOCITY	
		FROM MH	TO MH					TOTAL	IN PIPE								
				ha		ha	ha	min	min	mm/hr	L/s	mm	m	%	L/s	m/s	%
STREET THREE	1	1	4	0.456	0.65	0.2964	0.2964	10.0000 10.8067	0.8067	109.67742	90.37332	375	77.4	1.00	175.33014	1.5875	51.54
STREET THREE	2	2	3	0.243	0.65	0.1580	0.4544	10.0000	0.5172	109.67742	138.53279	375	54.6	1.00	175.33014	1.5875	79.01
	3	3	4	0.373	0.65	0.2425	0.6968	10.5172 11.6010	1.0838	107.35707	207.96181	525	90.0	0.40	271.99526	1.2565	76.46
STREET SIX	4	4	5	0.658	0.65	0.4277	1.4209	11.6010	0.8882	102.81893	406.14526	675	87.2	0.40	531.63462	1.4856	76.40
	5	5	6	0.805	0.65	0.5233	1.9442	12.4892	0.9027	99.39376	537.19715	750	90.0	0.35	658.62356	1.4908	81.56
		6	9	0.000	0.65	0.0000	1.9442	13.3919 13.5947	0.2028	96.15364	519.68512	750	20.1	0.35	658.62356	1.4908	78.90
FUTURE DEVELOPMENT	PLUG		7	5.430	0.65	3.5295	3.5295	12.5000 12.5753	0.0753	99.35374	974.85992	900	10.0	0.50	1280.08329	2.0122	76.16
STREET TWO	6	7	8	0.981	0.65	0.6377	4.1672	12.5753	0.2734	99.07496	1147.75136	1050	35.0	0.40	1727.06226	1.9945	66.46
	7	8	9	0.244	0.65	0.1586	4.3258	12.8486 13.1794	0.3308	98.07602	1179.42154	1050	42.6	0.40	1727.06226	1.9945	68.29
STREET TWO	8	9	10	0.542	0.65	0.3523	6.6222	13.5947	0.5283	95.45649	1757.32689	1050	80.1	0.50	1930.91431	2.2299	91.01
	9	10	11	0.755	0.65	0.4908	7.1130	14.1230	0.6337	93.68997	1852.62553	1200	86.2	0.35	2306.51994	2.0394	80.32
	10	11	12	0.392	0.65	0.2548	7.3678	14.7566	0.1320	91.66112	1877.43468	1200	19.0	0.40	2465.77353	2.1802	76.14
		12	20	0.000	0.65	0.0000	7.3678	14.8886 15.1750	0.2864	91.25034	1869.02104	1200	41.2	0.40	2465.77353	2.1802	75.80
STREET THREE	11	2	13	0.211	0.65	0.1372	0.1372	10.0000	0.5741	109.67742	41.81748	300	45.4	1.00	96.70076	1.3680	43.24
	12	13	14	0.118	0.65	0.0767	0.2139	10.5741	0.2366	107.10818	63.67614	300	29.3	2.50	152.89732	2.1631	41.65
	13	14	18	0.211	0.65	0.1372	0.3510	10.8106 11.2079	0.3973	106.08647	103.51705	375	51.1	2.00	247.95426	2.2450	41.75
STREET ONE	14	15	16	0.393	0.65	0.2555	0.2555	10.0000	0.6660	109.67742	77.88753	300	60.8	1.00	96.70076	1.3680	80.54
	15	16	17	0.358	0.65	0.2327	0.4882	10.6660	0.5865	106.70886	144.81000	375	59.7	0.90	166.33278	1.5060	87.06
		17	18	0.000	0.00	0.0000	0.4882	11.2525 11.4278	0.1753	104.23301	141.45014	450	13.2	0.40	180.31696	1.1338	78.45
SCHOOL/MULTI-RES	16	PLUG	18	2.041	0.70	1.4287	1.4287	10.0000 10.1061	0.1061	109.67742	435.61525	600	15.0	1.00	614.01154	2.1716	70.95

LOCATION				STORMWATER FLOW								DESIGN					
STREET	AREA NUMBER	MANHOLE LOCATION		AREA (A)	RUNOFF COEFF. (C)	A x C	CUMUL. A x C	CONCENTRATION TIME		RAIN INTENSITY (I)	FLOW (Q)	PIPE SIZE	LENGTH	SLOPE	CAPACITY	FULL FLOW VELOCITY	
		FROM MH	TO MH					TOTAL	IN PIPE								
				ha		ha	ha	min	min	mm/hr	L/s	mm	m	%	L/s	m/s	%
STREET FIVE	17	18	19	0.401	0.65	0.2607	2.5285	11.4278	0.7506	103.51658	727.64186	825	85.0	0.40	907.84922	1.6983	80.15
		19	20	0.000	0.65	0.0000	2.5285	12.1784	0.1625	100.56442	706.89043	825	18.3	0.40	907.84922	1.6983	77.86
								12.3409									
STREET TWO	18	20	21	0.522	0.70	0.3654	10.2617	15.1750	0.2408	90.37226	2578.08438	1350	33.3	0.30	2923.41550	2.0424	88.19
	19	21	22	0.662	0.65	0.4303	10.6920	15.4158	0.6065	89.64784	2664.65829	1350	90.0	0.35	3157.64963	2.2060	84.39
	20	22	31	0.425	0.65	0.2763	10.9682	16.0223	0.3676	87.87696	2679.50875	1350	63.1	0.50	3774.11318	2.6367	71.00
STREET THREE	21	13	23	0.232	0.65	0.1508	0.1508	10.0000	0.4936	109.67742	45.97941	300	40.0	1.00	96.70076	1.3680	47.55
	22	23	24	0.721	0.65	0.4687	0.6195	10.4936	1.1103	107.46042	185.05447	525	90.0	0.40	271.99526	1.2565	68.04
	23	24	27	0.757	0.65	0.4921	1.1115	11.6039	0.9793	102.80733	317.67155	600	90.0	0.40	388.33500	1.3735	81.80
STREET THREE	24	25	26	0.119	0.65	0.0774	0.0774	10.0000	0.3012	109.67742	23.58427	300	20.4	1.00	96.70076	1.3680	24.39
	25	26	27	0.312	0.65	0.2028	0.2802	10.3012	0.7111	108.31312	84.35610	375	51.5	0.50	123.97713	1.1225	68.04
								11.0123									
STREET FOUR	26	27	28	0.156	0.70	0.1092	1.5009	12.5832	0.6681	99.04565	413.25439	675	65.8	0.40	531.63462	1.4856	77.73
		28	30	0.000	0.00	0.0000	1.5009	13.2513	0.1520	96.64354	403.23192	675	14.9	0.40	531.63462	1.4856	75.85
								13.4032									
STREET ONE	27	15	29	0.191	0.65	0.1242	0.1242	10.0000	0.4140	109.67742	37.85374	300	31.9	1.00	96.70076	1.3680	39.15
	28	29	30	0.245	0.65	0.1593	0.2834	10.4140	0.4634	107.81149	84.93949	300	42.9	1.00	96.70076	1.3680	87.84
								10.8774									
WALKWAY BLOCK	WALKWAY	30	31	0.000	0.00	0.0000	1.7843	13.4032	0.4249	96.11435	476.74783	675	80.0	2.00	1188.77116	3.3220	40.10
STREET TWO	29	31	32	0.241	0.65	0.1567	12.9091	16.3899	0.1420	86.83965	3116.44039	1350	25.1	0.50	3774.11318	2.6367	82.57
		32	46	0.000	0.00	0.0000	12.9091	16.5319	0.0351	86.44578	3102.30559	1350	6.2	0.50	3774.11318	2.6367	82.20
								16.5670									
STREET THREE	30	25	33	0.197	0.65	0.1281	0.1281	10.0000	0.7467	109.67742	39.04286	300	58.0	1.00	96.70076	1.3680	40.37
	31	33	34	0.571	0.65	0.3712	0.4992	10.7467	1.1862	106.36080	147.60497	450	90.0	0.40	180.31696	1.1338	81.86
	32	34	35	0.190	0.50	0.0950	0.5942	11.9328	0.2005	101.51012	167.68213	525	15.9	0.40	271.99526	1.2565	61.65
	33	35	36	0.591	0.50	0.2955	0.8897	12.1334	0.6153	100.73628	249.15770	525	52.6	0.40	271.99526	1.2565	91.60
	34	36	40	0.497	0.50	0.2485	1.1382	12.7487	0.6605	98.43880	311.47965	600	60.5	0.40	388.33500	1.3735	80.21
STREET ONE								13.4092									
	35	30	37	0.112	0.65	0.0728	0.0728	10.0000	0.4503	109.67742	22.19696	300	30.0	1.00	96.70076	1.3680	22.95
	36	37	38	0.499	0.65	0.3244	0.3972	10.4503	0.9197	107.65111	118.85511	450	66.8	0.40	180.31696	1.1338	65.91
	37	38	39	0.294	0.65	0.1911	0.5883	11.3700	0.4151	103.75153	169.66850	525	33.0	0.40	271.99526	1.2565	62.38
	38	39	40	0.311	0.65	0.2022	0.7904	11.7851	0.7091	102.08856	224.32042	525	59.7	0.40	271.99526	1.2565	82.47
STREET TWO								12.4941									
		40	41	0.000	0.00	0.0000	1.9286	13.4092	0.1328	96.09367	515.20698	675	14.9	0.50	594.38558	1.6610	86.68
	39	41	42	1.025	0.50	0.5125	2.4411	13.5420	0.5428	95.63648	649.01385	750	62.0	0.45	746.80892	1.6904	86.90
		42	43	0.000	0.00	0.0000	2.4411	14.0848	0.1993	93.81530	636.65481	750	22.7	0.45	746.80892	1.6904	85.25

LOCATION				STORMWATER FLOW								DESIGN					
STREET	AREA NUMBER	MANHOLE LOCATION		AREA (A)	RUNOFF COEFF. (C)	A x C	CUMUL. A x C	CONCENTRATION TIME		RAIN INTENSITY (I)	FLOW (Q)	PIPE SIZE	LENGTH	SLOPE	CAPACITY	FULL FLOW VELOCITY	
		FROM MH	TO MH					TOTAL	IN PIPE								
				ha		ha	ha	min	min	mm/hr	L/s	mm	m	%	L/s	m/s	%
SWMF	40	43	44	0.732	0.65	0.4758	2.9169	14.2841	0.6730	93.16498	755.47311	825	84.0	0.50	1015.00629	1.8988	74.43
	41	44	45	0.239	0.65	0.1554	3.0723	14.9571	0.1697	91.03875	777.54877	825	21.3	0.50	1015.00629	1.8988	76.61
		45	46	0.000	0.00	0.0000	3.0723	15.1268	0.0478	90.51891	773.10892	825	6.0	0.50	1015.00629	1.8988	76.17
								15.1746									
		46	SWMF	0.000	0.00	0.0000	15.9814	16.5670	0.0491	86.34900	3836.32677	1350	10.0	0.65	4303.15110	3.0063	89.15



Stantec Technical Memo Dedicated Storm Sewer System for Low Lying Areas near Existing DICB158

March 29, 2021
File: 603-05680/03

Attention: Mr. Jeff Molenhuis / Mr. Bryan Bishop

Township of Wilmot
60 Snyder's Road West
Baden ON N3A 1A1

Dear Sirs,

**Reference: Activa Baden North Subdivision
Dedicated Storm Sewer System for Low Lying Areas near Existing DICB 158**

This letter has been prepared to outline and evaluate various alternatives considered to drain the low areas at the rear of Michael Myers Road existing Lots 3 to 12. It further recommends and provides design details for the preferred alternative that addresses the storm outlet required for these existing developed lands and adjacent areas included in the proposed Activa Baden North Subdivision.

Background

As per the Grading Plans and Storm Drainage Area Plans prepared for the existing Activa Baden Subdivision, rear yards of Lots 3 to 8 on Michael Myers Road drain to an existing DICB 158 located within an easement between Lots 6 and 7. Similarly, rear yards of Lots 9 to 12 on Michael Myers Road drain to an existing RLCB 159 located within an easement between Lots 8 and 9. Under the current conditions, existing DICB 158 and RLCB 159 convey 5-year storm flows to the existing storm sewers on Michel Myers Road. Storm flows, in excess of 5-year storm events, pond around DICB 158 within the existing low-lying area (with a bottom elevation of approximately 358.0 m and a corresponding spillover elevation of approximately 358.8 m) and drain towards the existing wetland located north of the existing Subdivision within the proposed Activa North Subdivision lands; however, under the proposed development conditions (i.e., development of Activa North Subdivision), an alternative conveyance solution is required to drain the 100-year storm events while maintaining a positive drainage to an acceptable outlet without impacting the adjacent existing homes.

Under the current conditions, DICB 158 and RLCB 159 also convey 5-year storm flows from some of the adjacent undeveloped lands to the west known as 1012 Snyder's Road West. MTE Consultant Inc., on behalf of the Owner of these lands, had prepared a Technical Memorandum in July 2020 summarizing the analyses of various options and recommended a preferred option that proposed a conveyance pipe system for the 100-year storm flows from the drainage areas currently allocated to DICB 158 and RLCB 159 through the proposed Activa North Subdivision discharging to the proposed stormwater management (SWM) Facility within the Activa North Subdivision.

Please refer to the attached Storm Drainage Area Plan Drawing No. 11 prepared by Stantec for the existing Baden Subdivision for current areas draining to DICB 158 and RLCB 159 in the existing conditions.

Storm Pipe System Alternatives

For the proposed conditions with Activa North and 1012 Snyder's Road West Subdivisions being developed, the following two alternatives were evaluated for the proposed storm pipe system to convey 100-year design storm flows from the drainage areas currently allocated to DICB 158 and RLCB 159:

1. Alternative 1: Dedicated Storm Sewer to convey 100-year design flows from the subject drainage area under proposed conditions up to the proposed SWM Facility within Activa North Subdivision.
2. Alternative 2: Combined Storm Sewer to convey 100-year flows from the subject drainage area under proposed conditions and additional 5-year design flows from the proposed drainage area along the route of the storm sewer up to the proposed SWM Facility within Activa North Subdivision.

Design with community in mind

**Reference: Activa Baden North Subdivision
Dedicated Storm Sewer System for Low Lying Areas near Existing DICB 158**

Under proposed conditions during the 100-year event, it is understood that the existing storm sewer system conveying the drainage from the above noted DICB 158 would surcharge. That said, to ensure there is no backwater effect, it is proposed to plug the existing storm pipe from DICB 158 and that DICB 158 be decommissioned and removed. A new inlet structure would be installed to collect the flows and convey to the proposed SWM Facility within the Activa North Subdivision via one of the alternatives noted above.

Preliminary Cost Estimates

A preliminary Opinion of Probable Cost (OPC) estimate was prepared for the two alternatives noted above. Based on these estimates included as an attachment to this letter, the following presents the estimated construction cost (excluding HST) for the two alternatives:

1. Alternative 1 (Dedicated Storm Sewer): Total construction cost is estimated at approximately \$787,000 made up of approximately \$378,000 for the dedicated storm sewer and \$409,000 for the additional local storm sewers along the route of the dedicated storm sewer up to the proposed SWM Facility.
2. Alternative 2 (Combined Storm Sewer): Total construction cost is estimated at approximately \$1,067,000 that includes an approximate \$364,000 estimated for the additional fill required to raise the site by approximately 0.15 m for this alternative to be feasible.

Based on the OPC estimates noted above, Alternative 1 represents the least cost alternative. It is therefore recommended to proceed with Alternative 1 (Dedicated Storm Sewer).

The above noted alternatives and their respective cost estimates have previously been discussed with the Township staff, Owner of the adjacent 1012 Snyder's Road West Subdivision and their consultant MTE. It was further discussed that the cost would be shared between two developments based on respective drainage area contributions from these developments. It should be noted that design of the preferred alternative and corresponding cost estimates would be updated and finalized as part of the preparation of the Functional Servicing Report (FSR) for Activa Baden North Subdivision. That said, based on our review of the preliminary design completed to-date, the dedicated storm sewer would be a 600 mm diameter which represents a reduction from 675 mm diameter noted in the above estimates which would be finalized and included in the FSR.

Alternative Locations for Dedicated Storm Sewer

Based on proceeding with the preferred alternative of dedicated storm sewer for the subject drainage area as discussed above, Stantec had prepared and discussed the following three options, included as an attachment to this letter, for the road cross section where this dedicated storm sewer could be located in addition to other utilities such as watermain, sanitary sewer and local storm sewer, etc.:

1. Option 1: Dedicated storm sewer would be located between local storm sewer (underneath the curb line) and the sanitary sewer (underneath the centerline of road) – Dedicated storm sewer and local storm sewers would be located on the west side and north side of the right-of-way (ROWs).
2. Option 2: Dedicated storm sewer would be located underneath the curb line and the local storm sewer would be located between the dedicated storm sewer and sanitary sewer (underneath the centerline of road) - Dedicated storm sewer and local storm sewers would be located on the west side and north side of the ROWs.
3. Option 3: Dedicated Storm Sewer would be located between local storm sewer (underneath the curb line) and the sanitary sewer (underneath the centerline of road) - Dedicated storm sewer and local storm sewers would be located on the east side and south side of the ROWs.

**Reference: Activa Baden North Subdivision
Dedicated Storm Sewer System for Low Lying Areas near Existing DICB 158**

Based on a review and analysis of the design details of the above-noted options, it was concluded that Option 2 is the preferred option for the location of the proposed dedicated storm sewer. The attached Drainage Area Plan shows the proposed locations of the sanitary sewers, storm sewers and watermain based on this preferred Option 2.

Design Details of Preferred Alternative

The preliminary design details of the preferred alternative are shown on the attached documents as noted below:

- Drainage Area Plan under proposed conditions for the dedicated storm sewer
- Design spreadsheet for the dedicated storm sewer
- Proposed Grading Plan near the inlet to the dedicated storm sewer pipe
- Drainage Area Plan Proposed Conditions Drawing No. C110
- Preliminary profile for the dedicated storm sewer pipe (Drawing No. TM100) from the inlet at the rear yards to the outlet at the SWM Facility. This profile also shows the local storm and sanitary sewers along this route

The above noted design details would be updated, as necessary, and included in the FSR for the Township's review and approval.

Should you have any questions or require any additional information, please do not hesitate to contact the undersigned.

Regards,

STANTEC CONSULTING LTD.

Hitesh Lad, M.Eng., P.Eng.
Associate/Project Manager
Community Development
Mobile: (519) 498-2809
hitesh.lad@stantec.com

Kevin Brousseau, L.E.T., C.E.T.
Principal/Practice Leader
Community Development
Mobile: (519) 501-9367
kevin.brousseau@stantec.com

Attachments: Storm Drainage Area Plan Drawing # 11 for Existing Baden Subdivision
Preliminary OPC Cost Estimates dated October 15, 2020 (3 pages)
Drainage Catchments Proposed Areas for Dedicated Storm Sewer Pipe
Preliminary Design Spreadsheet for Dedicated Storm Sewer Pipe
Preliminary Proposed Grading Plan near inlet to Dedicated Storm Sewer Pipe
Proposed Road Cross Section Options Figures (3 Figures)
Preliminary Drainage Area Plan for Proposed Conditions Drawing C110
Preliminary Plan and Profile for Dedicated Storm Sewer Pipe Drawing TM100

c. Mr. Peter Armbruster, Activa Holdings Inc.
Mr. Steve Peterson, MTE

ATTACHMENTS

Storm Drainage Area Plan Drawing # 11 for Existing Baden Subdivision

Preliminary OPC Cost Estimates dated October 15, 2020 (3 pages)

Drainage Catchments Proposed Areas for Dedicated Storm Sewer Pipe

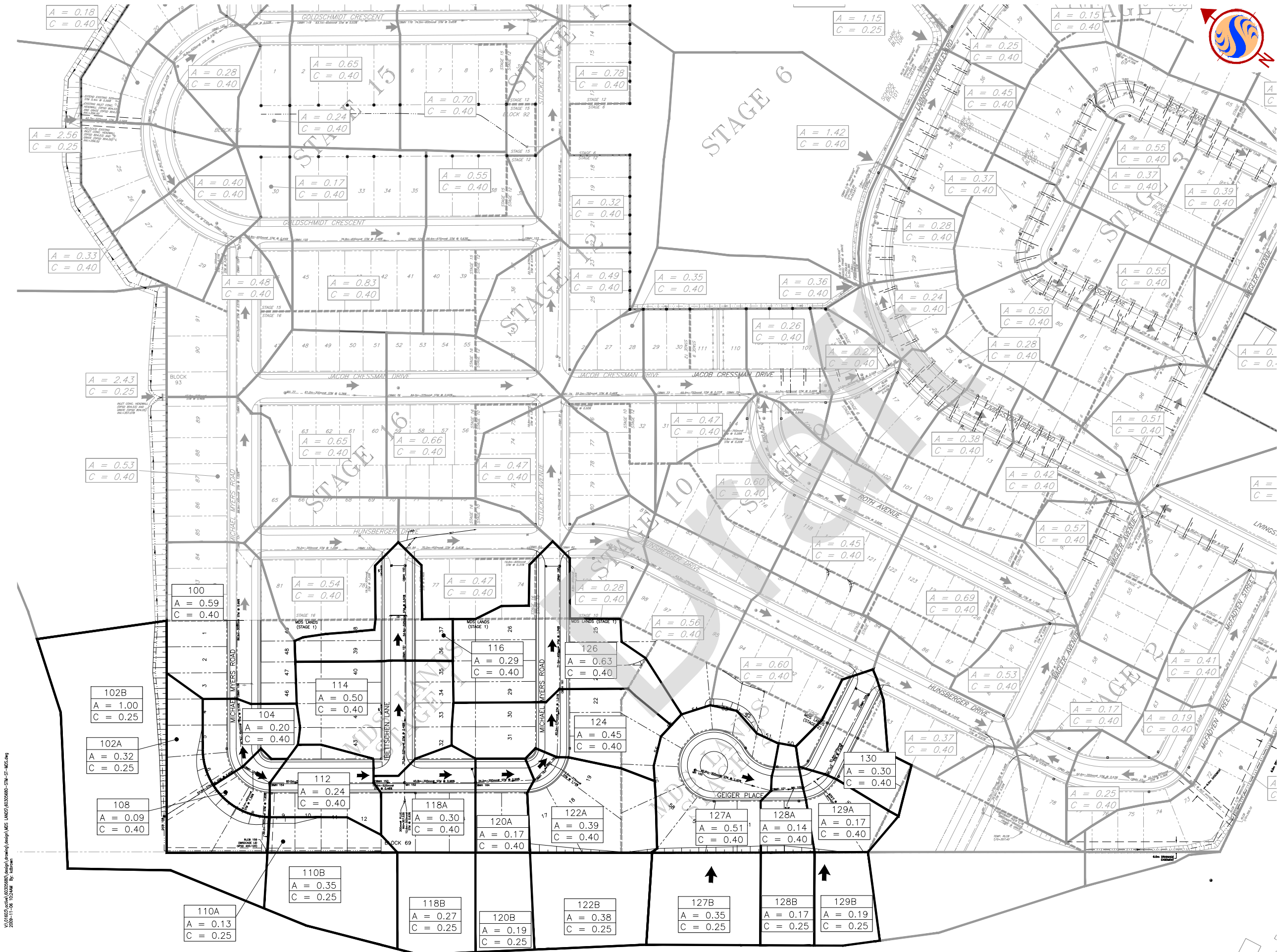
Preliminary Design Spreadsheet for Dedicated Storm Sewer Pipe

Preliminary Proposed Grading Plan near inlet to Dedicated Storm Sewer Pipe

Proposed Road Cross Section Options Figures (3 Figures)

Preliminary Drainage Area Plan for Proposed Conditions Drawing C110

Preliminary Plan and Profile for Dedicated Storm Sewer Pipe Drawing TM100





Stantec Consulting Ltd.
49 Frederick Street
Kitchener ON Canada
N2H 6M7
Tel. 519.579.4410
Fax. 519.579.6733
www.stantec.com

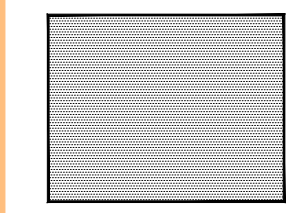
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The Contractor shall verify and be responsible for all dimensions. DO NOT scale the drawing - any errors or omissions shall be reported to Stantec Consulting Ltd. without delay.
The Copyrights to all designs and drawings are the property of Stantec Consulting Ltd. Reproduction or use for any purpose other than that authorized by Stantec Consulting Ltd. is forbidden.

- Notes
- BENCHMARK: #3. ELEV.=354.808m
BOLT & WASHERS IN NORTH FACE OF HYDRO LIGHT POLE
LOCATED AT S.W. CORNER OF SNYDER ROAD (REG. ROAD #1)
AND MILL STREET. *AS SUPPLIED BY REGION OF WATERLOO*.
 - TOPOGRAPHICAL INFORMATION FROM FIELD SURVEY BY STANTEC CONSULTING LIMITED, COMPLETED JULY 2008.
 - LEGAL PLAN PROVIDED BY METZ & LORENTZ LTD.
PROJECT NO. WS-117-11.
- STAGING / PHASING LIMITS
- 110A

A = 0.09
C = 0.25
- DRAINAGE AREA I.D.
DRAINAGE AREA (ha)
RUNOFF COEFFICIENT
- DRAINAGE AREA BOUNDARY
- EXTERNAL DRAINAGE
- AC=0.34
Tc=15.00

←
- ACCUMULATED AREA/RUNOFF COEFFICIENT
TIME OF CONCENTRATION
MAJOR OVERLAND FLOW



16. MDS LANDS - MDE COMMENTS	K.D.B.	P.D.F.	09.11.06
15. MDS STAGE 2 - FINAL LOTTING	K.D.B.	P.D.F.	09.10.26
14. MDS STAGE 1 - SECOND SUBMISSION	K.D.B.	P.D.F.	09.09.11
13. MDS STAGE 1 - FIRST SUBMISSION	K.D.B.	K.D.	09.07.07
12. THIRD SUBMISSION	K.D.B.	K.D.	08.05.09
11. SECOND SUBMISSION	J.C.M.	K.D.	08.01.16
10. STAGES 15 & 16 FINAL LOTTING	D.F.H.	V.E.R.	07.05.25
9. STAGES 10,17,18&MDS LANDS STG2 FIRST SUBMISSION COMMENTS	D.F.H.	V.E.R.	06.02.01
8. STAGES 10,17,18&MDS LANDS STG 2 FINAL LOTTING	D.F.H.	V.E.R.	05.12.16
7. STAGES 11,12,13&14 FIRST SUBMISSION COMMENTS	D.F.H.	V.E.R.	05.07.21
6. STAGES 11,12,13 & 14 FINAL LOTTING	D.F.H.	V.E.R.	05.03.18
5. AS RECORDED STAGES 2,7,8, & 9			
4. STAGES 2,7,8 & 9 FIRST SUBMISSION COMMENTS	M.D.H.	V.E.R.	04.03.04
3. STAGES 2,7,8 & 9 FINAL LOTTING	M.D.H.	V.E.R.	04.02.10
2. REGION OF WATERLOO COMMENTS	K.R.B.	VER	01.10.10
1. FIRST SUBMISSION COMMENTS	K.R.B.	VER	01.08.16
Revision	By	Appd.	Date
File Name:	K.R.B.	V.E.R.	01.06.01
	Dwn.	Chkd.	Dagn.
Seal			Date

Client/Project
ACTIVA HOLDINGS INC.

BADEN SUBDIVISION
30T-04603
Township of Wilmot, ON Canada

Title
STORM DRAINAGE
AREA PLAN

Project No. 60305680
Scale 1:1000
Drawing No. Revision



**ACTIVA BADEN NORTH
ACTIVA HOLDINGS INC.**

**OPINION OF PROBABLE CONSTRUCTION COST
Option 1 - SW Corner Dedicated Storm Pipe**

Stantec Project # 60305680
15-Oct-20

Item	Description	Unit	Quantity	Unit Price	Total
Option 1: Dedicated Storm Pipe c/w Outlet Headwall					
1.0	675 mm dia Storm Sewers	m	582.0	\$ 450.00	\$ 261,900.00
2.0	1500 mm dia Maintenance Holes	ea	8.0	\$ 6,500.00	\$ 52,000.00
3.0	Headwall c/w Rodent Grate	ea	1.0	\$ 15,000.00	\$ 15,000.00
	Sub-Total				\$ 328,900.00
	Contingency @ 15%				\$ 49,335.00
	Total Construction Cost (excluding HST):				\$ 378,235.00



**ACTIVA BADEN NORTH
ACTIVA HOLDINGS INC.**

**OPINION OF PROBABLE CONSTRUCTION COST
ROW Storm Pipe (In addition to Dedicated STM Option 1)**

Stantec Project # 60305680
15-Oct-20

Item	Description	Unit	Quantity	Unit Price	Total
ROW Storm Pipe c/w Outlet Headwall					
1.0	300 mm dia Storm Sewers	m	66.0	\$ 150.00	\$ 9,900.00
2.0	375 mm dia Storm Sewers	m	82.0	\$ 190.00	\$ 15,580.00
3.0	450 mm dia Storm Sewers	m	80.0	\$ 225.00	\$ 18,000.00
4.0	525 mm dia Storm Sewers	m	154.0	\$ 300.00	\$ 46,200.00
5.0	600 mm dia Storm Sewers	m	77.0	\$ 375.00	\$ 28,875.00
6.0	675 mm dia Storm Sewers	m	14.0	\$ 450.00	\$ 6,300.00
6.0	1350 mm dia Storm Sewers	m	38.0	\$ 1,200.00	\$ 45,600.00
6.0	1500 mm dia Storm Sewers	m	49.0	\$ 1,350.00	\$ 66,150.00
7.0	1200 mm dia Maintenance Holes	ea	3.0	\$ 5,000.00	\$ 15,000.00
7.0	1500 mm dia Maintenance Holes	ea	6.0	\$ 6,500.00	\$ 39,000.00
9.0	2400 mm dia Maintenance Holes	ea	2.0	\$ 20,000.00	\$ 40,000.00
10.0	Headwall c/w Rodent Grate	ea	1.0	\$ 25,000.00	\$ 25,000.00
	Sub-Total				\$ 355,605.00
	Contingency @ 15%				\$ 53,340.75
	Total Construction Cost (excluding HST):				\$ 408,945.75



**ACTIVA BADEN NORTH
ACTIVA HOLDINGS INC.**

**OPINION OF PROBABLE CONSTRUCTION COST
Option 2 - SW Corner Combined Storm Pipe**

Stantec Project # 60305680
15-Oct-20

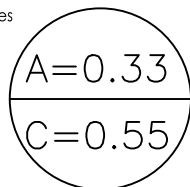
Item	Description	Unit	Quantity	Unit Price	Total
Option 2: Combined Storm Pipe c/w Outlet Headwall					
1.0	675 mm dia Storm Sewers	m	102.0	\$ 450.00	\$ 45,900.00
2.0	750 mm dia Storm Sewers	m	160.0	\$ 480.00	\$ 76,800.00
3.0	825 mm dia Storm Sewers	m	230.0	\$ 525.00	\$ 120,750.00
4.0	900 mm dia Storm Sewers	m	14.0	\$ 600.00	\$ 8,400.00
5.0	1500 mm dia Storm Sewers	m	38.0	\$ 1,350.00	\$ 51,300.00
6.0	1800 mm dia Storm Sewers	m	49.0	\$ 2,000.00	\$ 98,000.00
7.0	1500 mm dia Maintenance Holes	ea	5.0	\$ 6,500.00	\$ 32,500.00
8.0	1800 mm dia Maintenance Holes	ea	4.0	\$ 10,000.00	\$ 40,000.00
9.0	3000 mm dia Maintenance Holes	ea	2.0	\$ 30,000.00	\$ 60,000.00
10.0	Headwall c/w Rodent Grate	ea	1.0	\$ 30,000.00	\$ 30,000.00
11.0	Additional fill required (~26ha x 0.14m)	cum	36,400.0	\$ 10.00	\$ 364,000.00
	Sub-Total				\$ 927,650.00
	Contingency @ 15%				\$ 139,147.50
	Total Construction Cost (excluding HST):				\$ 1,066,797.50

V:\01403\active\60305680\design\drawing\civil\sheet_files\60305680_C-110SD-FSR_TOWNSHIP_AREA
DRAWING SOUTH.dwg
3/23/2021 3:25:12 PM By: Miller, Jonathan



Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo ON N2L 0A4
Tel: (519) 579-4410
www.stantec.com

Notes



RUNOFF COEFFICIENT

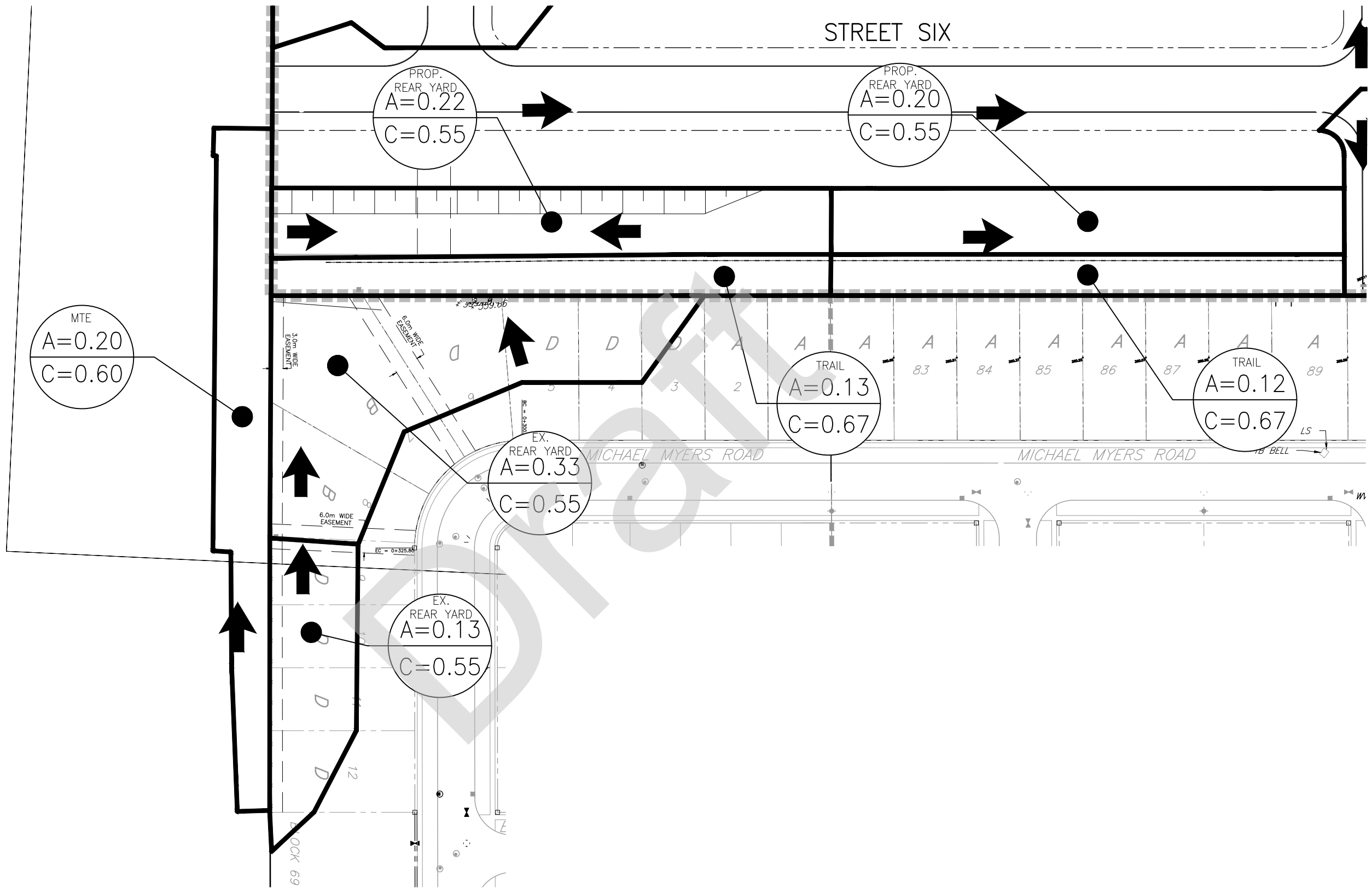
CONTRIBUTING AREA (ha)



MAJOR OVERLAND FLOOD ROUTE



DRAINAGE BOUNDARY



Client/Project

ACTIVA HOLDINGS INC.

ACTIVA BADEN

Project No.

60305680

Title

DRAINAGE CATCHMENTS
PROPOSED AREAS

Revision

Reference Sheet

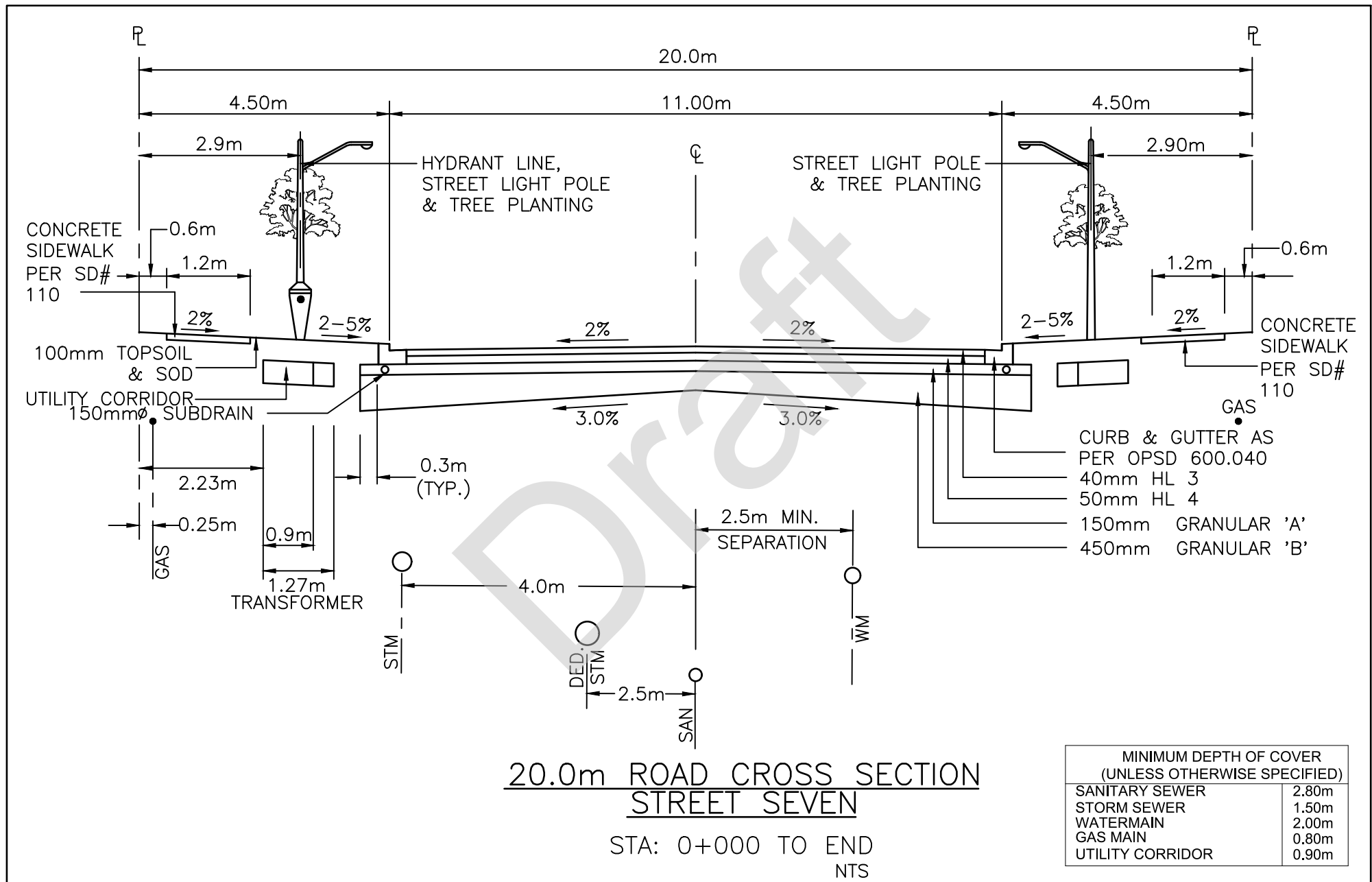
Date

21.03.29

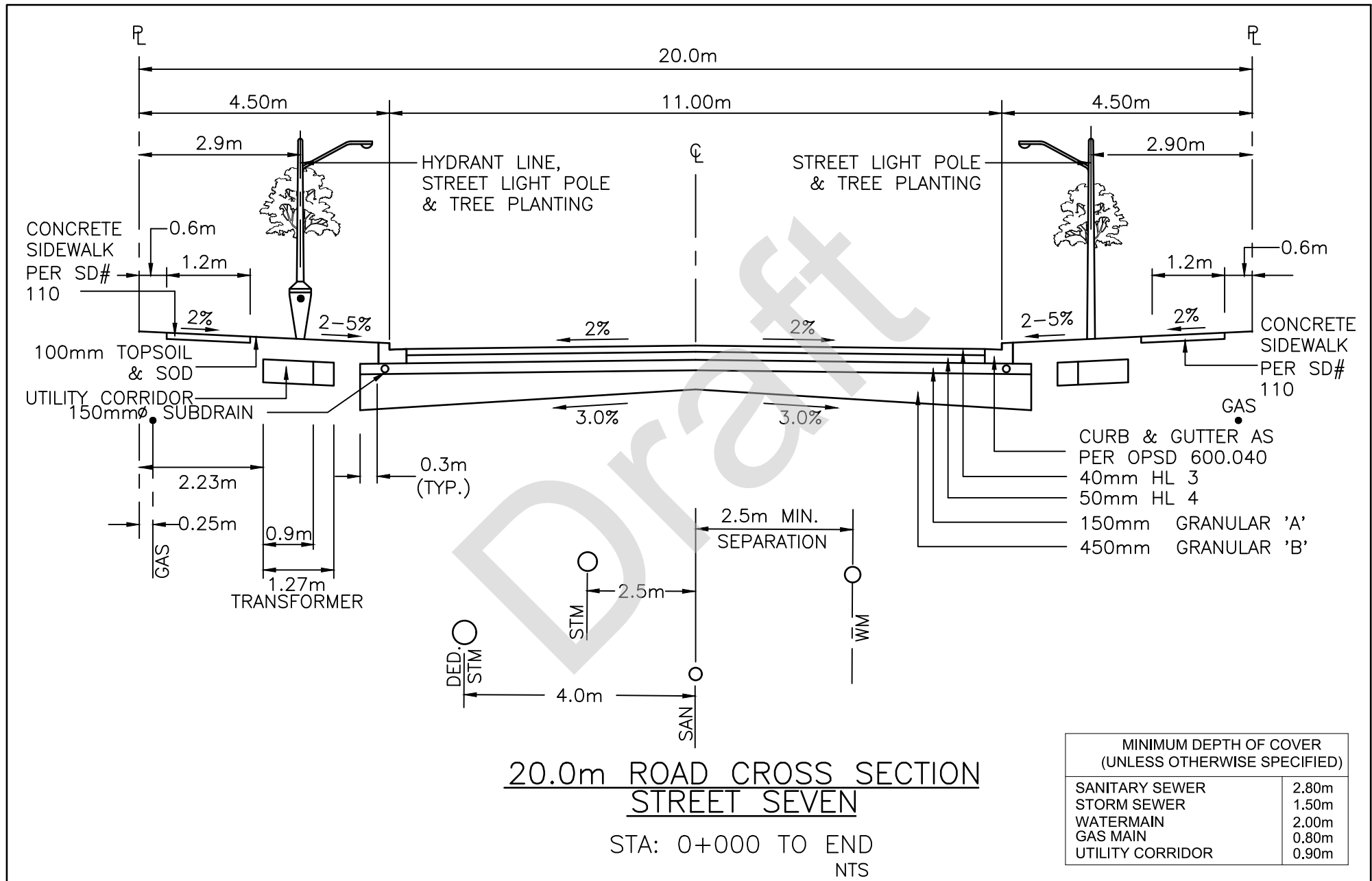
Figure No.

	SUBDIVISION		ACTIVA BADEN 60305680		STORM SEWER DESIGN SHEET						DESIGN PARAMETERS							4688.000 17.000 0.962
	Dedicated pipe from SW Corner to Proposed Pond		DESIGN STORM 1 IN 100 Years															
	DATE: December 18, 2020		DESIGNED BY: JBM		FILE NUMBER:		I = a / ((tc + b) ^c) a= 4688 MANNING'S n = 0.013 b= 17 MINIMUM COVER: 1.500 m c= 0.9620 TIME OF ENTRY 10 min											
	CHECKED BY:																	
LOCATION						DRAINAGE AREA					PIPE SELECTION							
BRA-NCH	FROM M.H.	TO M.H.	AREA I.D.	AREA (ha)	C	A x C (ha)	ACCUM. A x C (ha)	T of C (min)	I (mm/h)	Q (L/s)	LENGTH (m)	PIPE SIZE (mm)	SLOPE %	CAP (FULL) (L/s)	VEL. (FULL) (m/s)	TIME OF FLOW (ACT) (min)		
Street Six Rear yard drainage and trail				0.35	0.60	0.21	0.21											
Existing area Draining to RLCB 159				0.13	0.55	0.07	0.07											
Existing area Draining to RLCB 158				0.33	0.55	0.18	0.18											
Adjacent Land to West			Inlet	0.20	0.60	0.12	0.58	10.00	196.54	316.642	2.0	600	0.35	363.254	1.285	1.458	0.02	
	CBMH 310	MH309		0.00	0.50	0.00	0.58	10.02	196.38	316.384	36.5	600	0.35	363.254	1.285	1.458	0.42	
	MH309	MH308		0.00	0.50	0.00	0.58	10.44	193.50	311.754	84.9	600	0.35	363.254	1.285	1.452	0.97	
	MH308	MH307		0.00	0.50	0.00	0.58	11.41	187.11	301.455	75.4	600	0.35	363.254	1.285	1.445	0.87	
	MH307	MH306		0.00	0.50	0.00	0.58	12.28	181.76	292.837	90.0	600	0.35	363.254	1.285	1.439	1.04	
	MH306	MH305		0.00	0.50	0.00	0.58	13.33	175.74	283.143	66.8	600	0.35	363.254	1.285	1.426	0.78	
	MH305	MH304		0.00	0.50	0.00	0.58	14.11	171.50	276.301	90.0	600	0.35	363.254	1.285	1.426	1.05	
	MH304	MH303		0.00	0.50	0.00	0.58	15.16	166.10	267.598	90.0	600	0.35	363.254	1.285	1.413	1.06	
	MH303	HW		0.00	0.50	0.00	0.58	16.22	160.98	259.365	46.2	600	0.35	363.254	1.285	1.400	0.55	

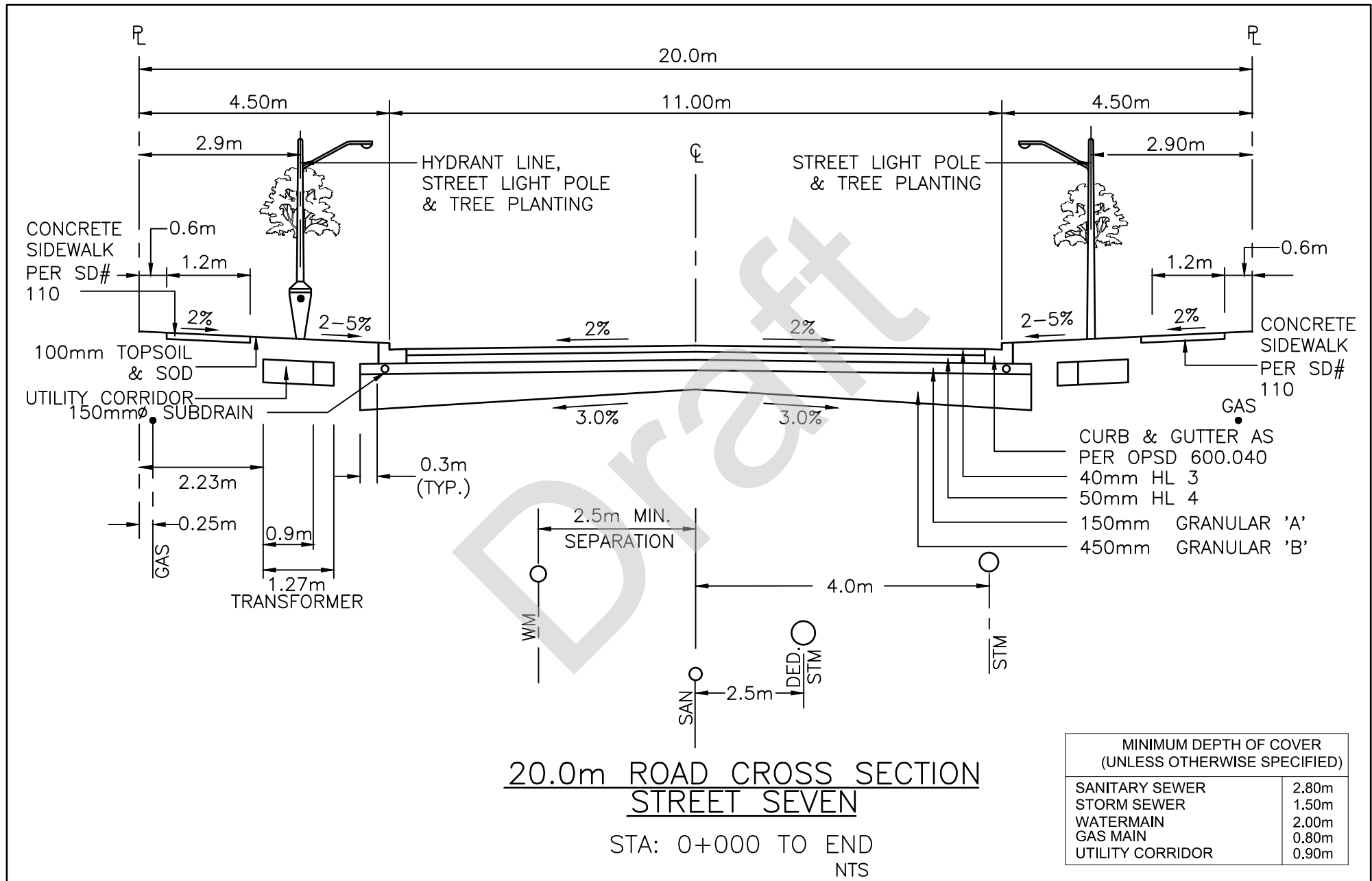
OPTION 1



OPTION 2



OPTION 3





- STAGE LIMIT / PHASE LIMIT
- PROPOSED STORM SEWER
- PROPOSED DEDICATED STORM SEWER
- PROPOSED SANITARY SEWER
- PROPOSED SANITARY TRUNK SEWER
- PROPOSED WATERMAIN
- PROPOSED STORM DRAINAGE AREA CONVEYED SOUTH THROUGH EXISTING DEVELOPMENT
- PROPOSED STORM DRAINAGE AREA CONVEYED NORTH VIA DEDICATED STORM PIPE

PRELIMINARY NOT FOR CONSTRUCTION

Not for permits, pricing or other official purposes. This document has not been completed or checked and is for general information or comment only.

Client/Project
ACTIVA HOLDINGS INC.

ACTIVA BADEN

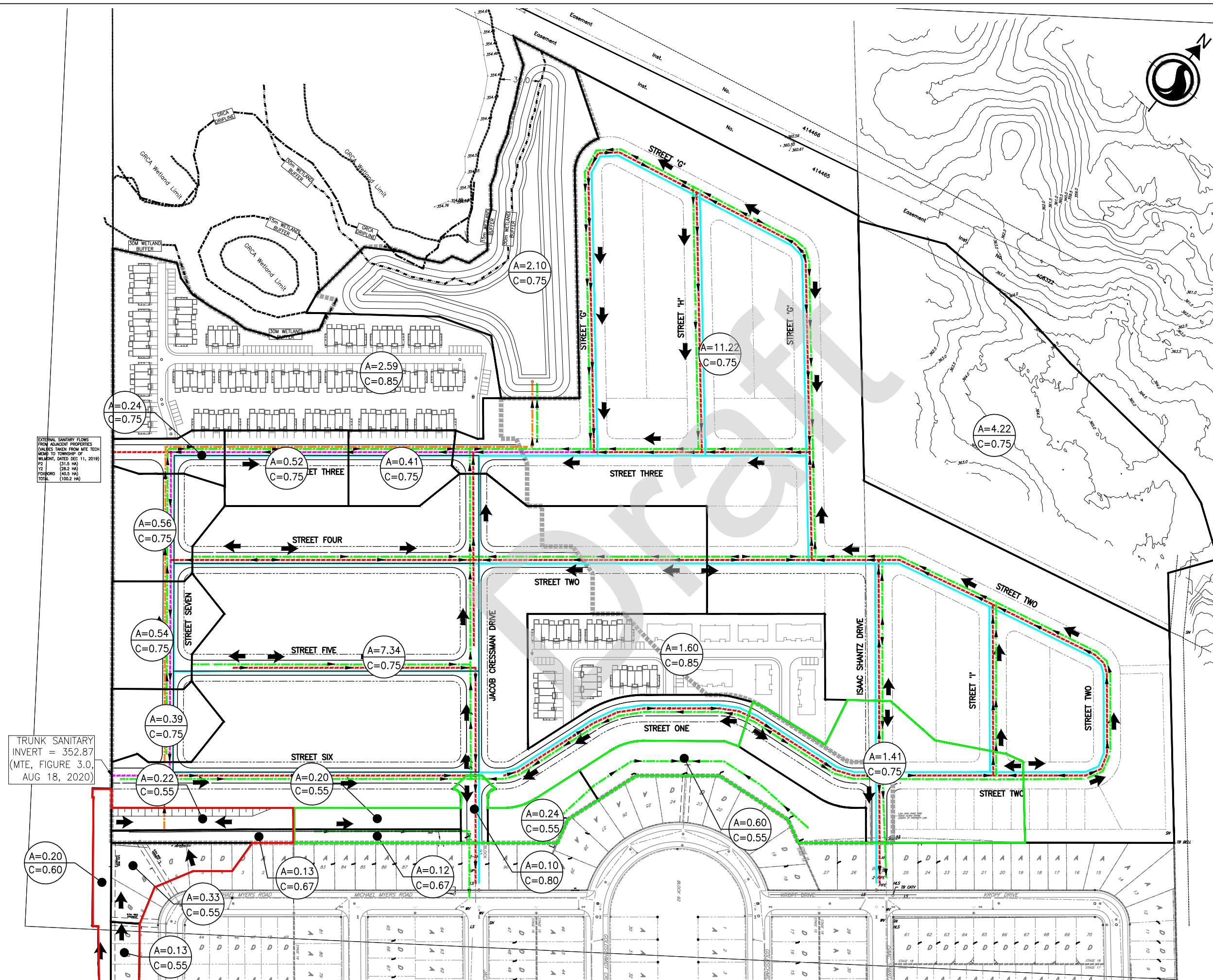
Baden, Ontario

Title
DRAINAGE AREA PLAN
PROPOSED CONDITIONS

Project No. 60305680 Scale 0 12.5 37.5 62.5m
1:1250

Revision Sheet of Drawing No.

C110



The Contractor shall verify and be responsible for all dimensions. DO NOT scale the drawing - any errors or omissions shall be reported to Stantec without delay. The Copyrights to all designs and drawings are the property of Stantec. Reproduction or use for any purpose other than that authorized by Stantec is forbidden.

Key Map NTS.



Revision	By	Appd	YYYY.MM.DD
File Name: 60305680_C-FIG_TECH MEMO			2021.03.09
	Dwn.	Chkd.	Dsgn.
			YY.MM.DD

**PRELIMINARY
NOT FOR
CONSTRUCTION**

Not for permits, pricing or other official purposes. This document has not been completed or checked and is for general information or comment only.

Baden, Ontario

Title

PLAN AND PROFILE
DEDICATED STORM PIPE
STREET SEVEN AND STREET THREE

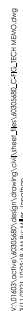
Project No.
60305680

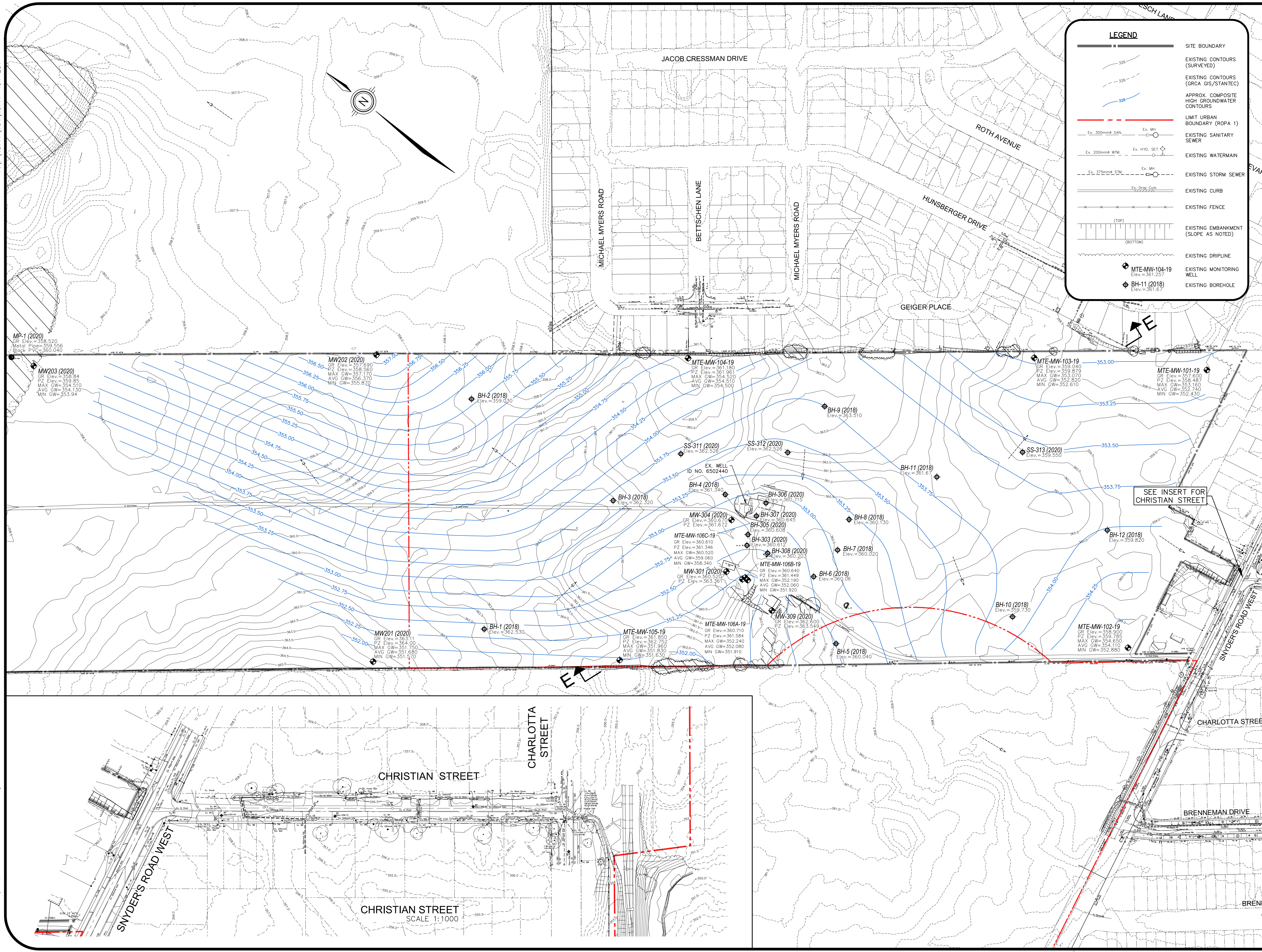
Scale 1:1000H
1:100V

0 10 30 50m
0 1 3 5m

Revision	Sheet	Drawing No.
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TM100





LEGEND

---	SITE BOUNDARY
---	EXISTING CONTOURS (SURVEYED)
---	EXISTING CONTOURS (GRCA GIS/STANTEC)
---	APPROX. COMPOSITE HIGH GROUNDWATER CONTOURS
---	LIMIT URBAN BOUNDARY (ROPA 1)
---	EXISTING SANITARY SEWER
---	EXISTING WATERMAIN
---	EXISTING STORM SEWER
---	EXISTING CURB
---	EXISTING FENCE
---	EXISTING EMBANKMENT (SLOPE AS NOTED)
---	EXISTING DRIPLINE
---	EXISTING MONITORING WELL
---	EXISTING BOREHOLE

Ex. 300mm# SAN. Ex. MH. Ex. 200mm# WTM. Ex. HYD. SET. Ex. 375mm# STM. Ex. MH. Ex. Grp. Curb.

(TOP) (BOTTOM)

MTE-MW-104-19 Elev.=361.257
BH-11 (2018) Elev.=361.67

KEY PLAN N.T.S.

GEODETIC BM ELEV. = 347.919m
BM # W-13
CONC. CULVERT UNDER REG. RD. 6, BEING 1.2km W. FROM JUNCTION OF REG. RD. 5 & FOUNDRY ST. S. OF BADEN. TABLET SET HORIZ. IN N. END OF CULVERT, BEING 0.15m W. FROM NE CORNER OF CULVERT, & 0.52m BELOW THE TOP.

SITE BENCHMARK ELEV. = 347.919m
SEE ABOVE

NOTE TO CONTRACTOR :
DO NOT SCALE DRAWINGS.
CONTRACTORS MUST CHECK AND VERIFY ALL DIMENSIONS AND REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK.
ALL DRAWINGS REMAIN THE PROPERTY OF THE ENGINEER AND SHALL NOT BE REPRODUCED OR REUSED WITHOUT THE ENGINEER'S WRITTEN PERMISSION.
THE OWNER/ARCHITECT/CONTRACTOR IS ADVISED THAT M.T.E. CONSULTANTS INC. CANNOT CERTIFY ANY COMPONENT OF THE SITE WORKS NOT INSPECTED DURING CONSTRUCTION. IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO NOTIFY M.T.E. CONSULTANTS INC. PRIOR TO COMMENCEMENT OF CONSTRUCTION TO ARRANGE FOR INSPECTION.

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No. REVISION BY DATE

TOWNSHIP of WILMOT

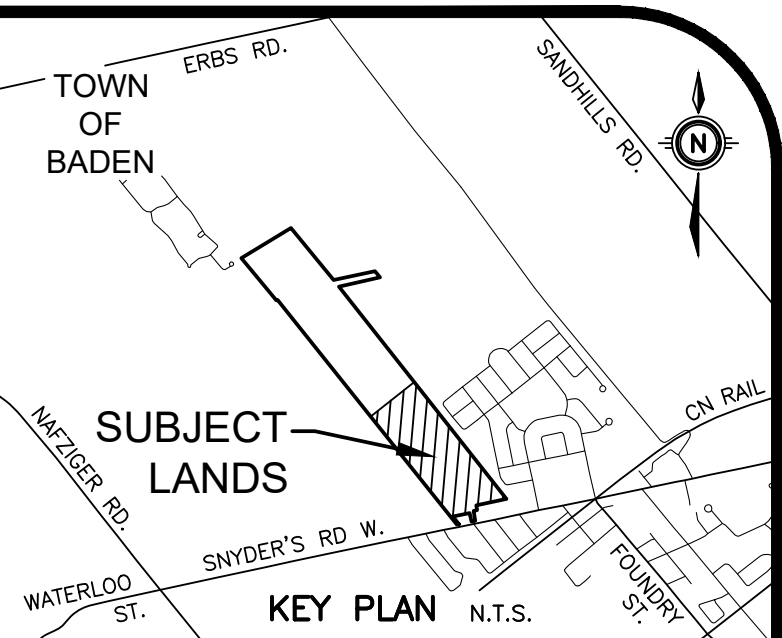
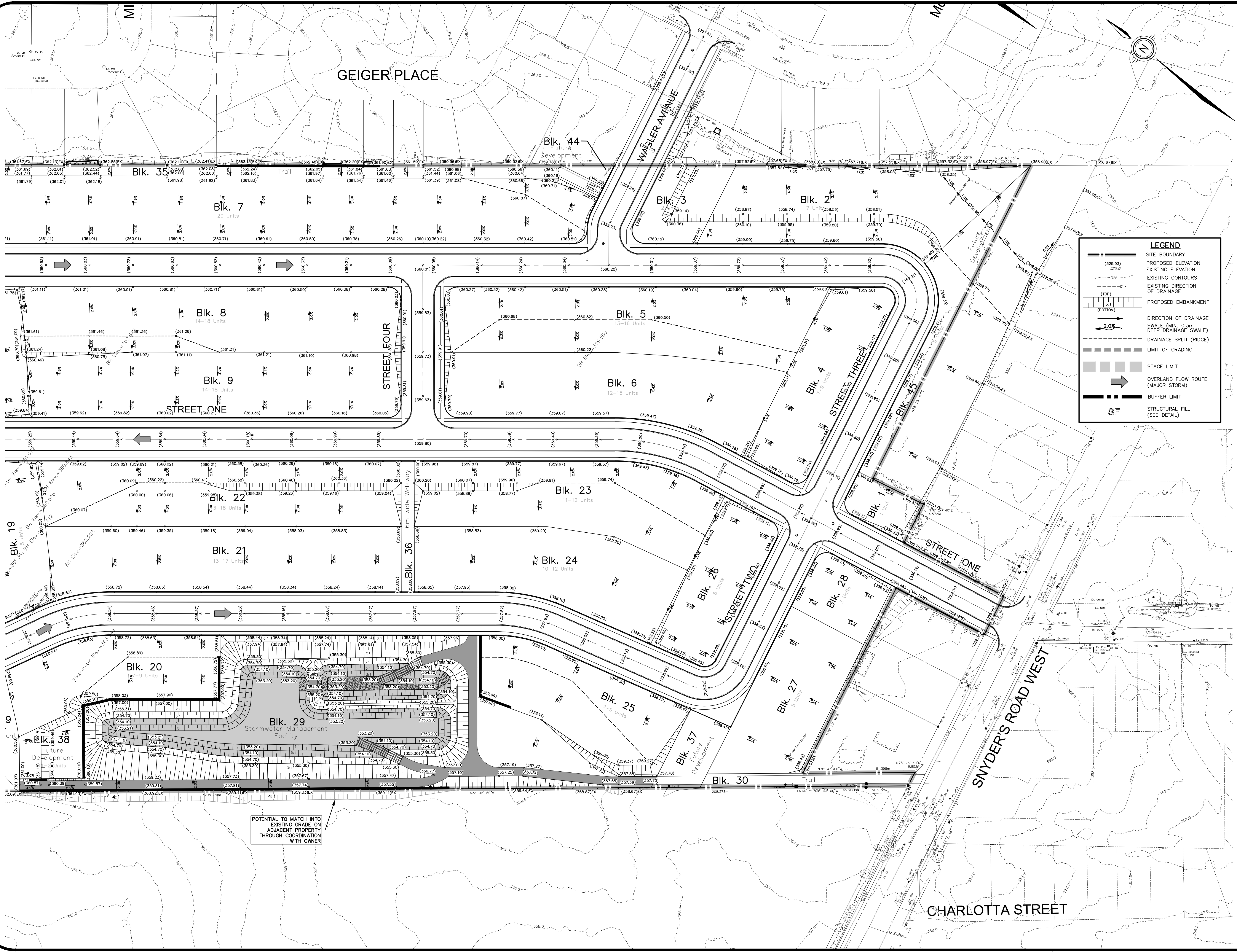
MTE
Engineers, Scientists, Surveyors
519-743-6500

OWNER
SNYDER'S ROAD (BADEN) GP INC.
91 CALDARI DRIVE, UNIT 1 CONCORD, ONT.

1012 SNYDER'S ROAD WEST
1012 SNYDER'S ROAD WEST BADEN, ONT.
DRAWING

EXISTING CONDITIONS PLAN

Project Manager S.PETERSON	Project No. 40777-104
Design By AJC	Checked By JEM
Drawn By KAT/AXH	Checked By AJC
Surveyed By MTE	Drawing No.
Date Sep.28/18	EC1.1
Scale 1:1500	Sheet of



GEODETIC BM ELEV. = 347.919m
BM # W-13
CONC. CULVERT UNDER REG. RD. 6, BEING 1.2km W. FROM JUNCTION OF REG. RD. 6 & FOUNDRY ST., S. OF BADEN. TABLET SET HORIZ. IN N. END OF CULVERT, BEING 0.15m W. FROM NE. CORNER OF CULVERT, & 0.52m BELOW THE TOP.

SITE BENCHMARK ELEV. = 347.919m
SEE ABOVE

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TOWNSHIP of WILMOT

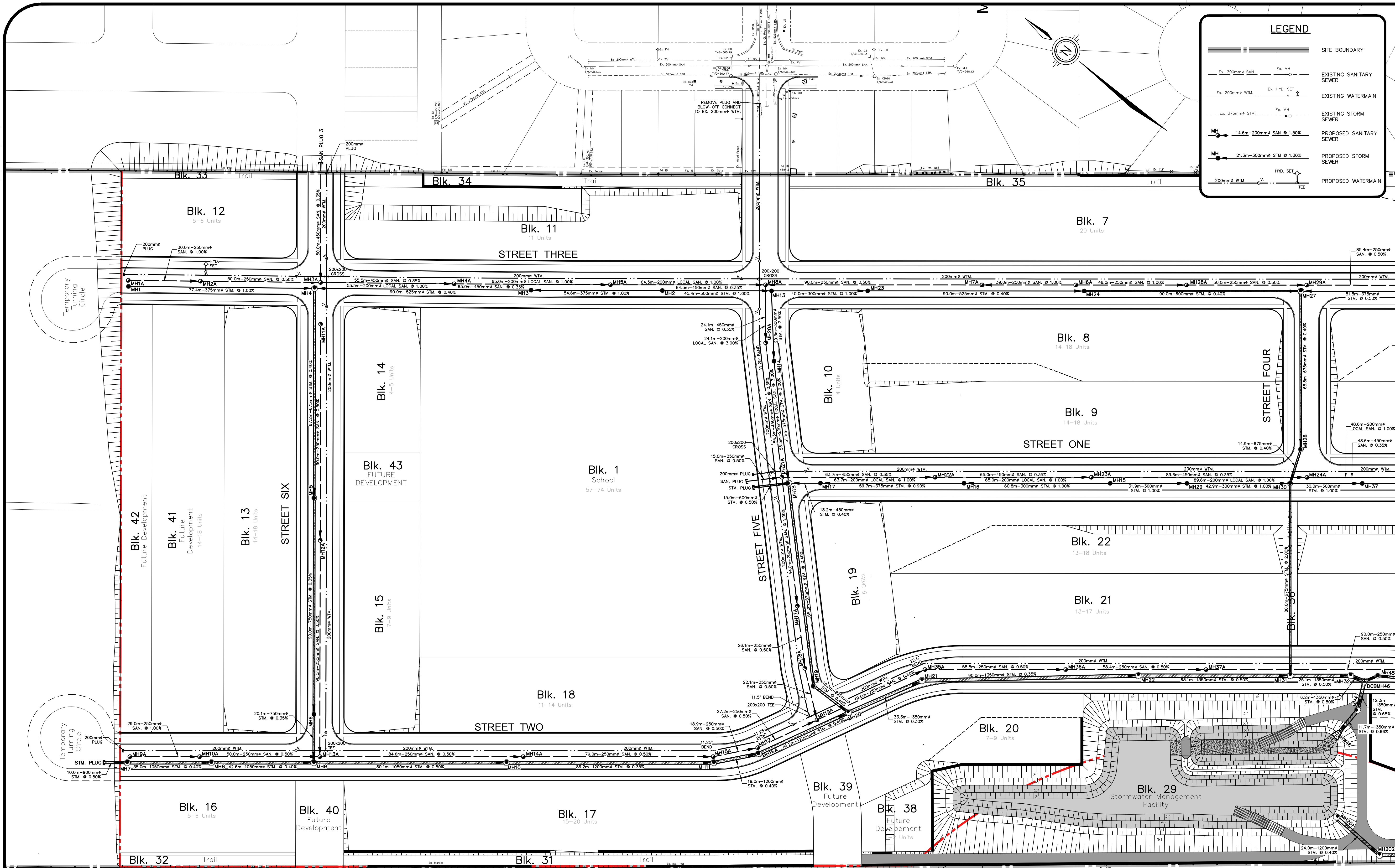


OWNER
SNYDER'S ROAD (BADEN)
GP INC.
91 CALDARI DRIVE, UNIT 1 CONCORD, ONT.

1012 SNYDER'S ROAD WEST
1012 SNYDER'S ROAD WEST BADEN, ONT.
DRAWING

AREA GRADING
PLAN No. 2

Project Manager	S. PETERSON	Project No.	40777-104
Design By	AJC	Checked By	JEM
Drawn By	KAT/AXH	Checked By	AJC
Surveyed By	MTE	Drawing No.	AG1.2
Date	Aug.19/20	Scale	1:750
Sheet	of		



LEGEND

- SITE BOUNDARY
- EXISTING SANITARY SEWER
- EXISTING WATERMAIN
- EXISTING STORM SEWER
- PROPOSED SANITARY SEWER
- PROPOSED STORM SEWER
- PROPOSED WATERMAIN

KEY PLAN N.T.S.

SUBJECT LANDS

GEODETIC BM
BM # W-13
ELEV. = 347.919m

SITE BENCHMARK
SEE ABOVE
ELEV. = 347.919m

NOTE TO CONTRACTOR :

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TOWNSHIP of WILMOT



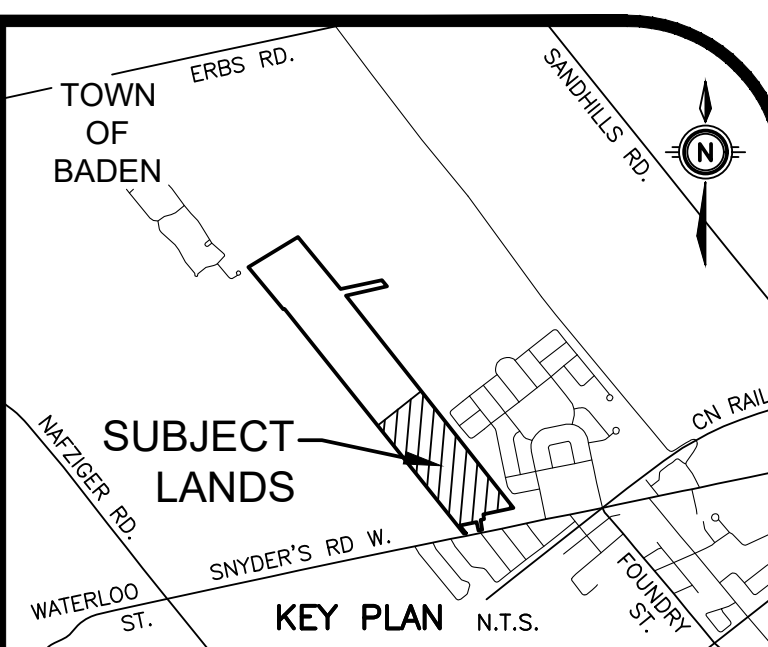
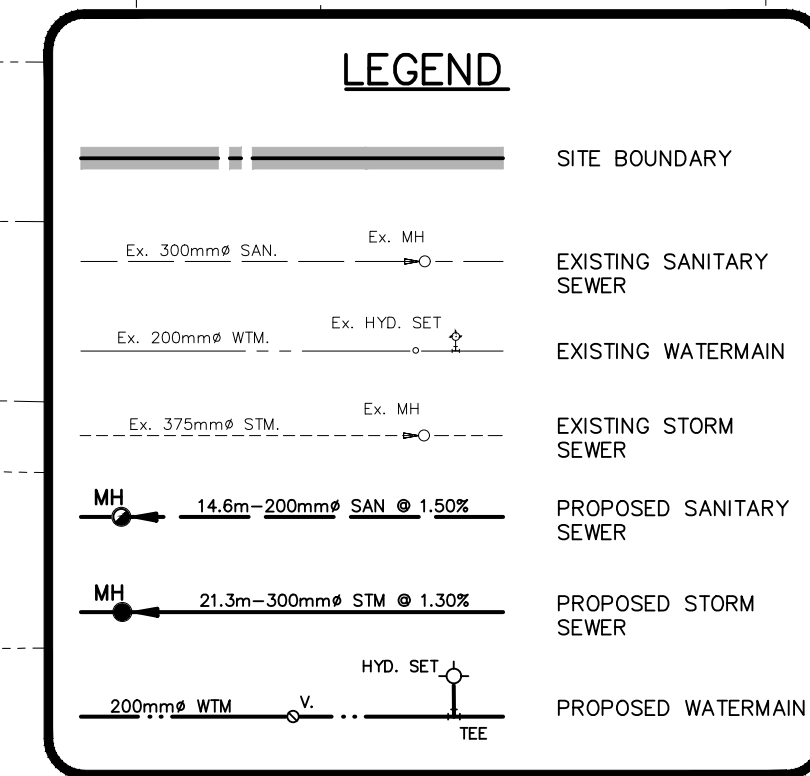
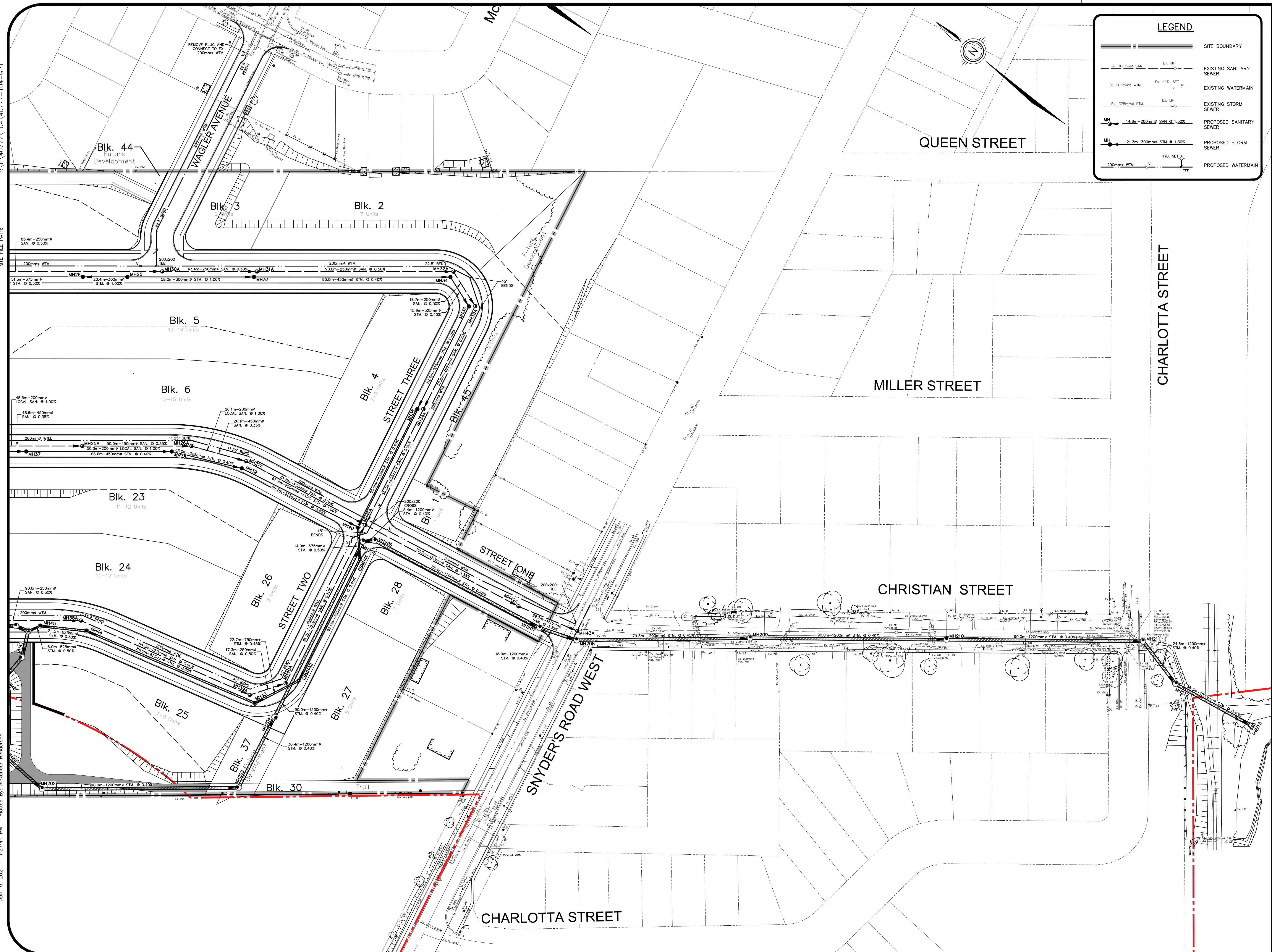
519-743-6500

OWNER
SNYDER'S ROAD (BADEN) GP INC.
91 CALDARI DRIVE, UNIT 1 CONCORD, ONT.

1012 SNYDER'S ROAD WEST
1012 SNYDER'S ROAD WEST BADEN, ONT.
DRAWING

GENERAL PLAN OF SERVICES
No. 1

Project Manager S.PETERSON	Project No. 40777-104
Design By AJC	Checked By JEM
Drawn By AXH	Checked By AJC
Surveyed By MTE	Drawing No. GP1.1
Date Sep.17/20	Scale 1:750
Sheet 1	of 1



GEODETIC BM **ELEV. = 347.919m**
 BM # WI-13
 CONC. CULVERT UNDER REG. RD. 6, BEING 1.2km W. FROM
 JUNCTION OF REG. RD. 6 & FOUNDRY ST., S. OF BADEN. TABLET
 SET HORIZ. IN N. END OF CULVERT, BEING 0.15m W. FROM NE.
 CORNER OF CULVERT, & 0.52m BELOW THE TOP.

SITE BENCHMARK **ELEV. = 347.919m**
 SEE ABOVE

NOTE TO CONTRACTOR :

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TOWNSHIP of WILMOT



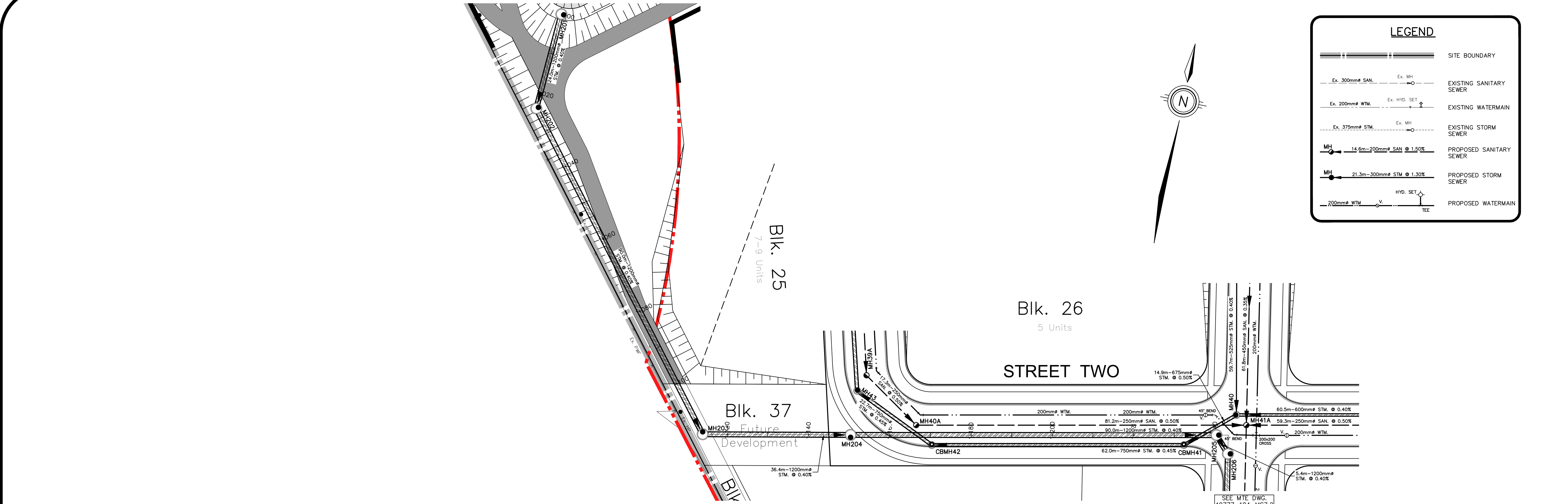
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OWNER	
SNYDER'S ROAD (BADEN) GP INC.	
91 CALDARI DRIVE, UNIT 1	CONCORD, ONT.
1012 SNYDER'S ROAD WEST	
1012 SNYDER'S ROAD WEST	BADEN, ONT.
DRAWING	

GENERAL PLAN OF SERVICES

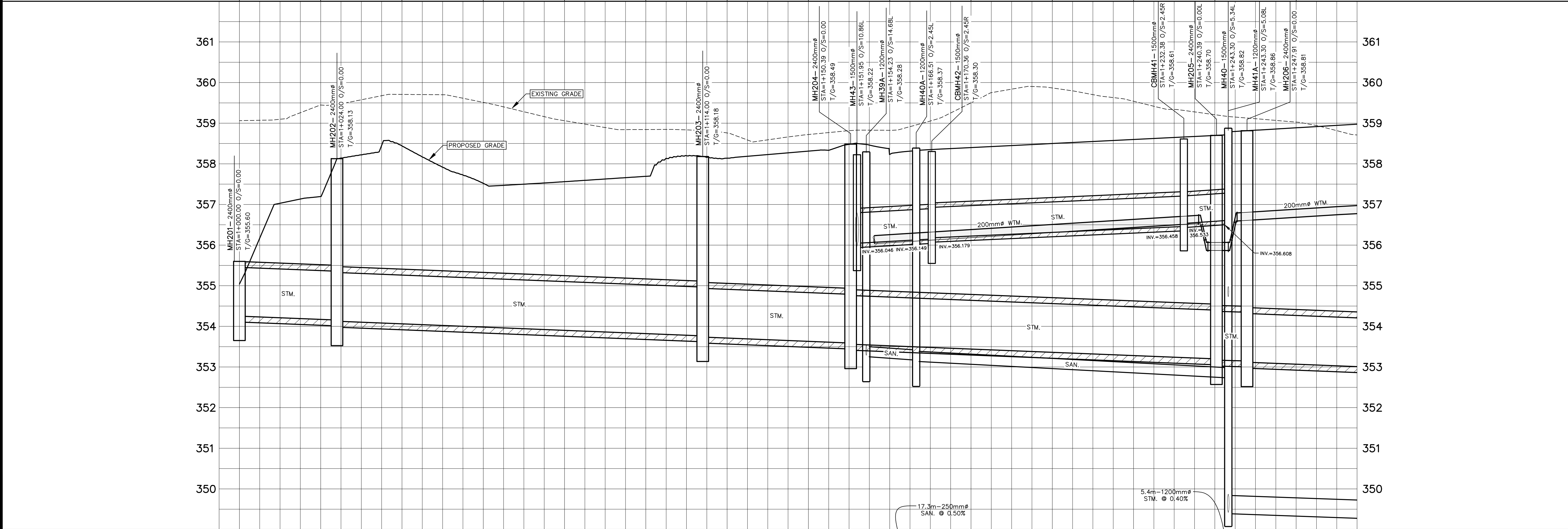
No. 2

Project Manager S.PETERSON	Project No. 40777-104
Design By AJC	Checked By JEM
Drawn By AXH	Checked By AJC
Surveyed By MTE	Drawing No. GP1.2
Date Sep.17/20	
Scale 1:750	Sheet of



CHAINAGE 1+000 1+020 1+040 1+060 1+080 1+100 1+120 1+140 1+160 1+180 1+200 1+220 1+240 1+260 CHAINAGE

PROPOSED @ ROAD ELEVATIONS 355.04 357.20 358.44 357.52 357.56 357.69 358.14 358.31 358.23 358.40 358.50 358.60 358.70 358.81 358.89



STM. OUTLET INVERT	S354.252	24.0m-1200mm ^ø STM. @ 0.40%	N354.156 E354.126	90.0m-1200mm ^ø STM. @ 0.40%	NW353.766 E353.736	36.4m-1200mm ^ø STM. @ 0.40%	W353.580 E353.569	90.0m-1200mm ^ø STM. @ 0.40%	NW353.285 E353.255	81.2m-250mm ^ø SAN. @ 0.50%	NW353.168 E353.138	85.4m-1200mm ^ø STM. @ 0.40%	W353.199 E353.169	79.5m-450mm ^ø SAN. @ 0.35%	NW353.147 E353.117	5.4m-1200mm ^ø STM. @ 0.40%	W353.199 E353.169	5.4m-1200mm ^ø STM. @ 0.40%	NW353.147 E353.117
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TOWN OF BADEN

ERBS RD.

SANDHILLS RD.

WATERLOO ST.

SNYDER'S RD. W.

FOUNDRY ST.

CN RAIL

SUBJECT LANDS

KEY PLAN N.T.S.

GEODETIC BM ELEV. = 347.919m

BM # W-13

CONC. CULVERT UNDER REG. RD. 6, BEING 1.2km W. FROM JUNCTION OF REG. RD. 6 & FOUNDRY ST., S. OF BADEN. TABLET SET HORIZ. IN N. END OF CULVERT, BEING 0.15m W. FROM NE CORNER OF CULVERT, & 0.52m BELOW THE TOP.

SITE BENCHMARK ELEV. = 347.919m

SEE ABOVE

NOTE: PRELIMINARY DESIGN

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No.	REVISION	BY DATE

TOWNSHIP of WILMOT

MTE

Engineers, Scientists, Surveyors

519-743-6500

OWNER

SNYDER'S ROAD (BADEN) GP INC.

91 CALDARI DRIVE, UNIT 1 CONCORD, ONT.

1012 SNYDER'S ROAD WEST

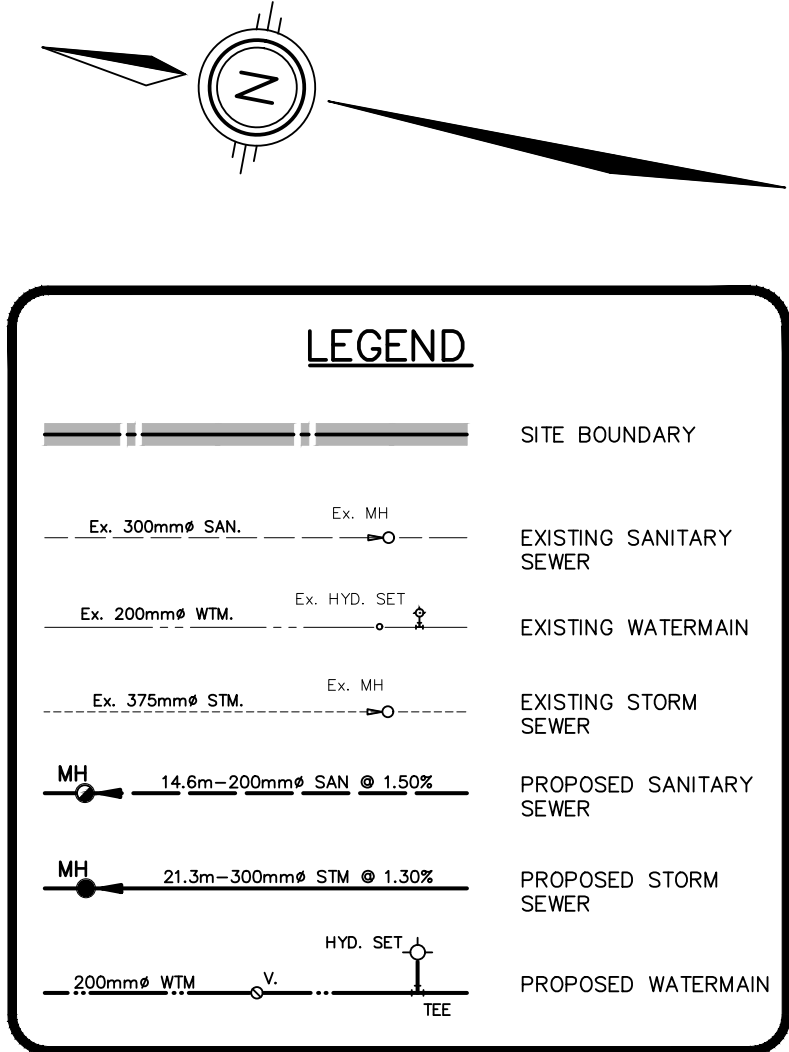
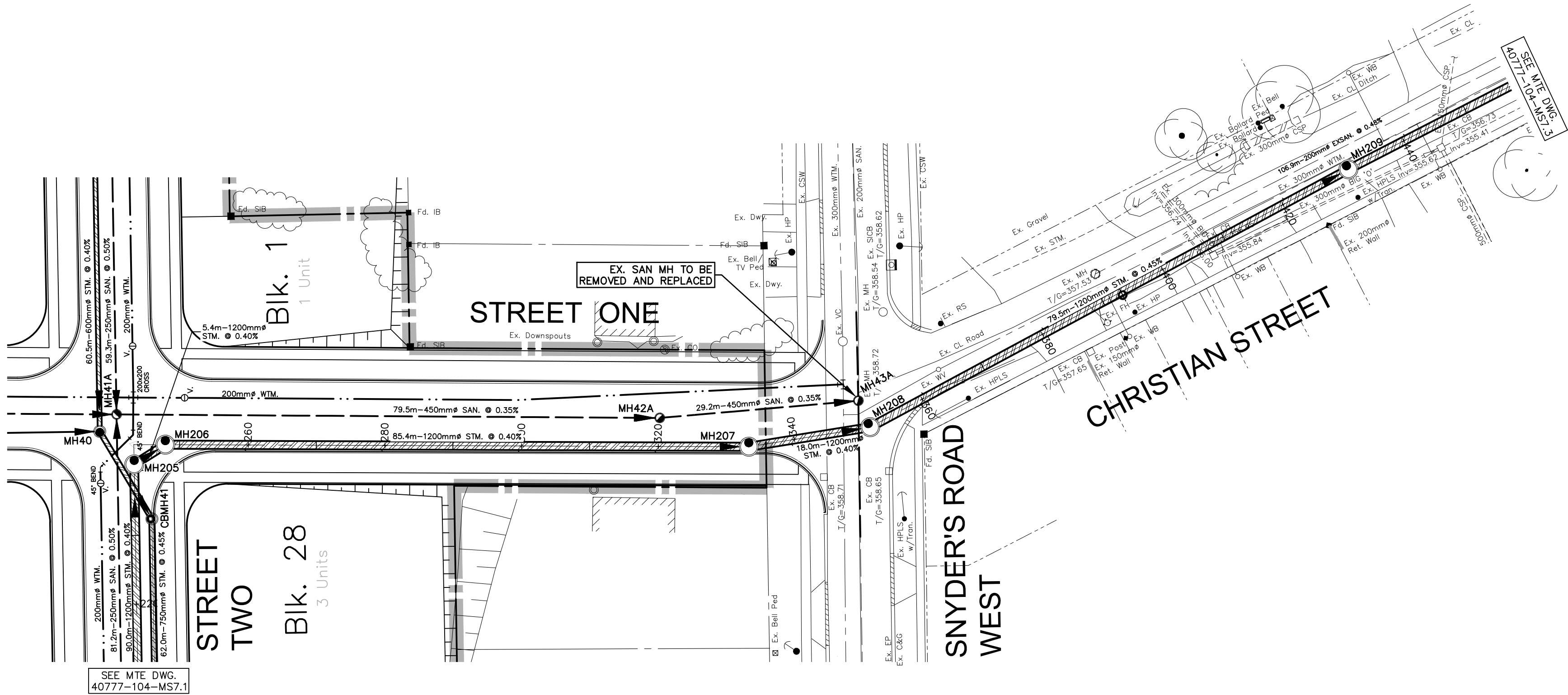
1012 SNYDER'S ROAD WEST BADEN, ONT.

DRAWING

SWM OUTLET PLAN AND PROFILE 1

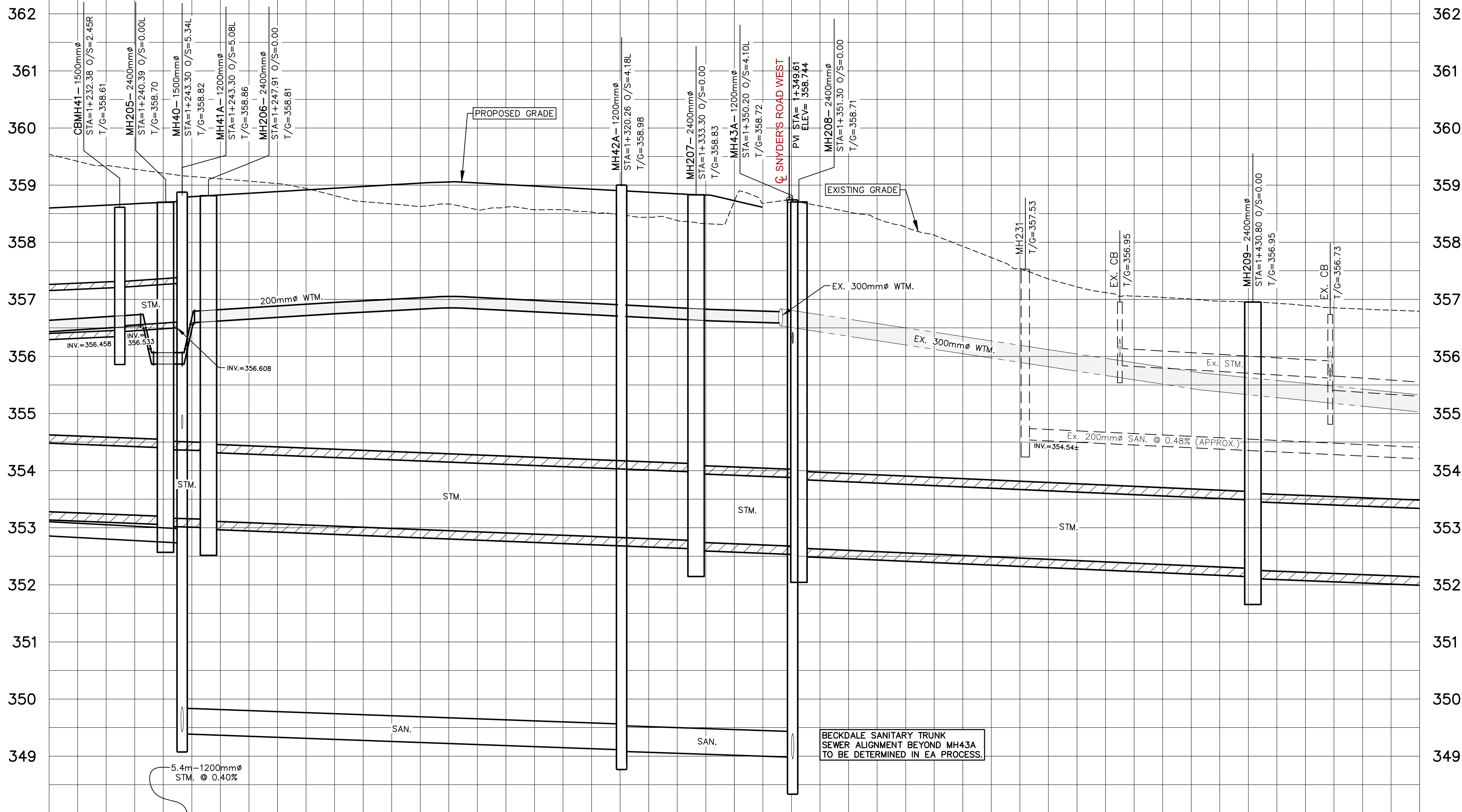
STA 1+000 to 1+260

Project Manager	S.PETERSON	Project No.	40777-104
Design By	AJC	Checked By	JEM
Drawn By	KAT	Checked By	AJC
Surveyed By	MTE	Drawing No.	MS7.1
Date	Sep.30/20	Scale	(H)1:500 (V)1:50
Sheet	of		



CHAINAGE 1+220 1+240 1+260 1+280 1+300 1+320 1+340 1+360 1+380 1+400 1+420 1+440 1+460 CHAINAGE

PROPOSED $\varnothing$ ROAD ELEVATIONS PROPOSED $\varnothing$ ROAD ELEVATIONS



NOTE: PRELIMINARY DESIGN

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No.	REVISION	BY	DATE

TOWNSHIP of WILMOT



Engineers, Scientists, Surveyors

519-743-6500

OWNER
SNYDER'S ROAD (BADEN)
GP INC.
91 CALDARI DRIVE, UNIT 1 CONCORD, ONT.

1012 SNYDER'S ROAD WEST
1012 SNYDER'S ROAD WEST BADEN, ONT.
DRAWING

SWM OUTLET
PLAN AND PROFILE 2
STA 1+220 to 1+440

Project Manager S.PETERSON Project No. 40777-104

Design By AJC Checked By JEM

Drawn By KAT Checked By AJC

Surveyed By MTE Drawing No.

Date Sep.30/20 MS7.2

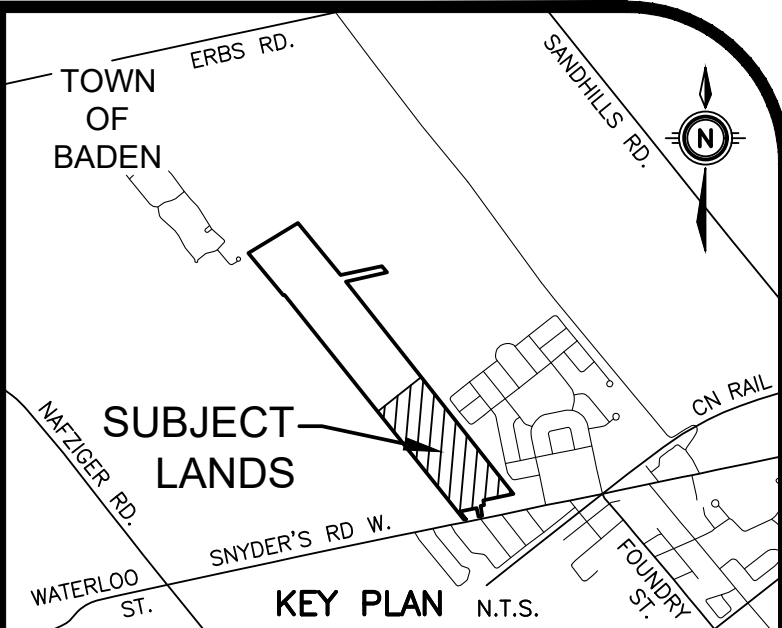
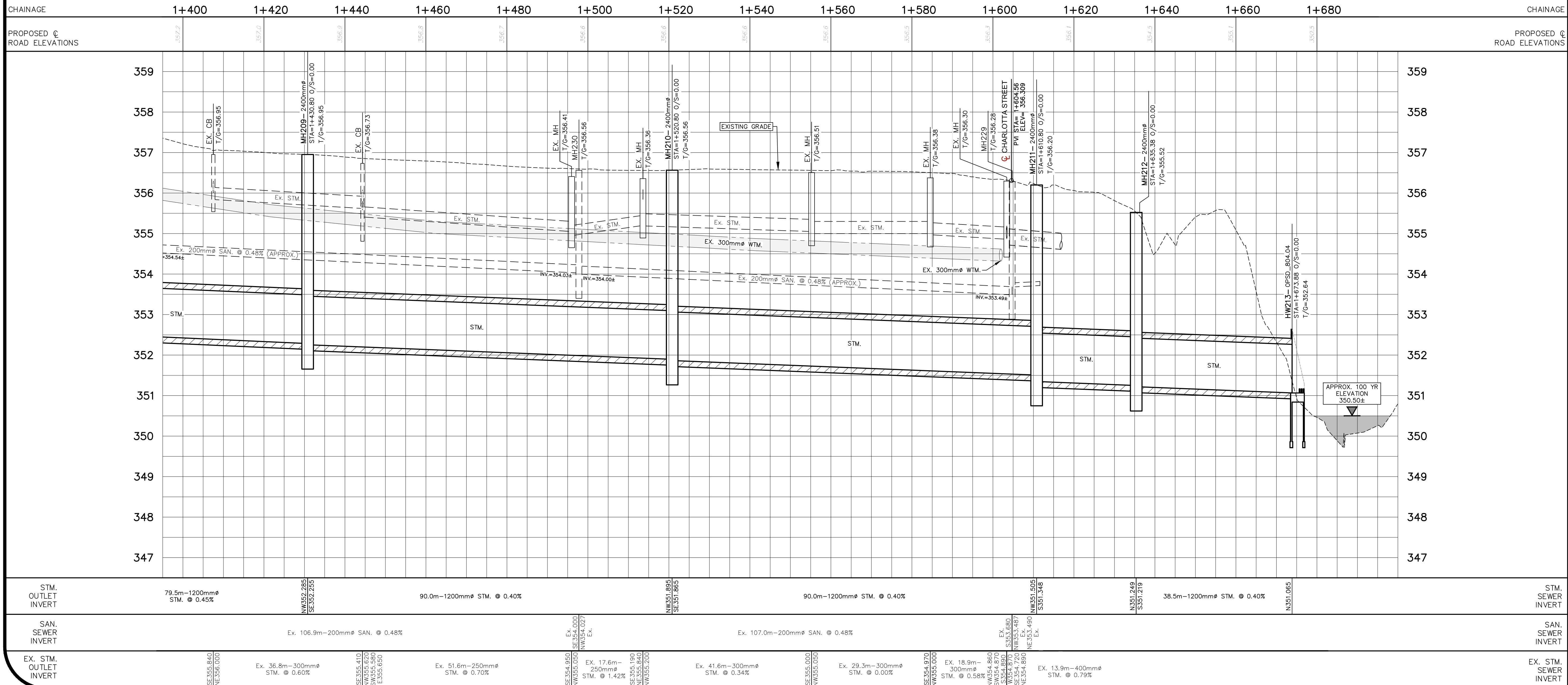
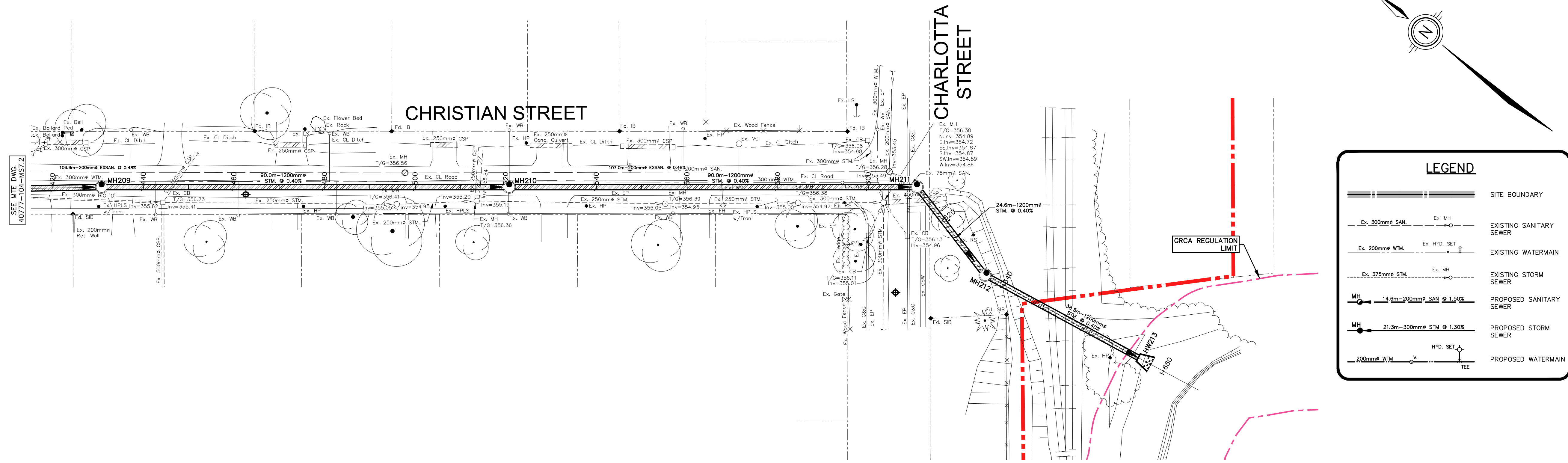
Scale (H)1:500 (V)1:50 Sheet of

STM.
OUTLET
INVERT

SAN.
SEWER
INVERT

STM.
OUTLET
INVERT

SAN.
SEWER
INVERT



GEODETIC BM BM # WI-13 CONC. CULVERT UNDER REG. RD. 6, BEING 1.2km W. FROM JUNCTION OF REG. RD. 6 & FOUNDRY ST., S. OF BADEN. TABLET SET HORIZ. IN N. END OF CULVERT, BEING 0.15m W. FROM NE. CORNER OF CULVERT, & 0.52m BELOW THE TOP.	ELEV. = 347.919m
SITE BENCHMARK SEE ABOVE	ELEV. = 347.919m

NOTE: EXISTING SANITARY SEWER ON
CHRISTIAN STREET FROM WALTER FEDY
McCARGAR HACHBORN AS BUILT PLAN
AND PROFILE (JAN.15,1973)

NOTE: PRELIMINARY DESIGN			
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No.	REVISION	BY	DATE

TOWNSHIP of WILMOT



Engineers, Scientists, Surveyors

519-743-6500

OWNER
SNYDER'S ROAD (BADEN)
GP INC.
91 CALDARI DRIVE, UNIT 1
CONCORD, ONT.

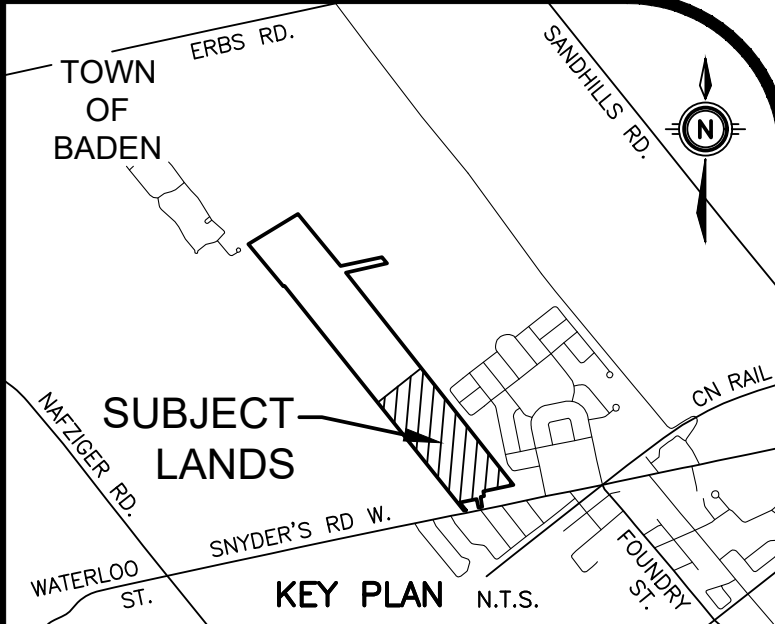
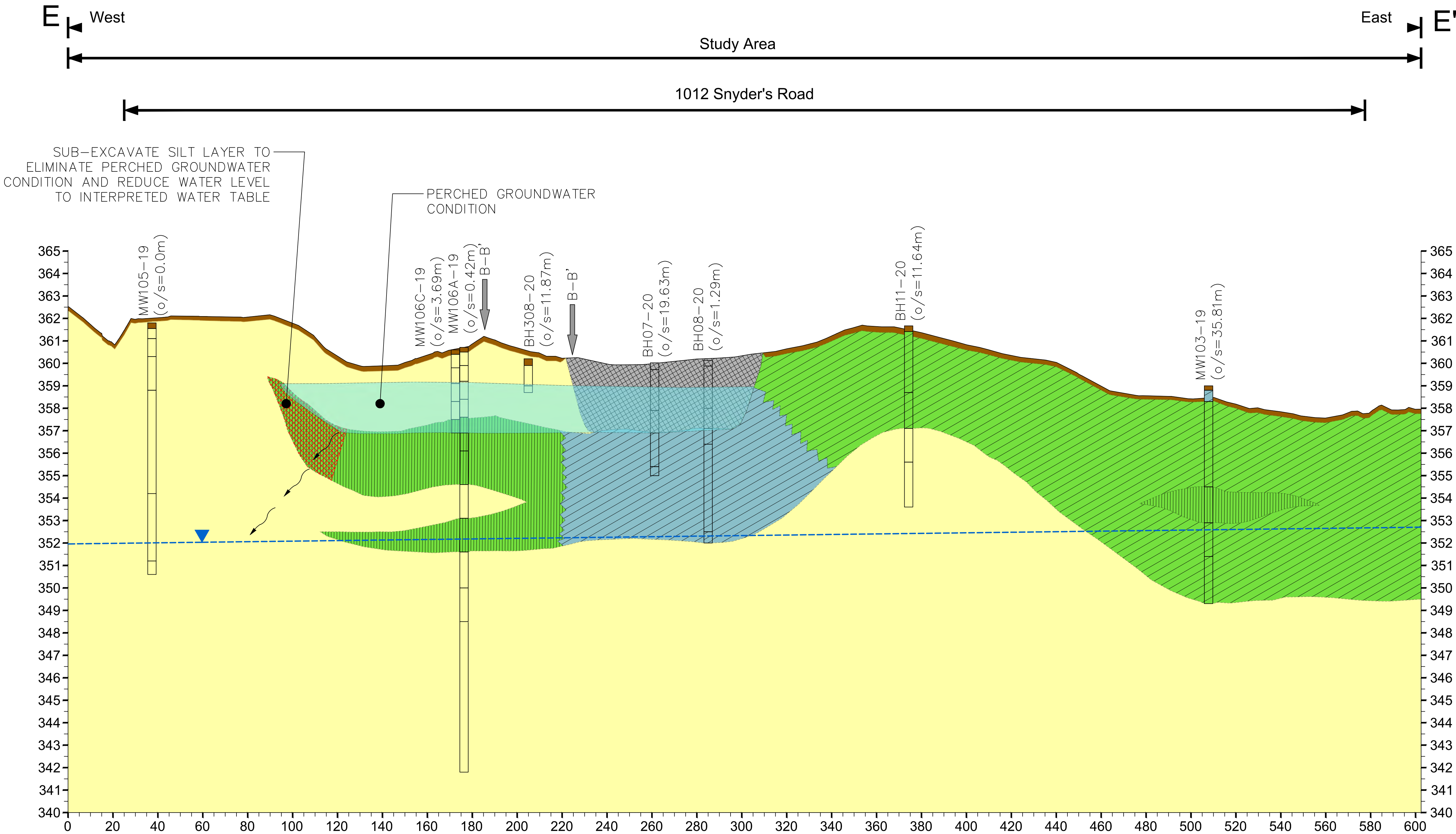
1012 SNYDER'S ROAD WEST

1012 SNYDER'S ROAD WEST BADEN, ONT.

DRAWING

SWM OUTLET
PLAN AND PROFILE 3
STA 1+400 to 1+680

Project Manager S.PETERSON	Project No. 40777-104
Design By AJC	Checked By JEM
Drawn By KAT	Checked By AJC
Surveyed By MTE	Drawing No. MS7.3
Date Sep.30/20	
Scale (H)1:500 (V)1:50	Sheet of



GEODETTIC BM
BM # W-13
CONC. CULVERT UNDER REG. RD. 6, BEING 1.2km W. FROM JUNCTION OF REG. RD. 5 & FOUNDRY ST., S. OF BADEN. TABLET SET HORIZ. IN N. END OF CULVERT, BEING 0.15m W. FROM NE CORNER OF CULVERT, & 0.52m BELOW THE TOP.
SITE BENCHMARK
SEE ABOVE
ELEV. = 347.919m
ELEV. = 347.919m

Legend

Ground Surface (2015/2020)

Interpreted Groundwater Table

Borehole Lithology

Topsoil

Sand / Silty Sand

Silty Clay

Removals

Fill

Silt

Silt Till

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No.	REVISION	BY	DATE

TOWNSHIP of WILMOT



Engineers, Scientists, Surveyors

519-743-6500

OWNER

SNYDER'S ROAD (BADEN)
GP INC.

91 CALDARI DRIVE, UNIT 1
CONCORD, ONT.

1012 SNYDER'S ROAD WEST
BADEN, ONT.

DRAWING

SECTION E-E

Project Manager S.PETERSON	Project No. 40777-104
Design By AJC	Checked By JEM
Drawn By AXH	Checked By AJC
Surveyed By MTE	Drawing No.
Date Jan.25/21	MS9.0
Scale (H)1:1000 (V)1:100	Sheet of