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FUNCTIONAL SERVICING REPORT

720 Erbsville Road
Waterloo, Ontario



Prepared for:

Sunvest DEVELOPMENT CORP.

November 28, 2023

JPE-1027

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1 Introduction

JPE Engineering (JPE) was retained to undertake a functional grading and servicing study for the proposed development at 720 Erbsville Road, Waterloo, Ontario (henceforth the "Site").

For the purposes of description in this report, Erbsville Road is assumed to run north-south. The total property area is approx. 9.3 ha with a proposed development area of 3.1 ha (the "Site"). The remaining 6.2 ha will remain as existing. The Site is bounded by Erbsville Road to the west, environmental lands (Laurel Creek) to the north and east, and an agricultural field to the south. Refer to **Plate 1** for an aerial photo of Property and the Site.

The Site currently comprises one residential/agricultural property with a residential home situated on the northwestern corner of the Site.



PLATE 1: Location Plan

It is proposed that the existing Site development will be demolished, and a mix of townhouses and stacked townhouses constructed with auxiliary driveways, pedestrian paths, amenity areas and two SWM ponds. The total development would contain approximately 169 residential units. The proposed Site Plan is included in **Appendix A**.

The site planning and design at the time of writing is in a preliminary stage, and is striving toward an Official Plan Amendment (OPA) and re-zoning for the Site. Therefore, it is premature to undertake detailed engineering at this early stage of the project's life. Accordingly, the purpose of this report is to:

- Demonstrate that the site is developable as proposed from a site municipal engineering perspective;
- Identify the general design criteria and constraints; and,
- Propose a functional design of the site grading and servicing in order to obtain preliminary acceptance on the design direction to guide the future detailed design that will follow acceptance of the functional design.
- Generally support the Planning applications (OPA and zoning);

Once the OPA and rezoning is completed, the development concept will be in a more final state and at that time final detailed engineering will be undertaken to support Site Plan Approval, Building Permits and construction.

2 Existing Conditions

The following sections describe the existing conditions of the Site at the time of writing based on field reconnaissance, topographical survey, and review of existing available information.

2.1 General

The Site's development area currently contains a single detached home (located in the north corner of the property) and agricultural field. The remainder of the subject property is environmental lands and is not proposed for development and will remain in is current condition (i.e., Laurel Creek, vegetation, wetland, etc.).

The Site has frontage and existing access onto Erbsville Road (a regional road) along the Site's western flankage. Erbsville Road is currently a two-lane road with a rural cross section (i.e., gravel shoulders, roadside ditches, and no curb or sidewalk).

Refer to **Appendix B drawing FE-1** for the Site's existing conditions.

2.2 Topography and Drainage

The Site generally slopes from high elevations along the western limits (high elevation = ~355.5m) to the east (low elevation = ~347.5m) with an elevation differential of approx. 8m. There is a somewhat undefined divided running east-west through the central portions of the Site. Existing stormwater drainage follows the Site's topography as sheet flow (no stormwater infrastructure exists on the Site).

Refer to **Appendix B** for the Site's existing conditions (shown on **drawing FE-1** and **FE-3**).

2.3 Subsurface Conditions

At time of writing, a geotechnical investigation had not been completed. This investigation will be undertaken and completed as part of the final design of the Site. However, groundwater monitoring has been undertaken with data available from 2006 to 2022 (at time of writing). The maximum elevation of the groundwater table over this monitoring period ranged from 347.9 along the eastern property boundary (i.e., at monitoring wells MW 3 and 4) to 349.9 at the central high point of the Site (i.e., at monitoring wells MW 2). Refer to **Appendix B, Drawing FE-1** for the monitoring well locations.

2.4 Municipal Servicing

From review of existing information and field reconnaissance, there is adjacent municipal servicing on Erbsville Road. The existing municipal infrastructure is described as follows, and shown on the existing engineering plans in **Appendix E**.

a) Stormwater

Erbsville Road has a high point near the intersection of Regal Place. Stormwater is conveyed from this highpoint via roadside ditches and driveway culverts to the north and south.

b) Sanitary

Sanitary infrastructure (300mm diameter pipe) exists on Erbsville Road from the intersection of Regal Place southerly along the flankage of the Site. The sewer was constructed in circa 2013 (MECP Application No. 0441-9AQJ8S).

The 300mm diameter sewer runs southerly along Erbsville Road at a slope of 0.35%. The subject Site was tributary to this sewer's design as shown on the sewer's design Sanitary Catchment Area drawing (refer to **Appendix E**).

c) Potable Water & Fire Protection

A 300mm diameter watermain exists on the eastern side of Erbsville Road from just north of the Regal Place intersection and runs southerly along the flankage of the Site.

Two fire hydrants exist on the eastern boulevard of Erbsville Road: one on the north side of the Regal Place intersection, and another near the southern property limit of the Site.

At the time of writing, the existing 300mm diameter watermain adjacent to the Site is supplied only from the south (i.e., it is serviced from only one direction and is not looped). However, it is understood that the City of Waterloo and Region of Waterloo have dual ownership watermains planned for the area along Erbsville Road, Conservation Drive, and Beaver Creek Road in order to service the Beaver Creek Meadows District Plan area. This proposed watermain work will loop the subject Erbsville Road watermain. This proposed new watermain installation is currently budgeted for 2024/2025.

d) Utilities (Hydro, communication and Gas)

From field observation, Hydro and tele-communication exist on a pole line on the western side of Erbsville Road along the entire flankage of the Site. Similarly, natural gas also exists within the Erbsville Road right-of-way.

3 Proposed Development

The Site's existing building, hardscape and appurtenances will be demolished in their entirety and removed from site.

Given the form of the development proposed (i.e., 169 residential units, driveways, parking, hardscape, etc.), and the required Site grading, all existing Site vegetation and topsoil will be removed.

The following sections describe the municipal functional engineering of the Site.

3.1 Site Access and Parking

The Site is proposed to have two driveway accesses to Erbsville Road (refer to the Site Plan in **Appendix A**). Internal to the Site, driveways and pathways with provide vehicular and active transportation. The internal driveways will be designed to accommodate garbage truck, snow plough, and emergency vehicle ingress and egress. Onsite parking to service the Site will be at surface with no underground parking proposed.

3.2 Area Grading and Drainage

The grading of the Site will respect various Site constraints, including:

- Erbsville Road: It is understood that Erbsville Road will potentially be urbanized and widened to 4 lanes in the not-too-distant future. Thus, assuming a 4-lane urban cross section, the right-of-way limit will be approx. 0.25m above the centreline of the road. The site grading will thus assume ground elevations along its western boundary (i.e., Erbsville Road's ROW) to be 0.25m above the existing road centreline such that the future Erbsville Road urbanization can match into the then existing Site property line elevations.
- Environmental: The north and eastern limits of the development border environmental areas. Environmental work has established buffers, and generally site grading will match into the existing elevations of the buffers and the buffers will remain as existing. There is however a few limited exceptions given development constraints, including:
  - The SWM pond outlet spreader swales will be located within the outer fringes of the buffer; and,
  - Some limited lengths of the proposed infiltration swale along the eastern side of the development will be located in the outer fringes of the buffer.
- Floodplain: A regulatory floodplain of Laurel Creek has been established and is shown on the Functional Engineering Plans. The floodplain elevations are based on GRCA modelling (Laurel Creek HEC-RAS model) and the Floodplain cross sections have been shown on the grading plan (**Appendix B, Drawing FE-1**).

  The proposed developed will remain outside the Regulatory Floodplain with no grading proposed within the floodplain.

The proposed grading of the Site will be designed to generally sheet flow stormwater internally onto the Site's proposed roads/driveways and/or swales directed to onsite outlets. The driveways will have a storm sewer system with catchbasins to collect stormwater up to the minor storm event (5-year storm). Stormwater flows in excess of the sewer capacity (i.e., storms events greater than the minor storm) will be conveyed overland as sheet flow via the driveways, swales or other surface routes.

Generally, all Site stormwater will be directed to one of the Site's two SWM Ponds (i.e., SWM Pond A or B). The one significant exception is the rear portion of the development along the eastern side of the development (i.e., the most eastern residential blocks' rear yard and a portion of the roofs). This area is low and will not be able to be directed to the proposed SWM ponds due to elevation constraints. It is proposed instead to convey this storm drainage via

sheet flow to a proposed "Infiltration Swale" located along the eastern flankage of the Site (refer to **Appendix B, Drawing FE-1**).

The following general grading design criteria will be utilized:

- Slopes on vehicular and pedestrian areas will be between 0.5% to 6% (1% to 4% preferred);
- Slopes on landscaped areas will be between 2% to 10% (2% to 5% preferred). Where significant transitions in elevation are required, a maximum slope of 33%, or retaining walls will be used (slopes preferred over retaining walls if space permits);
- Where needed, the Site's grading will be designed to limit the surface ponding depth over catchbasins to a maximum depth of 0.3m before overland spill occurs; and,
- Grading and building design will strive for basements to be located a minimum of 0.6m above the groundwater table.

Appendix B's drawing FE-1 shows the functional grading, ground slopes as percentages, and the general overland drainage directions proposed for the Site.

3.3 Stormwater Management

The development of the Site with buildings, driveways, parking, hardscape, etc., will increase the impervious cover compared to existing conditions. This increased impervious cover, and generally the grading of the land with positive slopes, will increase stormwater flows and tend to degrade stormwater quality compared to existing conditions.

To control and treat stormwater, two stormwater management (SWM) ponds are proposed: one in the north corner of the Site, and the other in the southeastern corner. This positioning of the SWM ponds generally allows the existing central drainage divide to be maintained (i.e., the east-west drainage divide near the middle of the Site). By maintaining the divide, this mimics existing drainage patterns and stormwater outlet locations, betters the cut/fill earth balance on the Site, reduces the quantity of earth moving required, and generally minimizes slopes and retaining walls required.

The two SWM ponds will provide quantity control, reducing post-development peak stormwater flows to pre-development flow rates. The outlets of the proposed SWM ponds will be located above the 100-year floodplain elevation, and will discharge via proposed spreader swales which will spill to the existing ground to the east and infiltrate to ground or sheet drain to Laurel Creek.

Given the relatively small area of the Site (well less then 5 ha), a constructed wetland is not proposed for quality control. Instead, stormwater quality treatment will be achieved utilizing Oil Grit Separators (OGSs) located at the outlet of each SWM pond.

Finally, it is required that post-development site stormwater infiltration should attempt to match pre-development recharge rates if feasible. Accordingly, active infiltration measures will be implemented in the form of infiltration swales, roof-water infiltration galleries, etc.

For further details of the Site's drainage, stormwater controls, and water balance, refer to the separate report entitled "720 Erbsville Road, Waterloo, ON – Stormwater Management Report", dated November 27, 2023, prepared by Water's Edge Ltd.

Finally, it is understood that a future development at 672 Erbsville Road may be required to share SWM facilities with 720 Erbsville Road. Accordingly, the proposed southern SWM pond (Pond B) on 720 Erbsville Road has been positioned and designed such that it can be readily expanded southward to increase storage volume to service 672 Erbsville Road.

3.4 Sanitary System

The Site is located within the City of Waterloo's municipal sanitary servicing area. It is proposed to extend a sanitary sewer lateral from the existing sanitary manhole at the Regal Place intersection into the Site and along the Site's internal road network with laterals extended to each residential unit (refer to **Appendix B, drawing FE-2)**. All sewer works will be designed to municipal and/or OBC standards.

The proposed development will comprise 169 residential units. The municipal sanitary design criteria pertinent to the Site is:

- Population estimate (per the Region or Waterloo's 2020 Water and Wastewater Monitoring Report, Section 2.4):
  - 2.44 persons per townhouse unit;
  - 1.77 persons per stacked townhouse unit.

- Residential flows:
  - Average design flow = 275 L/person/day;
  - Peak factoring = Harmon formula.

- Groundwater infiltration allowance = 0.25 L/s/ha.

Utilizing the population estimate, the design criteria, and the infiltration allowance based on the entire Site area, the following design flows are estimated (refer to **Appendix C** for calculations):

- Average flow: 1.68 L/s
- Peak flow: 4.98 L/s

It is anticipated that given the Site's small sewage flow (4.98 L/s) relative to the capacity of Erbsville Road's 300mm diameter trunk sanitary sewer (572 L/s), and given the Erbsville Road sanitary sewer was design with the Site as a tributary catchment, that capacity is not an issue for the Site's development. However, it is understood that the City of Waterloo has a sanitary network model of the City's sanitary system and that the proposed Site flows be added to this model to ensure no capacity constraints exist.

3.5 Water Supply, Demand & Distribution

The Site is located within the City of Waterloo's municipal water servicing area. A 300mm municipal watermain exists at the intersection of Erbsville Road and Regal Place adjacent to the Site. A hydrant flow test was conducted on October 21, 2021 to determine existing supply and pressures (refer to **Appendix D**).

While it is understood that the proposed looping of area's watermain infrastructure (described earlier in this report) will only better the water supply to the subject site, for the purposes of the analysis in this FSR, it will be assumed the Site will be supplied from the existing infrastructure (a worst-case scenario).

For Site servicing, it is proposed to connect a 200mm water service to the existing 300mm diameter watermain at the intersection of Erbsville Road and Regal Place. A network of watermain would be installed within the Site's internal road network to provide potable water as well as fire protection via on-site private fire hydrants. Refer to **Appendix B, drawing FE-2** for the proposed water servicing.

The following municipal criteria has been used to calculate the domestic water demands and fire flow requirements (per DGSSMS):

- Population density:
  - 2.44 persons per townhouse unit;
  - 1.77 persons per stacked townhouse unit.
- Water supply demand:
  - Residential: 225 L/person/day with peaking factors per DGSSMS;
  - Fire: per OBC 2012 - A3.2.5.7.
- Minimum Pressure:
  - Non-fire scenario: 40 psi (276 kPa);
  - Fire Scenario: minimum 20 psi (138 kPa).
- Maximum Pressure: 100psi (689kPa).

Three worst-case scenarios were developed to calculate water demands on which modelling could be undertaken to determine if sufficient supply exists. Modelling was performed using Excel spreadsheets and the EPANET 2.2 software. The scenarios are described as follows with the results summarized in **Table 1** (refer to **Appendix D** for the data and modelling):

1. **Residential Only Flows:**
   - Average day: the demand by the population without a peaking factor;
   - Minimum hour: the demand by the population with a peaking factor of 0.4;
   - Maximum day: the demand by the population with a peaking factor of 2.75;
   - Peak Hour: the demand by the population with a peaking factor of 4.13.
2. **Fire at worst case Townhouse Block + Maximum day:**
   - Per OBC plus Maximum day residential demand.
3. **Fire at worst case Stacked Townhouse Block + Maximum day:**
   - Per OBC plus Maximum day residential demand.

Table 1 – Water Demand Modelling Results

SCENARIO (worst case pressure node)	DEMAND Lps	RESIDUAL PRESSURE	
		psi	kPa
A. Residential Only Flows:			
Criteria (min/max)	*n/a*	*40 / 100*	*276 / 689*
- No flow (J-6)	0.00	78	538
- Average day	0.89	-	-
- Minimum hour	2.46	-	-
- Maximum day	0.36	-	-
- Peak Hour (J-6)	3.69	74	510
B. Fire at TH Block + Max. day			
Criteria (min/max)	*n/a*	*20 / 100*	*138 / 689*
- @ node J-4	90.46	50	342
C. Fire at Stacked TH Block + Max. day			
Criteria (min/max)	*n/a*	*20 / 100*	*138 / 689*
- @ node J-3	106.21	38	264

'-' = not modelled

As demonstrated, the existing municipal water supply on Erbsville Road is adequate to service the development's demand under all scenarios. As noted previously, it is expected that once the Erbsville watermain is looped as part of the Beaver Creek Meadows District Plan, water supply will only improve from existing conditions.

During final design, the proposed water system and connections to the municipal watermain will be designed to municipal, OBC, and MECP standards, including required water metering.

4 Erosion and Sediment Control

During construction, erosion and sediment control measures will be implemented to ensure sediment is prevented from migrating off the Site. These controls are expected to comprise of silt fence, mud-mats at construction accesses to Erbsville Road, temporary ditches/swales, straw bale/rock check dams, temporary sediment ponds, and other measures as required.

The required erosion controls will be designed during the final design and approval stages of the project.

5 Utilities

The various utilities (i.e. Hydro, gas, telecommunications, etc.) all have existing facilities adjacent to the Site. Servicing of the development by the various utilities will be provided by extension of these facilities into the Site. During the design stages of the project each utility will identify their specific requirements through the standard application circulation, design, and review process.

6 Summary

This Functional Servicing Report describes the proposed site grading and municipal servicing design for the proposed development at 720 Erbsville Road, Waterloo, Ontario. The report demonstrates that the proposed development is feasible and can be designed and constructed in accordance with municipal and provincial standards.

The following summarizes the functional site engineering, and provides recommendations for the final design of the Site:

Grading and Drainage:

a) The functional site grading demonstrates that appropriate gradients for all vehicular and pedestrian areas can be achieved, and that stormwater can be conveyed to appropriate stormwater outlets.

b) During final design, erosion and sediment controls will be designed and proposed to be implemented during construction to control site stormwater runoff and ensure external areas are not adversely impacted.

Stormwater Management:

c) SWM quantity control will be achieved via two proposed SWM ponds: one located in the north corner of the site, and the other in the southeastern corner of the Site. The ponds will have outlet controls to ensure peak discharge from the design storm events are equal to or less than municipal criteria.

Note, the southern SWM pond (Pond B) has been positioned and designed such that it can be readily expanded to increase storage volume to service 672 Erbsville Road.

d) For those areas that cannot be routed to one of the two SWM ponds (i.e., the eastern residential rear yards adjacent to the environmental buffer area), an infiltration swale will be utilized to capture and infiltrate the required stormwater flows.

e) SWM quality control will be achieved with oil grit separator (OGS) located downgradient of the SWM ponds' outlets.

f) Infiltration of roof water is proposed throughout the Site to provide groundwater recharge.

Sanitary:

g) Internal sanitary sewers will collect sewage from the residential development and convey it to the existing Erbsville Road 300mm diameter trunk sanitary sewer.

h) As is typical practice, the City of Waterloo should add the proposed development's sanitary flows to their sanitary model and confirm downgradient sewer capacity is not an issue.

Water:

i) The existing Erbsville Road watermain infrastructure was found to have sufficient capacity to service the proposed development. Once the Erbsville watermain is looped under the municipality's Beaver Creek Meadows District Plan proposed water works, supply will only improve.

j) A proposed 200mm diameter service will connect to the existing 300mm diameter municipal watermain on Erbsville Road to provide potable water and fire protection for the Site.

k) A looped watermain system will be installed within the Site's internal road network to distribute water via service laterals to each residential unit.

l) Proposed private hydrants within the development, and existing hydrants external to the Site on Erbsville Road will provide fire protection for the Site. During final design, the proposed onsite hydrants will be located to ensure proper fire-protection coverage.

Utilities:

m) Existing utilities (i.e., hydro, gas and communication) exist on Erbsville Road adjacent to the Site.

n) During the final planning and design of the Site, the various Utilities will be coordinated to provide service to the Site.

Based on the functional engineering review described herein, we conclude the proposed Site can be developed and serviced from a municipal/civil engineering perspective in accordance with municipal and agency criteria.

We recommend that the City of Waterloo, Region of Waterloo, and other agencies confirm the proposed criteria and review/confirm that the functional design approach outlined herein meets with their "approval in principle". This will support the Planning applications for OPA and rezoning, and provide guidance to the Site's detailed final design during the Site Plan Approval process.

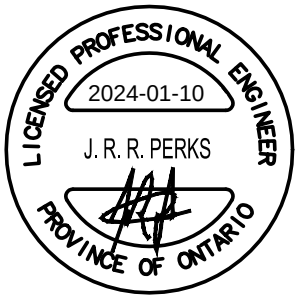
We trust this study and its findings support the OPA and re-zoning applications for the Site. Should there be any questions, or if further information is required, please do not hesitate to contact the undersigned.

* * * * * * * * * * * * * * * *

Respectfully prepared,

JPE ENGINEERING

John Perks, MBA, P.Eng.
Senior Engineer, President



APPENDIX A:

Site Plan

Concept Plan

City of Waterloo
Region of Waterloo

Residential Zone Area: 30,438m² / 3.04ha

Proposed Units:
Townhouses: 57
Stacked Townhouses: 112
Total Proposed Units: 169

Parking Required:
Townhouse: 76 (1.33 per unit)
Stacked Townhouse: 124 (1.1 per unit)
Total Parking Required: 200

Parking Provided:
Townhouse: 76 (1.33/unit)
Stacked Town: 167 (1.49/unit)
Total Parking Provided: 243 (1.43/unit)

Additional Lands: + 4,975m² / 0.49 ha
/Total Overall Area: 35,413m² / 3.54 ha

Notes:
1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SHOWN.
2. PROPERTY BOUNDARY APPROXIMATE, TO BE VERIFIED BY SURVEY.
3. CONTOURS (1m) & ENVIRONMENTAL CONSTRAINTS BASED ON ERBSVILLE EA STUDY (SEPTEMBER, 2018) AND NRSI EIS SURVEYS (2023)
7. FOR CONCEPTUAL PURPOSES ONLY.

DATE: January 8, 2024
FILE: 0977D
SCALE: 1:1,500
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north

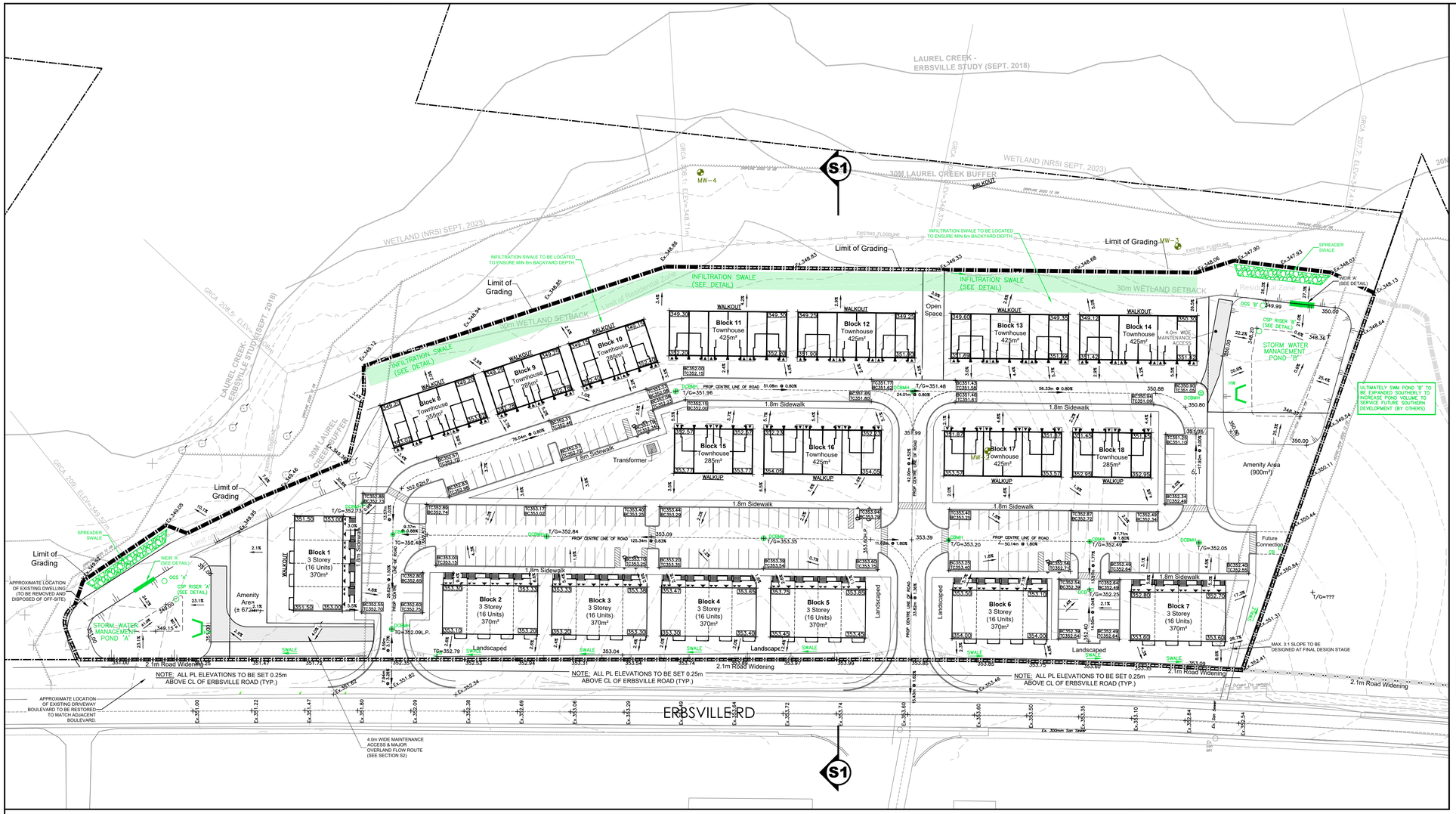
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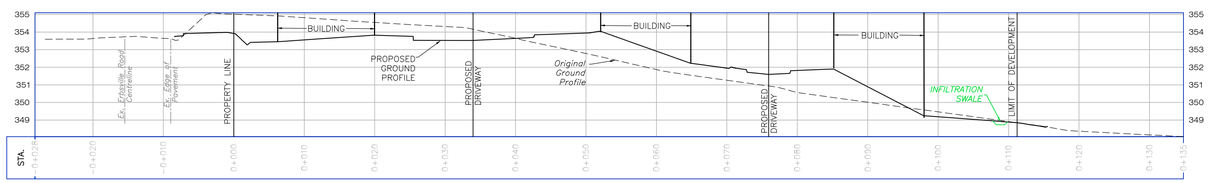
MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE
200-540 BINGEMANS CENTRE DR. KITCHENER, ON. N2B 3X9
P: 519.576.3650 F: 519.576.0121 | WWW.MHBCPLAN.COM

APPENDIX B:

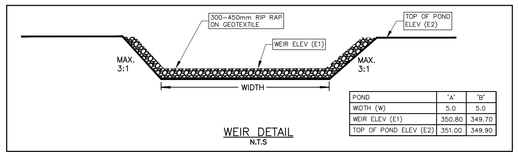
Functional Engineering Drawings

- FE-1: Functional Grading Plan
- FE-2: Functional Servicing Plan
- FE-3: Pre-Development Storm Catchment Area Plan
- FE-4: Post-Development Storm Catchment Area Plan



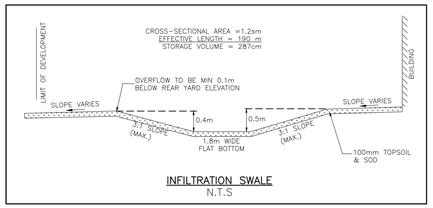


SECTION S1

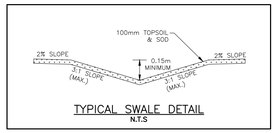


POND	'A'	'B'
WIDTH (W)	5.0	5.0
WEIR ELEV (E1)	350.80	349.70
TOP OF POND ELEV (E2)	351.00	349.90

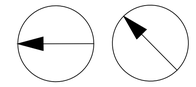
WEIR DETAIL
N.T.S



INFILTRATION SWALE
N.T.S



TYPICAL SWALE DETAIL
N.T.S



FUNCTIONAL DESIGN NOTES:

A. GENERAL:

1. THE FUNCTIONAL ENGINEERING PLANS ARE NOT FOR CONSTRUCTION. THE SOLE PURPOSE OF THESE PLANS IS TO DEMONSTRATE THE GRADING AND MUNICIPAL SERVICING DESIGN INTENT. ONCE APPROVAL IN PRINCIPLE HAS BEEN OBTAINED FROM THE APPROVAL AUTHORITIES, A DETAILED DESIGN WILL BE COMPLETED.
2. NOTES INCLUDED ON ANY ONE ENGINEERING PLANS SHALL PERTAIN TO ALL ENGINEERING PLANS IN THE DRAWING SET.
3. THE ENGINEERING PLANS SHALL NOT TO BE REPRODUCED IN WHOLE OR IN PART WITHOUT THE PERMISSION OF JPE ENGINEERING.
4. THE ENGINEERING PLANS ARE TO BE READ IN CONJUNCTION WITH ALL OTHER PROJECT PLANS AND DOCUMENTS, INCLUDING BUT NOT LIMITED TO LEGAL SURVEY, EXISTING CONDITION, GRADING, SERVICING, DETAILS, STORMWATER MANAGEMENT, ARCHITECTURAL, LANDSCAPE, ETC.
5. THE POSITION OF UNDERGROUND AND ABOVEGROUND UTILITIES/PLANT, STRUCTURES AND EXISTING TOPOGRAPHICAL FEATURES IS NOT NECESSARILY SHOWN, AND WHERE SHOWN, THE ACCURACY OF THE LOCATION AND/OR ELEVATION IS NOT GUARANTEED.

B. GENERAL DESIGN CRITERIA:

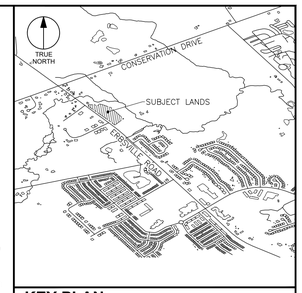
1. ALL WORK SHALL BE DONE IN STRICT ACCORDANCE WITH OPSD, OPSS, OBC, AND LOCAL MUNICIPAL STANDARDS, WHICHEVER IS MORE STRINGENT AS DETERMINED BY THE MUNICIPALITY AND ENGINEER.
2. SPECIFIC REFERENCES MADE TO STANDARDS ON THE ENGINEERING DRAWINGS ARE FOR CONVENIENCE ONLY AND SHALL NOT EXCLUDE OTHER STANDARDS FROM APPLYING TO THE WORK.
3. THE MINIMUM AND MAXIMUM SLOPES SHALL BE AS FOLLOWS UNLESS OTHERWISE NOTED:

	MINIMUM	MAXIMUM
a. CONCRETE GUTTER:	0.5%	8.0%
b. HARDSCAPE:	0.7%	5.0%
c. SOFTSCAPE:	2.0%	33.0%
d. VEGETATED SWALES:	2.0%	33.0%
e. AMENITY AREAS:	2.0%	5.0%

4. ALL AREAS SHALL BE MADE TO HAVE POSITIVE DRAINAGE AND BE DIRECTED TO APPROPRIATE OUTLETS TO ENSURE NO SURFACE PONDING OF STORM WATER OCCURS.
5. ELEVATIONS ALONG CURB LINES, SIDEWALKS, ETC., REFERENCE BOTTOM OF CURB, SIDEWALK, ETC., UNLESS OTHERWISE INDICATED.

FUTURE DESIGN TO IDENTIFY PIPE SIZES, INVERTS, SERVICE LOCATIONS, DETAILED CONSTRUCTION DETAILS & NOTES ETC.

ROOF WATER LEADER LOCATIONS TO BE DETERMINED BY ARCHITECT. ALL ROOF WATER LEADERS TO OUTLET TO SPLASH PADS AND BE DIRECTED TO APPROPRIATE OUTLETS.



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NOT FOR TENDER OR CONSTRUCTION. THE PURPOSE OF THIS PLAN IS TO SHOW THE FUNCTIONAL DESIGN OF THE DEVELOPMENT IN ORDER TO DEMONSTRATE THE GENERAL DESIGN INTENT. DETAILED DESIGN WILL FOLLOW ACCEPTANCE OF THE FUNCTIONAL DESIGN.

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Project:

720 ERBSVILLE ROAD, WATERLOO, ON

Drawing Title:

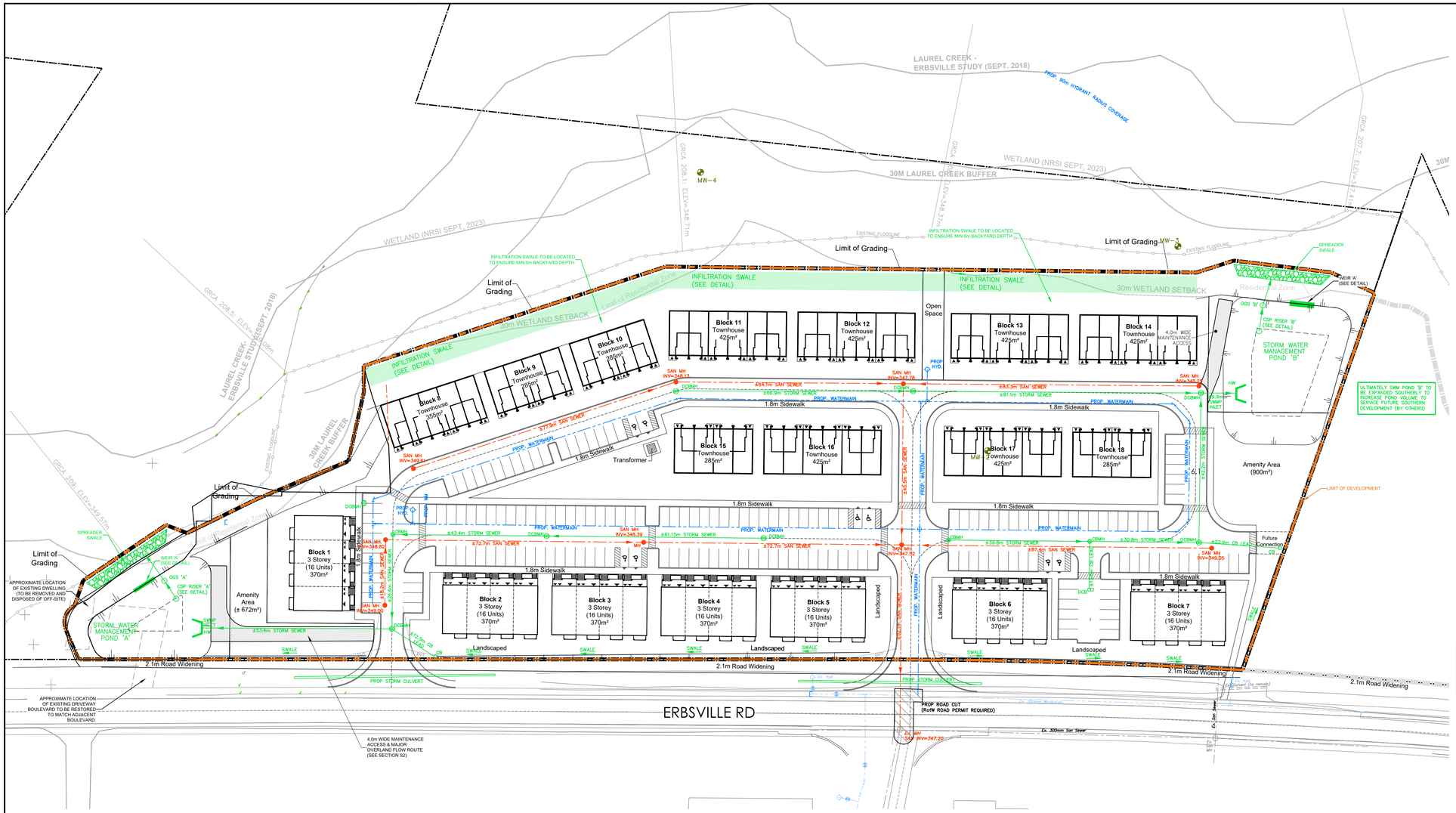
FUNCTIONAL GRADING PLAN

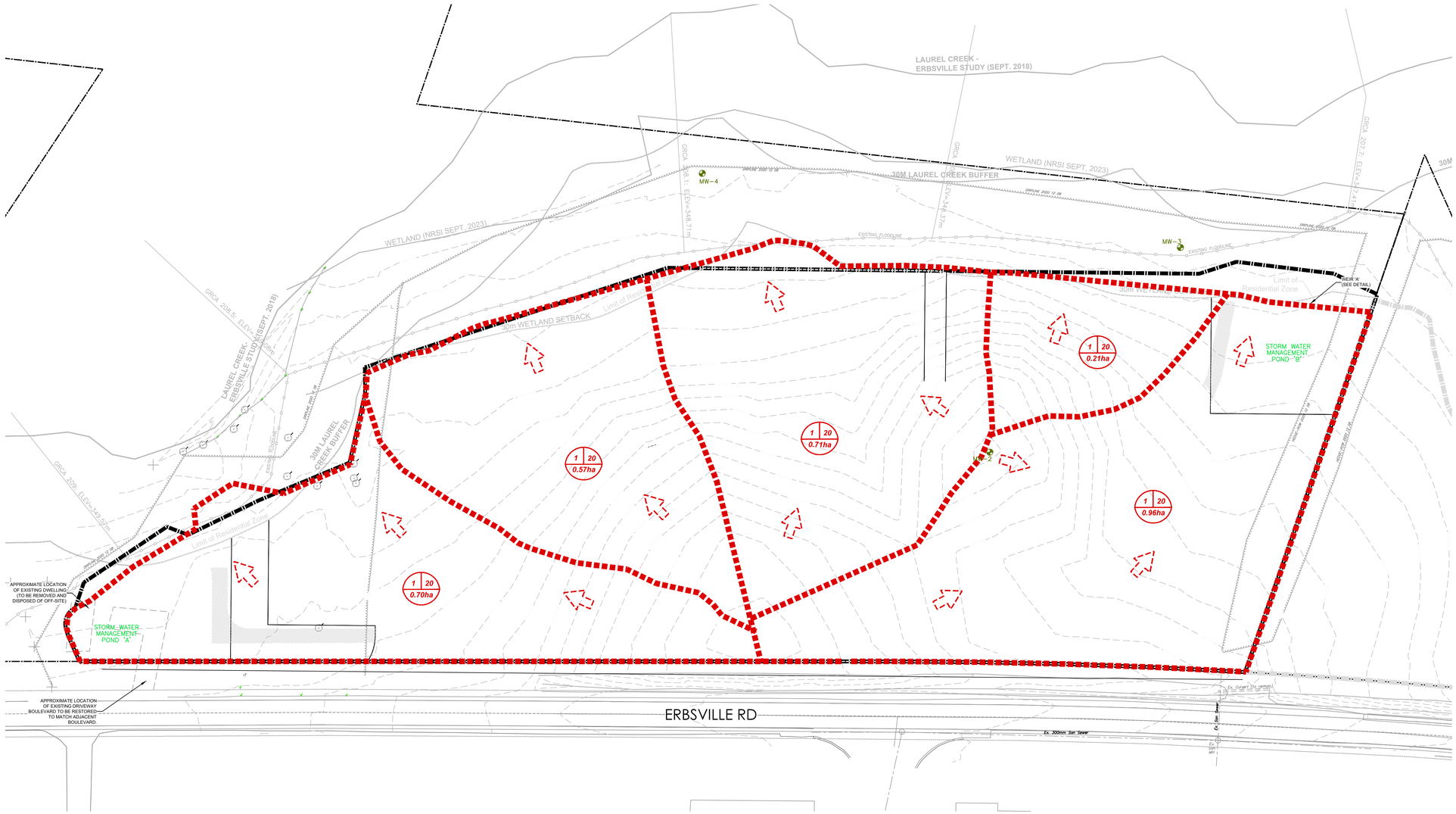
Scale:	1:600	**Date:**	2024-01-09
Drawn By:	MES/JP	**Checked By:**	JP
Project #:	JPE-1027	**Dwg #:**	FE - 1
		Rev #:	0

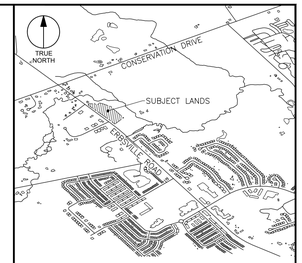
LEGEND

- PROPERTY LINE (SUBJECT)
- LOT LINES
- SANITARY
- EX. SANITARY
- WATERMAIN
- EX. WATERMAIN
- STORM
- EX. STORM
- BUILDING
- EX. BUILDING
- PROP. RETAINING WALL
- EX. FENCE
- PROPOSED SWALE
- EX. SAN. MANHOLE
- CURB STOP
- EX. HYDRANT
- LIVE TAP CONNECTION
- PROP WATER METER
- PROP SUMP PUMP OUTLET
- C-CR-DITCH
- 2% GRADE/SLOPE ARROW
- TREELINE
- SILT FENCE
- EXIST ±321.16 MATCH EXISTING GRADE
- 321.09 PROPOSED GRADE
- 321.09 PROPOSED GRADE AT BUILDING CORNER
- S321.09 PROPOSED SWALE GRADE
- 4.3% PROPOSED ± SLOPE GRADE
- *321.09 / Ex. Dwelling, etc.* ALL ITALIC TEXT IS EXISTING ALL NON-ITALIC TEXT IS PROPOSED
- 321.09↑ PROPOSED EASEMENT
- EXISTING CONTOUR

File Name: JPE-1027-BS 2024-01-08.dwg Last Saved: January 10, 2024 Plotted: January 10, 2024 11:46:18 AM


PROJECT NORTH
TRUE NORTH
LAUREL CREEK - ERBSVILLE STUDY (SEPT. 2018)
PROP. 90m HYDRANT RADIUS COVERAGE
WETLAND (NRSI SEPT, 2023)
30M LAUREL CREEK BUFFER
GRCA 208.1: ELEV=348.71m
GRCA 207.2: ELEV=347.37m
GRCA 208.5: ELEV=348.19m
GRCA 209: ELEV=348.57m
MW-4
MW-3
MW-2
Limit of Grading
INFILTRATION SWALE TO BE LOCATED TO ENSURE MIN 6m BACKYARD DEPTH.
INFILTRATION SWALE (SEE DETAIL)
30m WETLAND SETBACK
Limit of Residential Zone
Open Space
Block 1 3 Storey (16 Units) 370m²
Block 2 3 Storey (16 Units) 370m²
Block 3 3 Storey (16 Units) 370m²
Block 4 3 Storey (16 Units) 370m²
Block 5 3 Storey (16 Units) 370m²
Block 6 3 Storey (16 Units) 370m²
Block 7 3 Storey (16 Units) 370m²
Block 8 Townhouse 355m²
Block 9 Townhouse 285m²
Block 10 Townhouse 285m²
Block 11 Townhouse 425m²
Block 12 Townhouse 425m²
Block 13 Townhouse 425m²
Block 14 Townhouse 425m²
Block 15 Townhouse 285m²
Block 16 Townhouse 425m²
Block 17 Townhouse 425m²
Block 18 Townhouse 285m²
4.0m WIDE MAINTENANCE ACCESS
Transformer
Amenity Area (900m²)
Amenity Area (± 672m²)
STORM WATER MANAGEMENT POND 'A'
STORM WATER MANAGEMENT POND 'B'
SPREADER SWALE
WEIR 'A' (SEE DETAIL)
OGS 'A'
OGS 'B'
CSP RISER 'A' (SEE DETAIL)
CSP RISER 'B' (SEE DETAIL)
SWMP INLET
APPROXIMATE LOCATION OF EXISTING DWELLING (TO BE REMOVED AND DISPOSED OF OFF-SITE)
APPROXIMATE LOCATION OF EXISTING DRIVEWAY BOULEVARD TO BE RESTORED TO MATCH ADJACENT BOULEVARD.
4.0m WIDE MAINTENANCE ACCESS & MAJOR OVERLAND FLOW ROUTE (SEE SECTION 52)
PROP. WATERMAIN
PROP. STORM SEWER
PROP. SAN. SEWER
PROP. HYD.
PROP STORM CULVERT
1.8m Sidewalk
2.1m Road Widening
SWALE
Landscaped
LIMIT OF DEVELOPMENT
ULTIMATELY SWM POND 'B' TO BE EXPANDED SOUTHERLY TO INCREASE POND VOLUME TO SERVICE FUTURE SOUTHERN DEVELOPMENT (BY OTHERS)
Future Connection
ERBSVILLE RD
PROP ROAD CUT (RofW ROAD PERMIT REQUIRED)
Ex. 300mm San Sewer
Ex. MH SAN MH INV=347.20
Ex. 450mm Watermain
Ex. 200mm Watermain
Ex. SWM MH
Ex. Hydrant
Ex. Gas Valve (To remain)
Ex. Gas Valve (To remain)
Ex. Gas Valve (To remain)





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Drawing Title:

FUNCTIONAL PRE-DEVELOPMENT STORM CATCHMENT PLAN

Scale: 1:600	**Date:** 2024-01-09
Drawn By: MES	**Checked By:** JP

Project #:	Dwg #:	Rev #:
JPE-1027	FE - 3	0

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4. ANY DISCREPANCIES MUST BE BROUGHT TO THE ATTENTION OF THE ENGINEER, PRIOR TO ANY CONSTRUCTION.

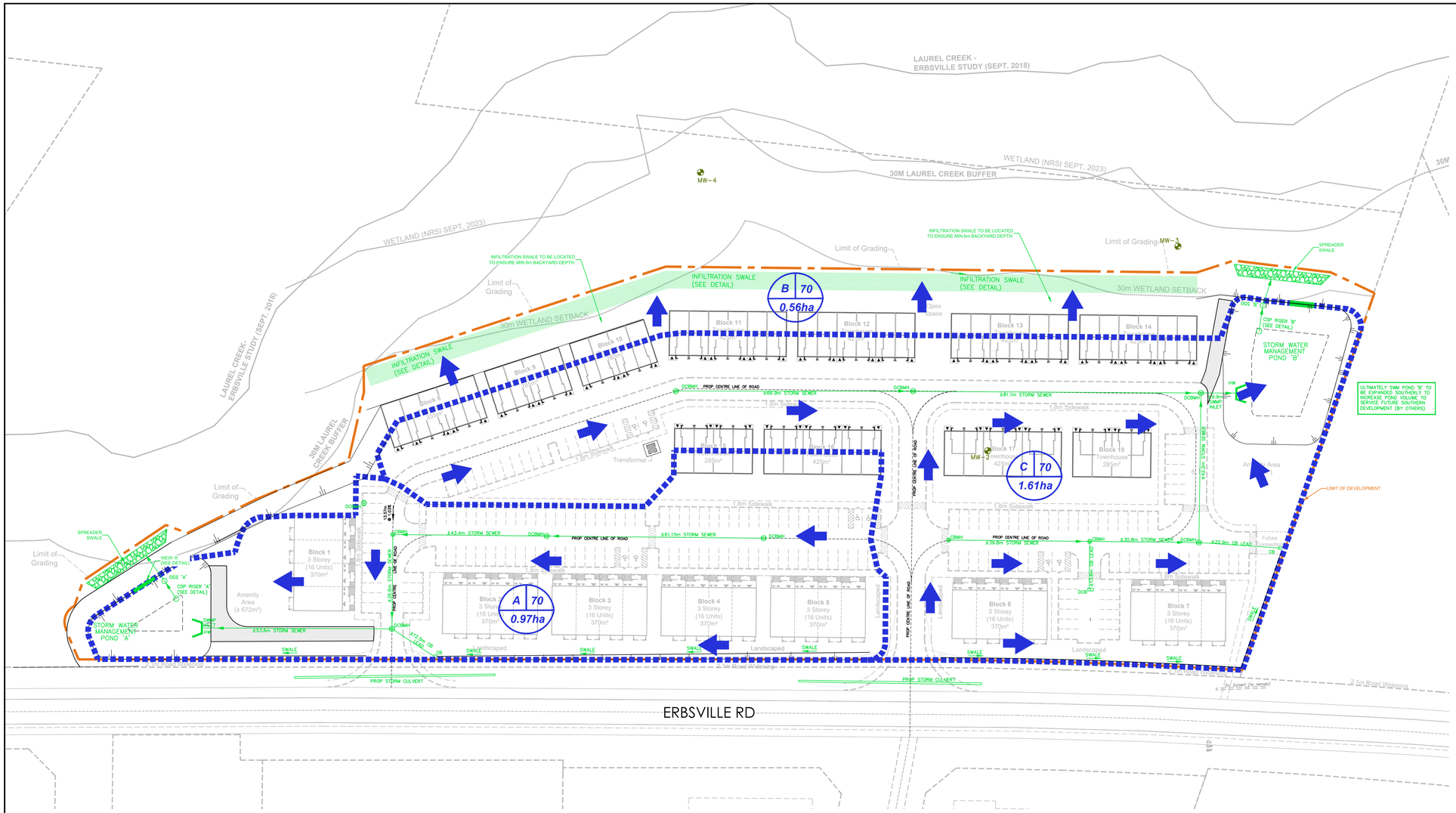
LEGEND

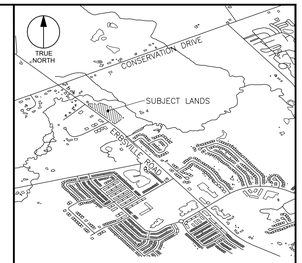
CATCHMENT AREA NUMBER — 20 | 70 — RUNOFF CO-EFFICIENT
AREA IN HECTARES — 0.24ha

Ex. MAJOR OVERLAND FLOW DIRECTION

PROPOSED CATCHMENT AREA BOUNDARY

File Name: JPE-1027-BS 2024-01-08.dwg Last Saved: January 10, 2024 Plotted: January 10, 2024 11:44:32 AM





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LEGEND

CATCHMENT AREA NUMBER — 20 | 70 — RUNOFF CO-EFFICIENT
AREA IN HECTARES — 0.24ha

MAJOR OVERLAND FLOW DIRECTION

PROPOSED CATCHMENT AREA BOUNDARY

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Drawing Title:

FUNCTIONAL POST-DEVELOPMENT STORM CATCHMENT PLAN

Scale:	1:600	Date:	2024-01-09
Drawn By:	MES/JP	Checked By:	JP
Project #:	JPE-1027	Dwg #:	FE - 4
Rev #:	0		

File Name: JPE-1027-SS 2024-01-08.dwg Last Saved: January 10, 2024 Plotted: January 10, 2024 11:43:21 AM

Appendix C:

Sanitary Calculations

September 18, 2023

720 ERBSVILLE ROAD, Waterloo ON
Sanitary Flow Calculation

TYPE	DENSITY (ppu)	# Units	Population
Single Dwelling	3.25	0	0
TownHouses	2.44	57	140
Aprt - 1 bed	1.40	0	0
Aprt - 2 bed	2.10	0	0
Aprt - 3 bed	3.10	0	0
Aprt - 4 bed	3.50	0	0
Stacks	1.77	112	199
TOTAL	**n/a**	**169**	**339**

Residential Flow:

Site Population	339	persons
Existing Population	0	persons
Total Population	339	persons
Flow per person	275	L/person/day
Peaking factor	4.06	per harmon: $1+ (14/(4+(P/1000)^{0.5}))$
Average flow	93225	L/day
Average flow	1.08	L/s
Peak flow	4.38	L/s

Commercial Flow:

Commercial area	0	ha
Existing Commerica	0	ha
Total Population	0	ha
Flow rate	0.5	L/s/ha
Peaking factor	2.5	
Average flow	0.00	L/s
Peak flow	0	L/s

Infiltration Flow

Total Area	0.35	ha
Infiltration rate	0.25	L/s/ha
Infiltration allowance	0.60	L/s

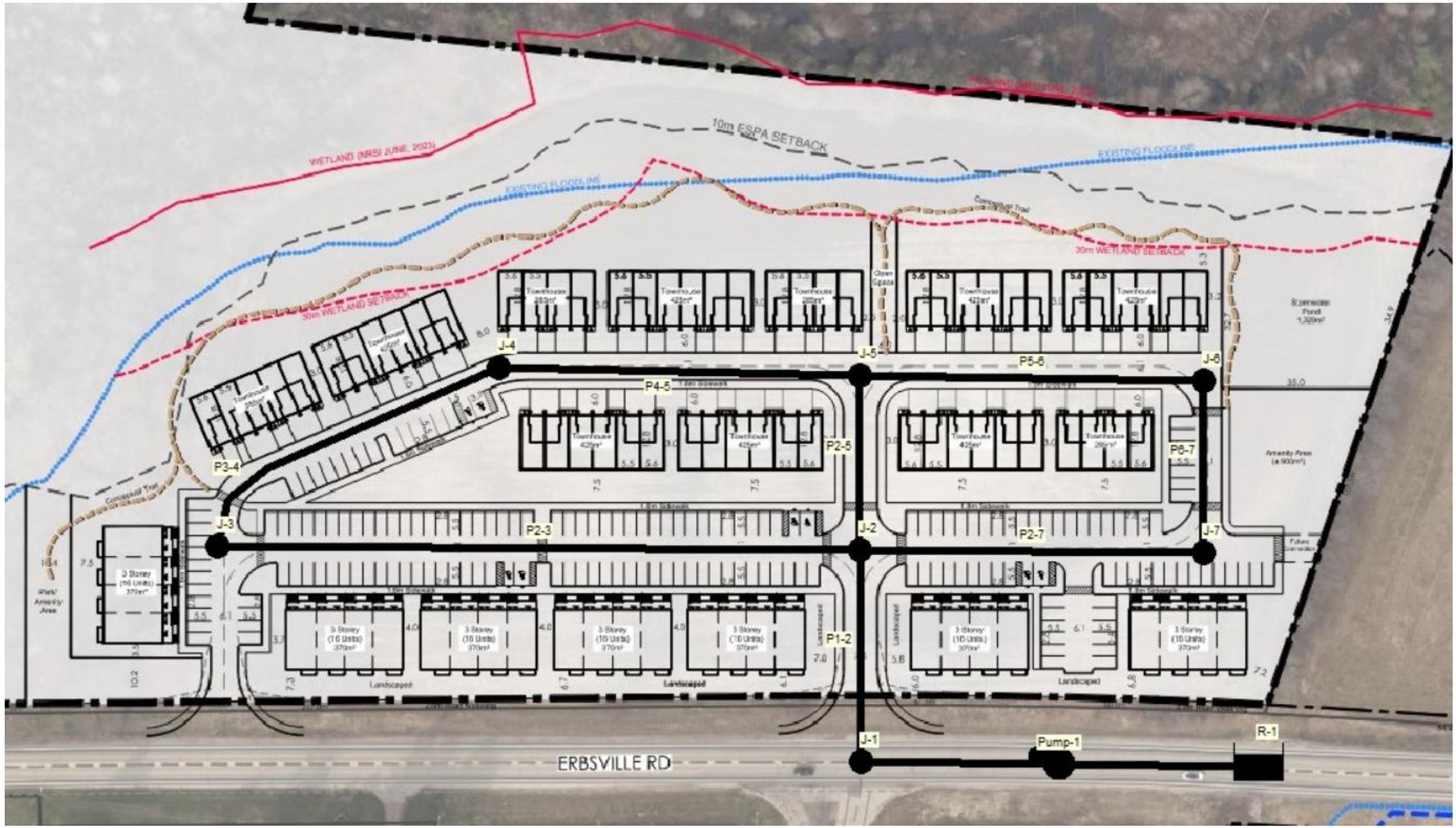
TOTAL

Average flow	**1.68**	**L/s**
Peak flow	**4.98**	**L/s**

Appendix D:

Water Supply & Demand

- Design Calculations
- EPANET 2.2 modelling output



SCALE:

NTS

scale is approx. when plotted on 11x17 paper

KEY PLAN:



#	REVISION	BY	DATE
1	First Submission	JRP	2023-09-18

BASE MAPPING SOURCES:
- MHBC Site Plan (2023-08-10)

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EPANET WATER NETWORK PLAN

SHEET 1 of 1

DWG JPE-1027 FE-W1

720 ERBSVILLE ROAD
Waterloo, Ontario

AVAILABE WATER SUPPLY

File No: JPE1027
Date: Sept 8, 2023
Sheet By: JP

HYDRANT FLOW TEST RESULTS
(per Hydrant Flow Test by C&H, Oct 5, 2021)

Static Pressure	74	psi	
One Port			
Residual Pressure	62	psi	
Flow	69.8	L/s	1107 usGAL/m
Two Ports			
Residual Pressure	50	psi	
Flow	107.6	L/s	1705 usGAL/m

CALCULATED AVAILABLE FLOW AT TEST HYDRANT @ 20psi
https://www.joiff.com/members/documents/hydrant_testing.pdf

$Q2 = Q1 (S - R2)^{0.54} / (S - R1)^{0.54}$

where: Q = flow rate in litres per seconds
S = static pressure in psi
R = residual pressure in psi

Q1	1705.5	usGal / m	107.6	lps
S			74.0	psi
R1			50.0	psi
R2			20.0	psi
Q2 =			**166.7**	**lps**
			2642.59302	usGal / m

720 ERBSVILLE ROAD
Waterloo, Ontario

DOMESTIC WATER DEMAND

File No: JPE1027
Date: Sept 8, 2023
Sheet By: JP

Proposed Residential Apartment	Population Density[1]		Units	Equivalent Population (persons)	Water Demand[1] @ 225 L/p/day (L/day)
Single Dwelling	3.25	PPU	0.00	0.00	0
TownHouses	2.44	PPU	59.00	144.00	32,400
Stacks	1.77	PPU	112.00	199.00	44,775
Aprt - 1 bed	1.40	PPU	0.00	0.00	0
Aprt - 2 bed	2.10	PPU	0.00	0.00	0
Aprt - 3 bed	3.10	PPU	0.00	0.00	0
Aprt - 4 bed	3.50	PPU	0.00	0.00	0
		Total	**171**	**343**	**77,175**

	Peaking Factor[2]	Flow
Average day (L/s)	1.00	0.89
Maximum day (L/s)	2.75	2.46
Minimum hour (L/s)	0.40	0.36
Peak hour (L/s)	4.13	3.69

NOTES:

1 Region's Water and Wastewater Monitoring Report, Region of Waterloo (June 2020)
2 MOE's "Design Guidelines for Drinking Water Systems (2008) - Table 3-1

720 ERBSVILLE ROAD
Waterloo, Ontario

FIRE FLOW REVIEW
per OBC 2012 - A3.2.5.7

File No: JPE1027
Date: Sept 8, 2023
Sheet By: JP

Building Classification: C 3-storey Traditional Townhouse Building (6 Unit)

Building details:

Building materials	Wood frame with metal/brick siding.		
Number of Storeys	2		plus basement
Avg Floor area (1 level)	425	m2	
Avg building height	9	m	(incl basement, excludes roof)
Thus, Building volume =	3825	m3	(floor area x height)
Firewall separation ?	No		
Sprinklered ?	No		
Stand Pipes ?	No		

Minimum supply of water (per OBC) = Q = K • V • S_{tot}

where: Q = minimum water supply required (L)
K = coefficient (Table 1 of 3.2.5.7 Table 1)
V = total building volume in cubic metres
S_{tot} = total of spatial coefficient (Stot = 1.0 + [S_{side1} + S_{side2} + S_{side3} + ... etc.)]

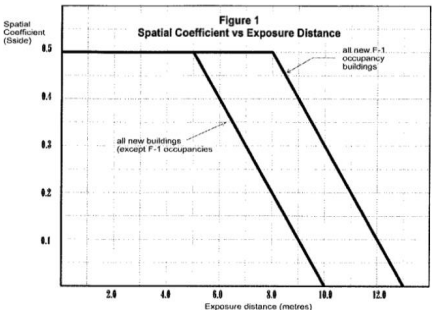
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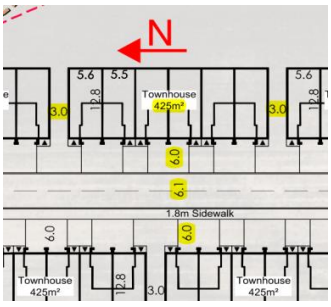
Table 1
Water Supply Coefficient - K

Type of Construction	Classification by Group or Division in Accordance with Table 3.1.2.1. of the Building Code				
	A-2 B-1 B-2 B-3 C D	A-4 F-3	A-1 A-3	E F-2	F-1
Building is of noncombustible construction with fire separations and fire-resistance ratings provided in accordance with Subsection 3.2.2., including loadbearing walls, columns and arches.	10	12	14	17	23
Building is of noncombustible construction or of heavy timber construction conforming to Article 3.1.4.6. Floor assemblies are fire separations but with no fire-resistance rating. Roof assemblies, mezzanines, loadbearing walls, columns and arches do not have a fire-resistance rating.	16	19	22	27	37
Building is of combustible construction with fire separations and fire-resistance ratings provided in accordance with Subsection 3.2.2., including loadbearing walls, columns and arches. Noncombustible construction may be used in lieu of fire-resistance rating where permitted in Subsection 3.2.2.	18	22	25	31	41
Building is of combustible construction. Floor assemblies are fire separations but with no fire-resistance rating. Roof assemblies, mezzanines, loadbearing walls, columns and arches do not have a fire-resistance rating.	23	28	32	39	53
Column 1	2	3	4	5	6

V = 3825 m3

		separation:	
S_N =	0.5	3	m
S_E =	0.0	>10	m
S_S =	0.5	3	m
S_W =	0.0	>10	m
constant	1.0		
S_{tot} =	2.0	(max = 2)	





Thus, by formula, Q = 175,950 m3

Thus min supply rate = 5400 L/min
= 90 L/s

Plus Maximum Day 2.46 L/s

Table 2

Part 3 Buildings under the Building Code	Required Minimum Water Supply Flow Rate, L/min
One-storey building with building area not exceeding 600 m²	1 800
All other buildings	2 700 (if Q ≤ 108 000 L)(1) 3 600 (if Q > 108 000 L and ≤ 135 000 L)(1) 4 500 (if Q > 135 000 L and ≤ 162 000 L)(1) 5 400 (if Q > 162 000 L and ≤ 190 000 L)(1) 6 300 (if Q > 190 000 L and ≤ 270 000 L)(1) 9 000 (if Q > 270 000 L)(1)

REQUIRED MIN SUPPLY 92.46 L/s (at 20 PSI)

Notes *:*

1. The analysis of this sheet is per OBC2012 - Appendix A (Volume 2), Section A3.2.5.7.
2. Per OBC 6.3, the absolute minimum fire flow required for residential development is 45 L/s at 20 psi.

720 ERBSVILLE ROAD
Waterloo, Ontario

FIRE FLOW REVIEW
per OBC 2012 - A3.2.5.7

File No: JPE1027
Date: Sept 8, 2023
Sheet By: JP

Building Classification: C 3-storey Stacked Townhouse Building (16 Unit)

Building details:

Building materials	Wood frame with metal/brick siding.		
Number of Storeys	3		plus basement
Avg Floor area (1 level)	370	m2	
Avg building height	12	m	(incl basement)
Thus, Building volume =	4440	m3	(floor area x height)
Firewall separation ?	No		
Sprinklered ?	No		
Stand Pipes ?	No		

Minimum supply of water (per OBC) = Q = K • V • S_{tot}

where: Q = minimum water supply required (L)
K = coefficient (Table 1 of 3.2.5.7 Table 1)
V = total building volume in cubic metres
S_{tot} = total of spatial coefficient (Stot = 1.0 + [S_{side1} + S_{side2} + S_{side3} + ... etc.)]

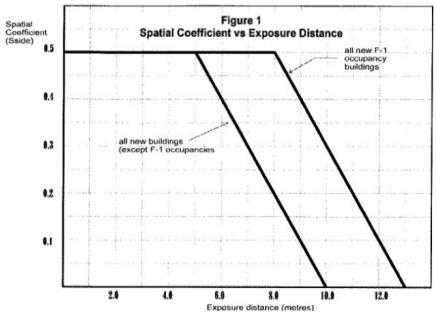
K = 23

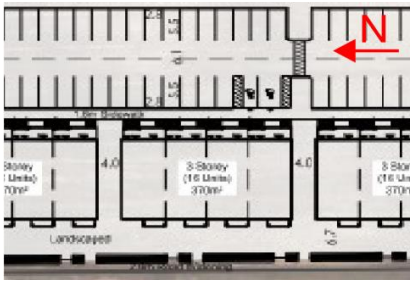
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Building is of noncombustible construction or of heavy timber construction conforming to Article 3.1.4.6. Floor assemblies are fire separations but with no fire-resistance rating. Roof assemblies, mezzanines, loadbearing walls, columns and arches do not have a fire-resistance rating.	16	19	22	27	37
Building is of combustible construction with fire separations and fire-resistance ratings provided in accordance with Subsection 3.2.2., including loadbearing walls, columns and arches. Noncombustible construction may be used in lieu of fire-resistance rating where permitted in Subsection 3.2.2.	18	22	25	31	41
Building is of combustible construction. Floor assemblies are fire separations but with no fire-resistance rating. Roof assemblies, mezzanines, loadbearing walls, columns and arches do not have a fire-resistance rating.	23	28	32	39	53
Column 1	2	3	4	5	6

V = 4440 m3

		separation:	
S_N =	0.5	3	m
S_E =	0.0	>10	m
S_S =	0.5	3	m
S_W =	0.0	>10	m
constant	1.0		
S_{tot} =	2.0	(max = 2)	





Thus, by formula, Q = 204,240 m3

Table 2

Part 3 Buildings under the Building Code	Required Minimum Water Supply Flow Rate, L/min
One-storey building with building area not exceeding 600 m²	1 800
All other buildings	2 700 (if Q ≤ 108 000 L)(1) 3 600 (if Q > 108 000 L and ≤ 135 000 L)(1) 4 500 (if Q > 135 000 L and ≤ 162 000 L)(1) 5 400 (if Q > 162 000 L and ≤ 190 000 L)(1) 6 300 (if Q > 190 000 L and ≤ 270 000 L)(1) 9 000 (if Q > 270 000 L)(1)

Thus min supply rate = 6300 L/min
= 105 L/s

Plus Maximum Day 2.46 L/s

REQUIRED MIN SUPPLY 107.46 L/s (at 20 PSI)

Notes *:*

1. The analysis of this sheet is per OBC2012 - Appendix A (Volume 2), Section A3.2.5.7.
2. Per OBC 6.3, the absolute minimum fire flow required for residential development is 45 L/s at 20 psi.

720 ERBSVILLE ROAD
Waterloo, Ontario

SUMMARY OF EPANET INPUT & RESULTS

File No: JPE1027
Date: Sept 8, 2023
Sheet By: JP

SCENARIO 'A1': No Demand
Fire Demand = 0 LPS

NODE	# UNITS		Pop.	Demand (LPS)	PRESSURE		
	TH	Stacks		(LPS)	m	PSI	kPa
J1			0	0.00	52.00	73.9	510
J2			0	0.00	52.20	74.2	512
J3	11	80	169	0.00	53.05	75.4	520
J4	26		64	0.00	53.90	76.6	528
J5			0	0.00	54.10	76.9	530
J6	22		54	0.00	54.85	78.0	538
J7		32	57	0.00	53.60	76.2	526
TOTAL	**59**	**112**	**344**	**0.00**			

720 ERBSVILLE ROAD
Waterloo, Ontario

SUMMARY OF EPANET INPUT & RESULTS

File No: JPE1027
Date: Sept 8, 2023
Sheet By: JP

SCENARIO 'A2': Peak Hour
Fire Demand = 0 LPS

NODE	# UNITS		Pop.	Demand (LPS)	PRESSURE		
	TH	Stacks		(LPS)	m	PSI	kPa
J1			0	0.00	51.97	74	510
J2			0	0.00	52.16	74	511
J3	11	80	169	1.82	53.01	75	520
J4	26		64	0.69	53.86	77	528
J5			0	0.00	54.06	77	530
J6	22		54	0.58	54.81	78	537
J7		32	57	0.61	53.56	76	525
TOTAL	**59**	**112**	**344**	**3.70**			

720 ERBSVILLE ROAD
Waterloo, Ontario

SUMMARY OF EPANET INPUT & RESULTS

File No: JPE1027
Date: Sept 8, 2023
Sheet By: JP

SCENARIO 'B': Townhouse Fire @ Node J4
Fire Demand = 90 LPS

NODE	# UNITS		Pop.	Demand (LPS)	PRESSURE		
	TH	Stacks		(LPS)	m	PSI	kPa
J1			0	0.00	39.32	56	385
J2			0	0.00	38.14	54	374
J3	11	80	169	1.21	35.78	51	351
J4	26		64	90.46	34.87	50	342
J5			0	0.00	38.87	55	381
J6	22		54	0.39	40.06	57	393
J7		32	57	0.41	39.06	56	383
TOTAL	**59**	**112**	**344**	**92.46**			

720 ERBSVILLE ROAD
Waterloo, Ontario

SUMMARY OF EPANET INPUT & RESULTS

File No: JPE1027
Date: Sept 8, 2023
Sheet By: JP

SCENARIO 'C': Stacked Townhouse Fire @ Node J3
Fire Demand = 105 LPS

NODE	# UNITS		Pop.	Demand (LPS)	PRESSURE		
	TH	Stacks		(LPS)	m	PSI	kPa
J1			0	0.00	35.24	50	345
J2			0	0.00	33.61	48	330
J3	11	80	169	106.21	26.94	38	264
J4	26		64	0.46	31.26	44	306
J5			0	0.00	34.55	49	339
J6	22		54	0.39	35.67	51	350
J7		32	57	0.41	34.61	49	339
TOTAL	**59**	**112**	**344**	**107.46**			

Appendix E:

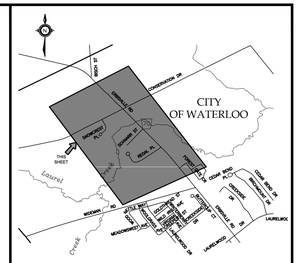
Existing Engineering Drawings

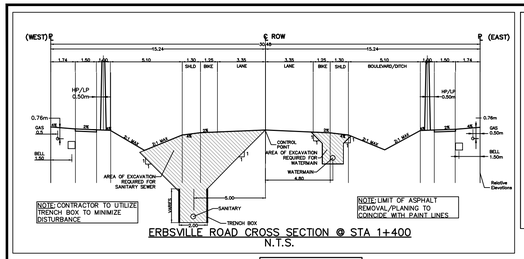
- Erbsville Road – Sanitary Catchment Areas
- Erbsville Road – Plan & Profile drawing



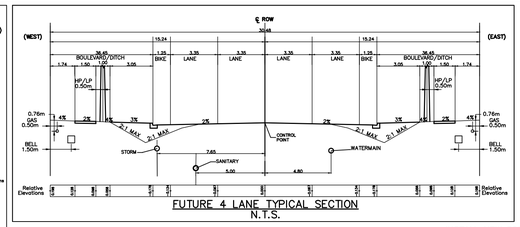
LEGEND

- DRAINAGE AREA NUMBER
- AREA (HA)
- POPULATION DENSITY (ppu=POPULATION PER UNIT; pph=POPULATION PER HECTARE)
- POPULATION
- SANITARY DRAINAGE AREA BOUNDARY
- MHS# – PROPOSED SANITARY MANHOLE
- PROPOSED SANITARY SEWER


CITY OF WATERLOO
THIS SHEET
ERBSVILLE RD
LAURELWOOD
LAURELWOOD DR
MOSAIC
MOSAIC PL
LAURELWOOD
CLAIRFIELDS DR W
CLAIRFIELDS DR E
CLAIRFIELDS CT
CLAIRFIELDS PL
CLAIRFIELDS DR
MOSAIC
MOSAIC PL
MOSAIC
MOSAIC PL
MOSAIC
MOSAIC PL



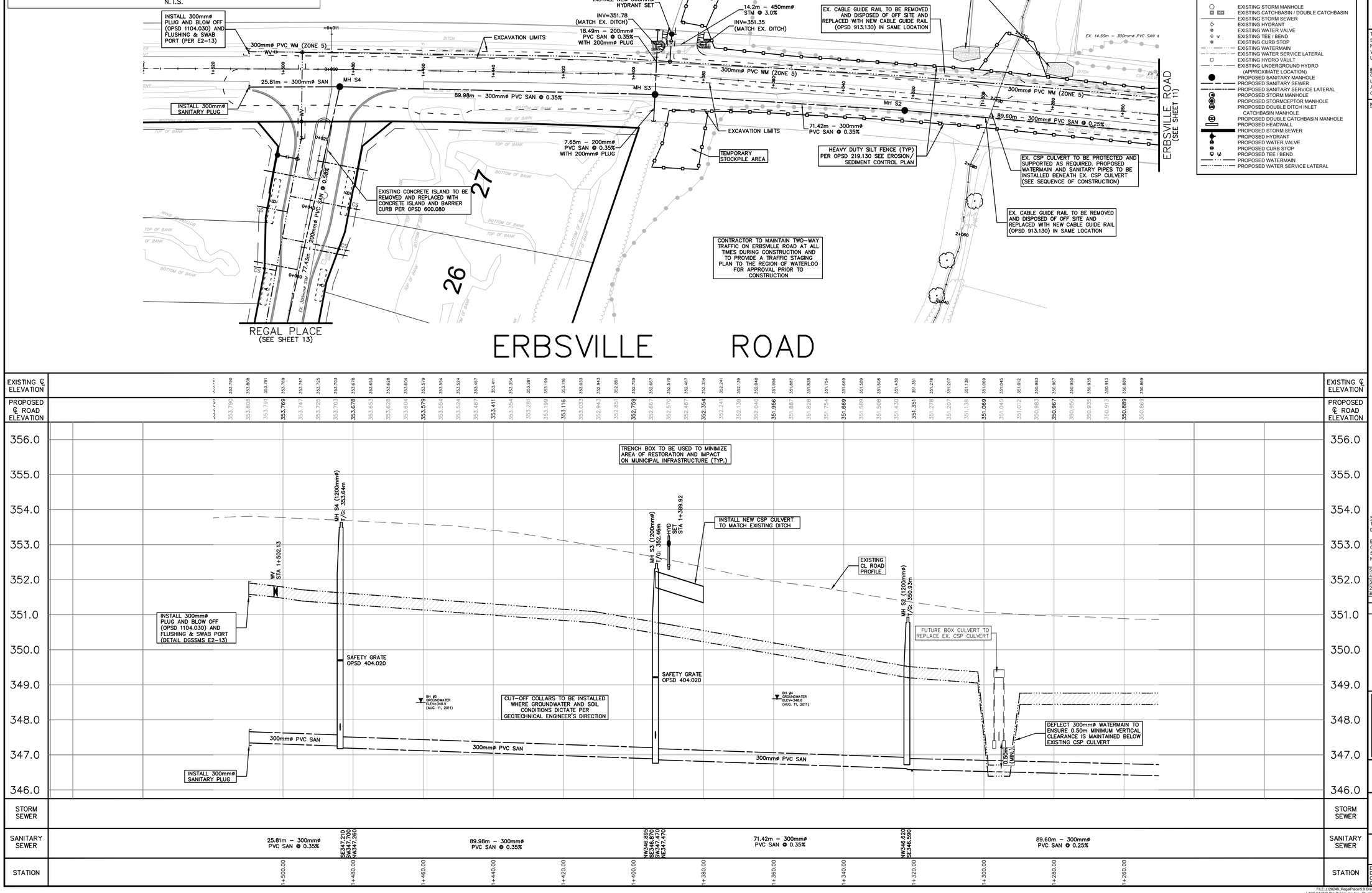
ERBSVILLE ROAD CROSS SECTION @ STA 1+400
N.T.S.

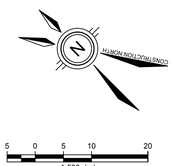


FUTURE 4 LANE TYPICAL SECTION
N.T.S.

SEQUENCE OF CONSTRUCTION:

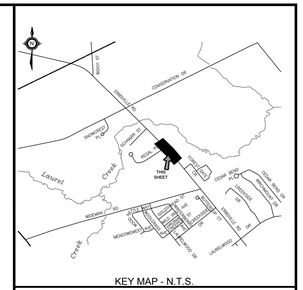
1. CONTRACTOR TO USE TRENCH BOX TO INSTALL SANITARY SEWER AND WATERMAIN DURING APPROACH TO EXISTING CULVERT AT WIDEMAN CREEK. AS CONTRACTOR APPROACHES CREEK FROM SOUTHERLY DIRECTION, CONTRACTOR SHOULD ALSO USE TRENCH BOX TO EXCAVATE AND EXPOSE EXISTING CULVERT SOUTH AND NORTH OF WIDEMAN CREEK.
2. AS EXISTING CULVERT IS EXPOSED, CONTRACTOR TO BRACE EXISTING CULVERT APPROPRIATELY TO REDUCE CHANCE OF CULVERT FAILURE DURING CONSTRUCTION.
3. GEOTECHNICAL ENGINEER TO BE ON SITE AND PROVIDE DIRECTION FOR DEWATERING PROCEDURES AS REQUIRED WHILE EXISTING CULVERT IS EXPOSED.
4. CONTRACTOR TO HAND EXCAVATE UNDER EXISTING CULVERT AND INSTALL WATERMAIN AND SANITARY PIPES UNDER CULVERT MAINTAINING CLEARANCE AS SHOWN ON PROFILE.
5. CONTRACTOR TO BACKFILL EXCAVATION AROUND EXISTING CULVERT PER OPSD 802.010.
6. RE-HABILITATE AND RE-STABILISE ALL DISTURBED AREAS AS STATED IN TENDER DOCUMENTS.





LEGEND

- EXISTING STORM MANHOLE
- EXISTING CATCHBASIN / DOUBLE CATCHBASIN
- EXISTING STORM SEWER
- EXISTING HYDRANT
- EXISTING WATER VALVE
- EXISTING TEE / BEND
- EXISTING CURB STOP
- EXISTING WATERMAIN
- EXISTING WATER SERVICE LATERAL
- EXISTING HYDRO VAULT
- EXISTING UNDERGROUND HYDRO (APPROXIMATE LOCATION)
- PROPOSED SANITARY MANHOLE
- PROPOSED SANITARY SEWER
- PROPOSED SANITARY SERVICE LATERAL
- PROPOSED STORM MANHOLE
- PROPOSED STORMCEPTOR MANHOLE
- PROPOSED DOUBLE DITCH INLET CATCHBASIN MANHOLE
- PROPOSED DOUBLE CATCHBASIN MANHOLE
- PROPOSED HEADWALL
- PROPOSED STORM SEWER
- PROPOSED HYDRANT
- PROPOSED WATER VALVE
- PROPOSED CURB STOP
- PROPOSED TEE / BEND
- PROPOSED WATERMAIN
- PROPOSED WATER SERVICE LATERAL



KEY MAP - N.T.S.

THE POSITION OF THE POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UTILITIES AND STRUCTURES ARE NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS AND, WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED.

BEFORE STARTING WORK, THE CONTRACTOR SHALL CONFIRM THE POSITION AND EXACT LOCATION OF ALL SUCH UTILITIES, AND SHALL ASSUME ALL RESPONSIBILITY FOR ANY DAMAGE TO THEM MADE DURING THE COURSE OF THE CONTRACT WORK.

NOTES

1. ALL WORK TO BE DONE IN ACCORDANCE WITH THE CITY OF WATERLOO STANDARDS, REGION OF WATERLOO'S SSMS DOCUMENTATION AND/ORTHE OPSD/OPSS STANDARDS.
2. SANITARY SEWER TO BE PVC PIPE SDR 35.
3. SANITARY SEWER MANHOLES ARE TO BE AS PER OPSD 701.010 (1200Ø) AND TO BE BACKFILLED WITH GRANULAR 'B'.
4. SANITARY SERVICE LATERALS ARE TO BE 100mmØ PVC SDR 28. SERVICE LATERALS DEEPER THAN 4.0m SHALL INCORPORATE A RISER SUCH THAT THE SERVICE LATERAL AT PROPERTY LINE IS NOT DEEPER THAN 3.5m OR SHALLOWER THAN 2.85m.
5. LOCATION OF EXISTING WATERMAIN SERVICES ARE TO BE CONFIRMED PRIOR TO COMMENCING ANY CONNECTION/REPLACEMENT WORK.
6. SINGLE CATCHBASIN LEADS SHALL BE 300mmØ PVC SDR 35 WITH A MINIMUM SLOPE OF 1.0%. (UNLESS OTHERWISE DIRECTED BY ENGINEER.)
7. DOUBLE CATCHBASIN LEADS SHALL BE 300mmØ PVC SDR 35 WITH A MINIMUM SLOPE OF 1.0%. (UNLESS OTHERWISE DIRECTED BY ENGINEER.)
8. WATERMAIN IS TO BE CLASS 150 PVC PIPE WITH MINIMUM COVER OF 2.0m. CONTRACTOR MUST ENSURE A MINIMUM OF 2.5m CLEAR HORIZONTAL AND 0.5m CLEAR VERTICAL SEPARATION FROM WATERMAIN TO ALL SEWERS AT ALL TIMES. CLEAR SEPARATION MEASURED FROM OUTSIDE OF PIPE WALL TO OUTSIDE OF PIPE WALL IS MAINTAINED DURING INSTALLATION.
9. THE EXISTING WATERMAIN SHALL BE FLUSHED, SWABBED, CLEANED, DISINFECTED, AND BACTERIOLOGICAL SAMPLES TAKEN, ALL IN ACCORDANCE WITH CITY OF WATERLOO STANDARDS UNTIL THE WATERMAIN IS PASSED AND ACCEPTED BY THE CITY.
10. WATER SERVICE LATERALS ARE TO BE 25mmØ POLYETHYLENE PIPE AND AS PER R.O.W. SSMS E2-05 WITH SERVICE BOXES SET ON PROPERTY LINE.
11. (AB) EXISTING WATER SERVICE LATERALS SHALL BE DISCONNECTED AT MAIN AND ABANDONED. TOP SECTION OF CURB STOP TO BE REMOVED AND DISPOSED OF OFF SITE UNLESS NOTED OTHERWISE.
12. ALL HYDRANTS SHALL CONFORM TO AWWA C502 AND OPEN COUNTER-CLOCKWISE.
13. HYDRANTS FOR WATERMAINS LESS THAN 300mm
    - 1-100mm NOZZLE WITH STORTZ CONNECTION
    - 2-65mm NOZZLES - 150mm MECHANICAL JOINT INLET
14. HYDRANTS FOR WATERMAINS 300mm AND LARGER
    - 1-100mm NOZZLE WITH STORTZ CONNECTION
    - 2-65mm NOZZLES - 150mm MECHANICAL JOINT INLET
15. TRANSITION PROPOSED BACK OF CURB TO MATCH EXISTING BACK OF CURB. TRANSITION SHALL BE DONE OVER 5.0m LENGTH.
16. GRADING SHALL BE TO R.O.W. UNLESS OTHERWISE NOTED.
17. TRENCH BOX INSTALLATION REQUIRED WHERE INDICATED OR OTHERWISE DIRECTED BY ENGINEER.
18. PAVEMENT STRUCTURE.
    REGAL PLACE
    - 40mm HL3 SURFACE ASPHALT
    - 2-45mm HL8 BINDER ASPHALT
    - 150mm GRANULAR 'A'
    - 450mm GRANULAR 'B'
    ERBSVILLE ROAD
    - 40mm HL3 SURFACE ASPHALT
    - 2-45mm HL8 BINDER ASPHALT
    - 150mm GRANULAR 'A'
    - 450mm GRANULAR 'B'
19. REFER TO SURFACE WORKS DRAWINGS FOR PAVEMENT ELEVATIONS.
20. TEMPORARY SUPPORT OF EXISTING UTILITY POLES MUST BE APPROVED BY WATERLOO NORTH HYDRO. ALL ASSOCIATED COSTS WILL BE THE RESPONSIBILITY OF THE CONTRACTOR.
21. GAS VALVES, MAIN, SERVICES TO BE ADJUSTED BY OTHERS. CONTRACTOR TO COORDINATE WITH UNION GAS (TYP.)

SURVEY INFO:
TOPOGRAPHIC SURVEY COMPLETED BY IBI GROUP INC. DATED SEPT. 2009.

BENCHMARK - ELEVATION: 351.844m
CONCRETE MONUMENT No. 030-03-006, REGISTERED PLAN 58M-376. SOUTH SIDE OF WIDEMAN ROAD AT THE NORTHEAST CORNER OF LOT 22, REGISTERED PLAN 58M-376.

#	DATE	BY	DESCRIPTION
5	AUG.9/13	PCK	FINAL SUBMISSION/CONSTRUCTION
4	JUL.9/13	PCK	ISSUED FOR TENDER
3	JUN.26/13	PCK	FINAL SUBMISSION
2	MAR.28/13	PCK	THIRD SUBMISSION

REVISIONS

APPROVALS

LICENSED PROFESSIONAL ENGINEER
AUG. 9, 2013
J. R. R. PERKS
PROVINCE OF ONTARIO

IBI GROUP
379 QUEEN STREET SOUTH
KITCHENER, ONTARIO
N2G 1W6
(519) 745-9455
www.ibigroup.com

CITY OF WATERLOO
REGION OF WATERLOO

SUNVEST
REGAL PLACE
PART OF LOT 6, REGISTERED PLAN 575
PART OF LOT 45, GERMAN COMPANY TRACT

ERBSVILLE ROAD
PLAN AND PROFILE 3
STA.1+250 TO 1+520

DESIGNED BY:	PCK	SCALE HORIZ:	1:500
DRAWN BY:	PCK	SCALE VERT:	1:50
CHECKED BY:	JRP	FILE NUMBER:	28249
DATE:	JUL.19/13	SHEET NUMBER:	12