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CUMAC Subdivision – Phase II

PRELIMINARY FUNCTIONAL SERVICING REPORT

Mr. Alvin Young

File 116238 | November 4, 2019

Document Control

File:	Prepared by:	Prepared for:
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Date: **November 4, 2019**	**T** 705-444-2565 **tathameng.com**	

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Andrew Schoof, B.A.Sc., M.A.Sc. Intern Engineer	Randy Simpson, B.A.Sc., P.Eng. Director, Group Leader

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Issue	**Date**	**Description**
1	November 4, 2019	First Submission

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1 Introduction

Tatham Engineering Limited (Tatham) has been retained by Mr. Alvin Young to prepare a Functional Servicing Report in support of the proposed Cumac Phase II Residential Development within the Township of Adjala-Tosorontio. This report has been prepared to address the internal and external servicing requirements associated with this project. Specifically, this report will address the Potable Water, Wastewater and Utility requirements for the proposed development.

This Functional Servicing Report has been prepared recognizing the pertinent Conservation Authority, Municipal and Provincial guidelines for development including the following:

- Nottawasaga Valley Conservation Authority Technical Guidelines, Nottawasaga Valley Conservation Authority (December 2013);
- Design Criteria for the Township of Adjala-Tosorontio, Township of Adjala-Tosorontio (January 2006);
- Stormwater Management Planning and Design Manual, Ministry of the Environment, (March 2003);
- Design Guidelines for Drinking Water Systems, Ministry of the Environment, (2008);
- Design Guidelines for Sewage Works, Ministry of the Environment, (2008); and
- Everett Secondary Master Servicing Plan, Class Environmental Assessment Study Report; Greenland Consulting Engineers, (January 2013).

1.1 SITE DESCRIPTION

The 4.33 ha development site is located within the Town of Everett and is bounded by Pine Park Boulevard to the Northwest, Burbank Circle to the South and Concession 6 to the east. We have enclosed Figure 1.0 - Site Location Plan at the end of this report for reference. The legal description of the property is Part Lot 11 of Concession 5 in the Township of Adjala-Tosorontio; being Part 1 of Plan 51R-18023.

The site is well vegetated forestlands with mature trees and underbrush. The land consists of rolling terrain and low-lying marsh areas with a drainage course traversing the landscape.

1.2 EXISTING NATURAL HAZARDS

A Natural Hazard Assessment has previously been submitted to the Nottawasaga Valley Conservation Authority (NVCA) which has established the flood and erosion hazard limits associated with the channel across the site. As per Provincial Policy Statement 3.1, development is restricted to areas outside the natural hazards. As such, development of the subject property is restricted to the area outside the flood and erosion hazard limits. The NVCA has acknowledged and approved the hazard limits as defined in the assessment in a letter dated March 6, 2017. We have enclosed a copy of the letter in Appendix A and approved Natural Hazard Mapping Plan (FM-1) at the rear of the report. To adequately address the natural hazards moving forward, the hazard assessment concludes that the proposed channel cleanout/improvements be applied prior to construction to reinstate the channel to original grade.

1.3 GEOTECHNICAL REPORT

A preliminary Geotechnical investigation of the site has been completed by GeoPro Consulting Ltd. in support of the development. The geotechnical recommendations will be considered during final design. Below is a summary of the findings contained in the geotechnical report.

GeoPro completed 4 boreholes at various locations throughout the development site. Each borehole identified the soil stratification as follows:

- Topsoil occurred from 0 – 0.3 m in depth;
- Fill material (silty sand and sand) occurred in borehole 1 to a depth of 1.40 m below existing ground surface;
- Reworked fill material (silty sand) occurred in borehole 3 to a depth of 0.80 m below existing ground surface;
- Sand to fine sand deposits were encountered in all boreholes and extended to depths ranging from 4.60 m to 8.10 m below the existing ground surface;
- Ground water during drilling was encountered in borehole 2 and borehole 3, and
- Monitoring wells were installed in each borehole and were monitored on March 7, 2017; groundwater was encountered between 0.80 m to 2.74 m below ground surface in all boreholes.

For the purpose of our preliminary calculations we reviewed the Simcoe County Soils Map and Report No. 29 for information relating to the typical soil classifications in the area. The map indicates that the soil on site is classified as Tioga Sand Loam – Bondhead Loam. This formation is found throughout South Simcoe County primarily in the Adjala & Tecumseth Townships. This classification is categorized as having a Hydrological Soil Group A-AB; having generally good drainage and is stone-free to moderately stony which is consistent with the findings of the preliminary geotechnical report.

The stormwater management design should utilize low impact development (LID) and infiltration techniques where possible and will be analysed in conjunction with the geotechnical recommendations during final design.

1.4 PROPOSED LAND USE

Under the 2017 development concept prepared by Jones Consulting Group, 45 residential lots will be developed utilizing 4.33 ha.

1.5 EXISTING SERVICES

Development on this site has been expected and planned for years. Currently, Phase I of the Cumac Subdivision is serviced with private septic systems, rural road ditches and Municipal water servicing. A 150 mm dia. PVC watermain is located on Burbank Circle. We have enclosed a copy of the existing servicing plan provided by the Township for reference.

2 Water Distribution & Servicing

2.1 BACKGROUND

The water servicing for the site will be designed such that the proposed development will be connected to the 150 mm dia. PVC water distribution system on Burbank Circle. The proposed 150 mm dia. watermain will comply with the Ministry of the Environment Design Guidelines for Drinking Water Systems.

2.2 EVERETT SECONDARY PLAN MASTER SERVICING – WATER STORAGE AND DISTRIBUTION

2.2.1 Existing Water Supply System

Everett is currently serviced by a large municipal residential water supply, distribution and storage system. The system is comprised of three active groundwater supply wells and one storage reservoir.

The Master Secondary Servicing Plan (MSSP) report prepared by Greenland Consulting has calculated the current equivalent population of Everett to be 1,929. The Cumac Subdivision is within the Secondary Plan area. The proposed Phase 2 subdivision is delineated in the study. The R&M Homes Subdivision located in northwest portion of the Secondary Plan is the only proposed subdivision that is draft plan approved and provided servicing allocation within the planning area. The total equivalent population when including the R&M development has been calculated to be 3,405. The MSSP includes the R&M development as existing in the analysis of the current system. Table 1 below summarizes the existing water demand based on the Master Servicing Plan study report.

Table 1: Existing Water Demand

DEVELOPMENT PHASE	TOTAL EQUIVALENT POPULATION	AVERAGE DAILY DEMAND (M^3/DAY)	MAXIMUM DAILY DEMAND (M^3/DAY)
Existing Population	1,929	387	939
R&M Development	1,476	406	834
Total Existing (In process)	3,405	793	1,773

The MSSP report estimates that the maximum combined hydraulic rated capacity of the three wells is 4,870 m^3/day. A preliminary hydrogeological study completed by Golder & Associates (2012) estimates the total operating capacity of the Everett wells to be 4,787 m^3/day, 83 m^3/day less than estimated in the MSSP.

The hydrogeological report prepared by Golder & Associates estimates that the maximum equivalent serviced population that can be supported by current water supply is 5,359 people.

Based on the analysis provided in the Greenland and Golder reports, the existing water supply system can support an additional equivalent population of 1,954 prior to the commissioning of a new well and pumping system.

2.2.2 Existing Water Distribution System

The existing water distribution system is comprised of a 1,600 m^3 storage reservoir and approximately 13 km of watermain. As noted previously, the distribution system is supplied by the three groundwater supply wells.

The analysis of the distribution system prepared by Greenland suggests that the existing system can support the existing equivalent population of 3,405 (incl. R&M development). Based on MOE fire flow calculations, the Total Storage required by the existing equivalent population is 1,598 m^3.

Based on the Greenland Report, the existing equivalent population of 3,405 maximizes the total existing storage and therefore, additional storage options will be required prior to any population increase in the Everett Secondary Plan Area.

2.2.3 Recommended Water Supply for the Everett Secondary Plan Area

The MSSP prepared by Greenland Consulting recommends that prior to the secondary plan area population exceeding 5,359 people, the Township will need to increase the capacity by 2,760 m^3/day to provide adequate capacity and system demand. It has been proposed that the Township undertake the commissioning of two new 200 mm dia. groundwater supply wells with pumping stations, each with a capacity of 1,380 m^3/day.

Upon commissioning of the two wells, the firm capacity of the system would be 5,585 m^3/day which is greater than the anticipated maximum daily demand of 5,575 m^3/day for the ultimate servicing population of 10,669 as concluded by Greenland.

2.2.4 Recommended Water Servicing and Distribution for the Everett Secondary Plan Area

The MSSP study report prepared by Greenland Consulting recommends that prior to the secondary plan area population exceeding 3,405 people, the Township will be required to undertake upgrades to the existing water storage reservoir and distribution network to provide adequate storage for servicing the ultimate servicing population of 10,669. Taking into consideration the R&M Development which has been draft plan approved, the existing servicing population of Everett is 3,405 people.

The MSSP recommends that the Township provide upgrades to the existing reservoir and/or the construction of a new aboveground reservoir to allow for the storage capacity increase of 4,321 m^3.

In conjunction with the upgrades to the water storage facilities, a new trunk watermain will need to be installed within Everett. Upgrades to the network including a new trunk main from the reservoir to the proposed trunk main on Wales Avenue will be required to ensure adequate supply and pressure is maintained.

2.3 CUMAC PHASE II WATER SUPPLY REQUIREMENTS

The preliminary Potable Water and Fire Flow calculations for the proposed development have been completed in accordance with the MSSP, National Fire Protection Association (NFPA 1142, 2007), MOE Guidelines for Drinking Water Systems (2008) and Township Standards (2006) including the Fire Underwriters Survey of the Insurance Bureau of Canada - Water Supply for Fire Protection, A Guide to Recommended Practice (1999).

By comparing these various methods for calculating water supply requirements, the minimum and maximum supply requirements have been summarized below in Table 2 below.

Table 2: Cumac Phase II Anticipated Water Demands

Water Supply Calculation Summary							
Regulating Authority	Pop. Density (ppl/unit)	Avg. Daily Flow (L/cap.day)	Max. Day Factor	Min. Fire Flow (L/s)	Max. Daily Demand (L/s)	Peak Hourly Demand (L/hr)	Max. Daily Demand Incl. Fire Flow (L/s)
MSP	2.67	275	2.0	30	1.53	6.32	31.53
MOE	2.80	450	5.46	38	7.17	10.84	45.17
NFPA	2.67	275	2.0	64	1.53	6.32	65.53
NFWS	2.67	275	2.0	75	1.53	6.32	76.50
Township	2.67	400	5.46	75	6.07	9.19	81.04

Supporting calculations for the potable water supply are enclosed in Appendix A for reference.

The Township's water supply has the capacity to service the proposed development, as part of the additional equivalent population of 1,954 available. The upgrades to the system as recommended in the MSSP will be required in support of growth in the Secondary Planning Area once the R&M development reaches full build out.

For the residential development a 150 mm dia. watermain is proposed to loop through the Phase II development connecting to the existing system on Burbank Circle. All watermain material including piping, valves, and services will be specified in accordance to the Townships Design Criteria Manual (2006) and the approved materials list.

Hydrants will be placed on lot lines, set at a distance of 125 m or less between hydrants. Specific requirements for the placement of hydrants will be reviewed in conjunction with the Townships Utility Separation requirements during final design. The proposed watermain layout is enclosed on (GS-1) for reference.

3 Sanitary Servicing

3.1 EXISTING SANITARY SEWAGE SERVICING

The majority of the residential homes within Everett are serviced with private septic systems. In the early 1990's a subdivision known as New Horizons was developed containing 112 dwellings all serviced with gravity sewers. Effluent from this subdivision is collected at two sanitary sewage pumping stations and pumped to a communal wastewater treatment facility and septic tile bed within the development.

3.1.1 Existing Sanitary Sewage Treatment and Conveyance System

The MSSP report places emphasis on the New Horizons wastewater treatment facility and that no municipal servicing currently exists outside of this subdivision. The existing New Horizons subdivision and sewage systems currently service an equivalent population of 300 people. The existing municipal sewer system consists of gravity sewers, two pump stations and a communal wastewater treatment facility and tile bed. The pump stations are located on Dekker Street and Lynch Lane. Based on the MSSP, the peak sanitary sewage flow including infiltration is 567 m^3/day or 6.56 L/s. The collected sewage is pumped from the pumping stations to the wastewater treatment plant then to the subsurface tile bed through a 100 mm dia. force main. It is recommended in the MSSP that the New Horizons treatment facility be decommissioned once the R&M Homes wastewater treatment facility and additional upgrades are completed.

The R&M Homes wastewater treatment facility is designed to provide a treatment for the development with a capacity of 748 m^3/day (8.66 L/s) based on the design by Pearson-McQuaig Engineering Ltd. The MSSP concludes that based on the population growth of 10,669 people within the Everett Secondary Plan Area, the existing wastewater treatment and conveyance systems do not have the capacity to service the ultimate development conditions as currently proposed.

3.1.2 Proposed Sanitary Sewage Treatment and Conveyance System

The Greenland MSSP Addendum #2 determined that the preferred option for treatment would include installing new gravity sewers throughout the Everett Secondary Plan Area. This option suggests that a sanitary easement be allotted through the Cumac development lands discharging to the proposed sewage pumping station within the Cumac development and through the proposed force main to the future infrastructure east of the development. Several forcemain options were discussed, with the preferred option outlined on the SAN-1 drawing.

3.1.3 Sewage Pumping Station & Forcemain

The new Everett sewage pumping station (SPS) will meet the MOE Design Guidelines for Sewage Works (2008) and Township of Adjala-Tosorontio Engineering Standards.

The SPS will consist of a single, reinforced concrete wet well equipped with two submersible sewage pumps (duty / standby), pump lifting system, access ladders, safety platform, discharge piping and valves, and flow meter. A building will house the controls, MCC and a standby generator. The SPS will discharge into the downstream gravity sewer via 675 m of new forcemain and 1,125 m of the existing NH-SPS #2 forcemain along Concession Rd 6 to the Farsight WWTP.

Two options have been considered for the SPS with anticipated sewage flows as described in Table 3.

Table 3: Sanitary Design Flows to the SPS

Option	Drainage Area	Area (ha)	Number of Units	Equivalent Population	Average Daily Flow (L/s)	Peaking Factor (Harmon)	Inflow & Infiltration (L/s)	Peak Design Flow (L/s)
1	CM-N	4.56	52	156	0.61	4	0.16	2.6
2	CM-SPS drainage area from Everett Secondary Plan	46.1	239	717	2.82	3.9	0.75	11.7

For Option 1, the SPS would be designed to service the property CM-N, as shown on the Everett Secondary Plan - Option WWC-F drawing by Greenland Consulting Engineers, dated March 2018. The proposed 45 units and 7 existing units will generate a peak design sewage flow of 2.6 L/s.

For this option, the SPS would consist of a 2.4 m diameter wet well equipped with two 2 HP submersible sewage pumps. The new forcemain from the SPS to Concession Rd. 6 would be 75 mm in diameter. The estimated construction cost for the SPS and forcemain is $950,000.

Alternatively, a privately owned SPS could be constructed to service the CM-N property. This would consist of a wet well equipped with duty and standby pumps, floats, and an outdoor control panel. No building or generator would be included. The estimated construction cost for a privately-owned SPS and forcemain is $350,000.

For Option 2, the SPS would be designed to service the entire drainage area, consisting of 239 units with a peak design flow of 11.7 L/s.

Option 2 would involve a larger SPS consisting of a rectangular wet well with a cross section of approximately 15 m^2 equipped with two 5 HP pumps. The new forcemain from the SPS to Concession Rd. 6 would be 150 mm in diameter. The estimated construction cost for the SPS and forcemain for the second option is $1.6 Million.

4 Stormwater Management

The stormwater management strategy for the proposed development site has been prepared recognizing the pertinent Conservation Authority, Municipal and Provincial guidelines on water resources.

The primary objective of this report is to demonstrate that the proposed development will conform to the SWM criteria established in the MOE Stormwater Management Planning and Design Manual (March, 2003), the Everett Secondary Plan Master Servicing Plan report (January 2013) and the NVCA Development Review Guidelines (December 2013).

This will be accomplished by evaluating the effect of expansion on the local drainage conditions, review of recommendations set-forth in the Master Servicing Study report for stormwater quality and quantity control measures and providing solutions to mitigate siltation and erosion during and after construction.

The stormwater management strategy for the proposed development site has been prepared recognizing the pertinent Conservation Authority and Provincial guidelines on water resources including the following:

- Nottawasaga Valley Conservation Authority Technical Guidelines, Nottawasaga Valley Conservation Authority (December 2013);
- Stormwater Management Planning and Design Manual, Ministry of the Environment, Conservation and Parks, (March 2003);
- Everett Secondary Master Servicing Plan, Class Environmental Assessment Study Report; Greenland Consulting Engineers, (January 2013); and
- Design Criteria for the Township of Adjala-Tosorontio, Township of Adjala-Tosorontio (January 2006).

4.1 WATER QUANTITY CONTROL

This report will focus on the viability of the conclusions and recommendations set-forth in the Everett Secondary Plan Master Servicing Plan Class Environmental Assessment Study report Volume 3 prepared by Greenland Consulting Engineers.

The MDP report recommends a Regional approach for stormwater quantity control. This approach will allow for the post-development stormwater directed to the Pine River to be controlled to pre-development levels at key nodes in the river system, without controlling site specific runoff from each development within the Secondary Plan Area.

The Cumac Phase II development is located within Catchment 7 (56.32 Ha) of the Pine River Tributary Node 100 as demonstrated in the recommended MDP Option 3. Based on the MDP Study report the total catchment area draining to Node 100 under existing conditions is 584.24 Ha. Under post-development conditions, the total catchment area increases by 31.76 Ha to 616.00 Ha.

A Visual OTTHYMO model was developed for the MDP report to analyze the ultimate buildout of the Everett Secondary Plan Area on a regional scale. This model utilized the MOE Owen Sound Intensity-Duration-Frequency (IDF) rainfall data for the period from 1965 to 2003.

The model utilizes eight (8) stormwater management facilities (SWMF) in key developments within the Secondary Plan Area to control the pre-to-post peak runoff flow rate matching in a regional scale. Three (3) of the SWMF are existing while five (5) are proposed to be constructed as development of the Secondary Plan Area occurs. For preliminary pond sizing please refer to Volume 3 of the MDP Study report.

As noted in the MDP Study report the post peak runoff flow rate analysis in MDP Option 3 closely mimics the pre-development runoff flow rates. MDP Option 3 over-controls the post post-development flow rates draining into Node 100.

4.2 WATER QUALITY CONTROL

It is anticipated that water quality control for the site will be maintained by enhanced roadside ditches, bioswales, property line swales and lot level controls. Preliminary water quality calculations have been developed based on the MOECC guidelines for each post-development catchment.

4.3 LOW IMPACT DEVELOPMENT TECHNIQUES

Low Impact Development (LID) techniques are utilised in planning and engineering design to promote stormwater filtration, infiltration, water conservation and protect water quality. LID techniques allow planning and engineering design to implement hydrological controls while providing pre-to-post peak runoff flow rate matching in part with end of pipe stormwater quantity and quality control as part of the overall treatment train.

The implementation of LID techniques will be analyzed during final design and may include:

- individual soak-away pits on each lot;
- enhanced roadside ditches and bio-swales; and
- property line swales and lot level controls.

4.4 SILTATION AND EROSION CONTROL

Siltation and erosion controls will be implemented for all construction activities, including topsoil stripping, material stockpiling, road construction activities and grading operations. The detailed erosion and sediment control measures proposed will be implemented during and after construction and will be provided during final design and may include the following:

- Heavy duty silt fence will be erected around the perimeter of the site before any grading operations commence to control sediment movement;
- A construction vehicle entrance will be constructed and maintained consisting of a stone mud mat to reduce off-site tracking of material; and
- Rock check flow dams and straw bale check flow dams will be installed prior to construction and will be maintained and inspected throughout the course of construction as required to prevent the transportation of sediment and delirious materials offsite.

A complete Stormwater Management Report will be submitted under separate cover.

5 Hydro-Electric, Telephone, Cable & Natural Gas Utilities

It has been acknowledged that the following utility regulators have services in the immediate area:

- Bell Canada;
- Enbridge Gas;
- Rogers Cable; and
- Hydro One Networks Inc.

Each of these companies will be contacted in advance of final design to confirm that sufficient capacity exists within the current installations to support the proposed development.

6 Summary

The conclusions and recommendations are based on the preferred recommended options analyzed by Greenland Consulting Engineers contained in the Everett Secondary Plan Master Servicing Plan reports Volume 1 through Volume 3.

This Functional Servicing Report has demonstrated that adequate servicing is available to support the current development concept when developed in the context of the Secondary Planning Area.

In conclusion, the preliminary functional servicing report has demonstrated that the proposed development is feasible and will conform to all regulating authorities' requirements.

TATHAM ENGINEERING

CUMAC SUBDIVISION
SITE LOCATION PLAN

DWG. No. **FIG. 1**

SCALE: N.T.S.	DATE: MAR/17	JOB NO. 116238

Drawing Name: 116238-FIG01.dwg, Plotted: Nov 05, 2019

Appendix A: Supporting Calculations

Nottawasaga Valley
Conservation Authority

6 March 2017

Ms. Jacquie Tschekalin MCIP, RPP
Director of Planning
Township of Adjala-Tosorontio
7855 30th Sideroad
Alliston, ON L9R 1V1

email: jtschekalin@adjtos.ca

Dear Ms. Tschekalin,

Re: Natural Hazard Study (Flood Hazard and Erosion Hazard)
Winzen Property – Alvin Young
Part Lot 11, Concession 5 (Everett)
Township of Adjala-Tosorontio
NVCA ID # 29957

Nottawasaga Valley Conservation Authority [NVCA] staff has been provided with a revised Natural Hazard Study prepared in support of a proposed residential development north of Burbank Circle in the community of Everett in the Township of Adjala-Tosorontio.

NVCA staff has reviewed the information presented in the following document:

- C. C. Tatham Letter Report "Natural Hazard Study" dated January 17, 2017
- C. C. Tatham drawing entitled "Natural Hazards Mapping Plan" signed and sealed January 17, 2017

Based on our review of the above noted documents, NVCA staff provides the following comments:

1. The submission has satisfied all outstanding comments and presents an accurate representation of the flooding and erosion hazard limits for the property.

Please feel free to contact the undersigned at extension 231 should you require any further information or clarification on any matters contained herein.

Sincerely,

Lee J. Bull, MCIP, RPP
Manager, Planning Services

Copies:
Mr. Alvin Young - Winzen
Ms. Amanda West – C. C Tatham & Associates
Ms. Brandi Clement – Jones Consulting Group

TATHAM ENGINEERING	Project: Cumac Subdivision - Ph.2	Date: January 2017
	File No.: 116238	Designed: DDH
	Subject: Water Supply Calculation	Checked: AS

Fire Underwriters Survey of The Insurance Bureau of Canada
Potable Water Supply & Fire Flow Calculations

Design Criteria:

Population Density	=	2.67	ppl/unit	(Everette Secondary Plan MSP Study, Greenland 2012)
Average Daily per cap. Flow	=	275	L/cap./d	(Everette Secondary Plan MSP Study, Greenland 2012)
Maximum Day Factor	=	2		(Everette Secondary Plan MSP Study, Greenland 2012)
Peak Hour Factor	=	8.26		(MOE, 2008)

Residential Development:

Number of Units	=	45	
Equivalent Population	=	120.15	ppl
Average Daily Demand	=	33.04	cu.m/day

Fire Flow Calculations - Fire Underwrites Survey of the Insurance Bureau of Canada (1999)

Construction Coeficient ©	=	1.50	(Wood Framed Construction)
Average Dwelling Area (A)(sq.m)	=	185.80	(Typical construction of 2000.00 sq.ft)
Required Fire Flow (F)(L/mir	=	4498.18	
Required Fire Flow (L/s)	**=**	75.0	

$$F = 220C\sqrt{A}$$

Design Flow Calculations:

Maximum Daily Demand	=	66.08	cu.m/day	or	**1.53 L/s**
Peak Hour Demand	=	272.92	cu.m/day	or	**6.32 L/s**
Max Daily plus Fire Flow	=	**76.50**	**L/s**		

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National Fire Protection Association
Potable Water Supply & Fire Flow Calculations

Design Criteria:

Population Density	=	2.67	ppl/unit	(Everette Secondary Plan MSP Study, Greenland 2012)
Average Daily per cap. Flow	=	275	L/cap./d	(Everette Secondary Plan MSP Study, Greenland 2012)
Minimum Fire Flow	=	64	L/s	(1000 gal./mim.) (NFPA 1142, 2007)
Maximum Day Factor	=	2		(Everette Secondary Plan MSP Study, Greenland 2012)
Peak Hour Factor	=	8.26		(MOE, 2008)

Residential Development:

Number of Units	=	45	
Equivalent Population	=	120.15	ppl
Average Daily Demand	=	33.04	cu.m/day

Design Flow Calculations:

Maximum Daily Demand	=	66.08	cu.m/day	or	**1.53**	**L/s**
Peak Hour Demand	=	272.92	cu.m/day	or	**6.32**	**L/s**
Max Daily plus Fire Flow	=	**65.53**	**L/s**			

TATHAM ENGINEERING	Project: Cumac Subdivision - Ph.2	Date: January 2017
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	Subject: Water Supply Calculation	Checked: AS

Everett Secondary Plan Master Servicing Plan
Potable Water Supply & Fire Flow Calculations

Design Criteria:

Population Density	=	2.67	ppl/unit	(Everette Secondary Plan MSP Study, Greenland 2012)
Average Daily per cap. Flow	=	275	L/cap./d	(Everette Secondary Plan MSP Study, Greenland 2012)
Minimum Fire Flow	=	30	L/s	(Everette Secondary Plan MSP Study, Greenland 2012)
Maximum Day Factor	=	2		(Everette Secondary Plan MSP Study, Greenland 2012)
Peak Hour Factor	=	8.26		(MOE, 2008)

Residential Development:

Number of Units	=	45	
Equivalent Population	=	120.15	ppl
Average Daily Demand	=	33.04	cu.m/day

Design Flow Calculations :

Maximum Daily Demand	=	66.08	cu.m/day	or	**1.53**	**L/s**
Peak Hour Demand	=	272.92	cu.m/day	or	**6.32**	**L/s**
Max Daily plus Fire Flow	=	**31.53**	**L/s**			

TATHAM ENGINEERING	Project: Cumac Subdivision - Ph.2	Date: January 2017
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Ministry of Environment and Climate Change
Potable Water Supply & Fire Flow Calculations

Design Criteria:

Population Density	=	2.80	ppl/unit	(MOE, 2008)
Average Daily per cap. Flow	=	450	L/cap./d	(MOE, 2008)
Minimum Fire Flow	=	38	L/s	(MOE, 2008)
Maximum Day Factor	=	5.46		(MOE, 2008)
Peak Hour Factor	=	8.26		(MOE, 2008)

Residential Development:

Number of Units	=	45	
Equivalent Population	=	126.00	ppl
Average Daily Demand	=	56.70	cu.m/day

Design Flow Calculations:

Maximum Daily Demand	=	309.58	cu.m/day	or	**7.17**	**L/s**
Peak Hour Demand	=	468.34	cu.m/day	or	**10.84**	**L/s**
Max Daily plus Fire Flow	=	**45.17**	**L/s**			

TATHAM ENGINEERING	Project: Cumac Subdivision - Ph.2	Date: January 2017
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Township of Adjala-Tosorintio Design Criteria Manual
Potable Water Supply & Fire Flow Calculations

Design Criteria:

Population Density	=	2.67	ppl/unit	(Everette Secondary Plan MSP Study, Greenland 2012)
Average Daily per cap. Flow	=	400	L/cap./d	(Design Criteria Manual 2006)
Maximum Day Factor	=	5.46		(MOE, 2008)
Peak Hour Factor	=	8.26		(MOE, 2008)

Residential Development:

Number of Units	=	45	
Equivalent Population	=	120.15	ppl
Average Daily Demand	=	48.06	cu.m/day

Fire Flow Calculations - Fire Underwrites Survey of the Insurance Bureau of Canada (1999)

Construction Coeficient ©	=	1.50	(Wood Framed Construction)
Average Dwelling Area (A)(sq.m)	=	185.80	(Typical construction of 2000.00 sq.ft)
Required Fire Flow (F)(L/mir	=	4498.18	
Required Fire Flow (L/s)	**=**	75.0	

$$F = 220C\sqrt{A}$$

Design Flow Calculations:

Maximum Daily Demand	=	262.41	cu.m/day	or	**6.07**	**L/s**
Peak Hour Demand	=	396.98	cu.m/day	or	**9.19**	**L/s**
Max Daily plus Fire Flow	=	**81.04**	**L/s**			

TATHAM ENGINEERING			
Project:	Everett SPS - Option 1	Date:	9/4/2018
File No.:	116238	Designed:	JRC
Subject:	SPS Preliminary Design - Wet Well Calculations	Checked	ST
Revisions:			

Background Information

- Sanitary design flows from Everett MSP, Sanitary Sewer Design Sheet - Option F.
- SPS to service property CM-N as shown on Everett Secondary Plan - Option WWC-F drawing by Greenland Consulting Engineers, Dated Mar. 2018.

Design Criteria - as per Everett MSP Addendum #2

Per capita flow	=	340	L/cap/day
People per unit	=	3	
Peaking Factor	=	Harmon Equation	$\rightarrow 1 + \frac{14.0}{4+p^{0.5}}$, where p = population in thousands, and 1.5 <= PF <= 4.0
Peak I&I	=	90	L/cap/day
Number of units	=	52	(7 existing lots + 45 proposed)

Wet Well Sizing and Pump Configuration

- Based on Sanitary Sewer Design sheet, the invert elevation of the inlet sewer to the SPS is 233.69 m, and proposed grade at SPS is 238.42 m.
- As per the MOE Design Guidelines for Sewage Works (2008):
  - The minimum surface plan area of the wet well should be 4.9 m^2 (2.25 m square or 2.50 m diameter).
  - The fill time should not exceed 30 minutes, based on design ADF.
  - The wet well operating volume should provide a minimum cycle time of 10-minutes for each pump.
- The pump station will have two constant speed pumps (duty and standby), with one pump in operation at a time.
- Wet well to include emergency storage capacity to accommodate 30 minute operator response time to pump or power failure.

  Peak flow x 30 minutes = 2.6 L/s x 1800 seconds = 4.7 m^3
- Wet well to be sized based on peak and emergency storage requirements.
  - 2.4 m diameter reinforced concrete pumping station, with plan area of: 4.5 m^2

    The plan area is slightly less than MOE Guidelines but ensures a fill time less than 30 minutes for a reasonable operating depth.
  - Wet well storage above high level alarm to accommodate emergency storage = 4.7 m^3 / 4.5 m^2 = 1.04 m

Wet Well Plan Area (m^2)	Pop	Total ADF (L/s)	Peak I & I (L/s)	Peaking factor	Total PF (L/s)	Pump Configuration	Approx. Firm Pumping Capacity (L/s)	Min. Operating Volume (m^3)	Min. Operating Depth (m)	ADF Fill Time (min)	ADF Empty Time (min)
4.5	156	0.61	0.16	4.00	2.62	duty/standby	2.7	0.41	0.090	11	3

Pump Cycle Time

- Pump Cycle Time (ADF Fill Time + ADF Empty Time) = 14 minutes.
- Based on the configuration above, the wet well fill and pump cycle times (based on the minimum operating volume and ADF) are acceptable.

Wet Well Levels

- Wet well operating levels based on wet well sizing calculations above and MOE Guidelines and nominal grade, sewer and forcemain elevations assumed.
- Rest platform required as per OSHA O.Reg.213/91, S. 286. One will be provided.

Wet Well Elevations (m)				
Top of Wet Well	=	238.72	300	*mm above grade*
Finished Grade	=	238.42		*Nominal elevation assumed*
Outlet Forcemain Invert at p/l	=	236.52	1.8	*m below grade*
Safety Platform	=	234.92	3.5	*m below grade*
Inlet Sewer Invert	=	233.69	4.73	*m below grade*
High Level Alarm	=	232.65	*1042*	*mm below inlet sewer invert for emergency storage.*
Start Duty Pump	=	232.50	*150*	*mm below high level alarm*
Stop Pump	=	232.35	148	*mm operating depth (See Wet Well Sizing - min. operating depth =* 90 mm)
Pump Lockout/Low Level Alarm	=	232.20	*150*	*mm below pump stop*
Bottom of Wet Well	=	231.90	300	*mm min submergence below low level alarm*

Total wet well depth below grade = 6.52 m

Pump Selection

- See attached TDH and system curve calculations.

Discharge Piping Sizing

- MOE Design Guidelines recommend a velocity for the 20-year or greater sewage flow in pump discharge piping in the low end of 0.8 to 4.0 m/s.
- Calculated velocities are based on actual inside diameter of Schedule 10S Stainless Steel pipe.

Nominal Diameter (mm)	Inner Diameter (mm)	Velocity at Firm Pumping Capacity 2.7 L/s (m/s)
50	55	1.1
75	83	0.5
100	108	0.3
150	161	0.1

- Nominal 50 mm piping will accommodate the 20-year/ultimate sewage flow, while falling within the recommended velocity.

Force Main Sizing

- Sewage will be pumped along Concession Rd. 6 and discharge into a gravity sewer approx. 1,800 m away, that flows to the Farsight WWTP.
- The force main elevation has been assumed to be consistent at 236.52 m
- MOE Design Guidelines recommend velocity in force main within range of 0.6 to 3.0 m/s.
- CCTA recommends a minimum velocity of 0.75 m/s to resuspend settled solids in the force main.
- The force main sizing must consider force main velocities and friction losses. The following friction loss calculations have been performed to aid in selecting the optimal force main configuration. Detailed head loss calculations, including friction losses, minor losses, and static head for the force main can be found in the forcemain calculations.

- Friction losses are estimated from the Hazen-Williams equation with C = 120 and an inside diameter (ID) of HDPE DR 11 pipe.

Firm Pumping Capacity (L/s)	Force Main Length (m)	75 mm DIAMETER Inner Diameter (mm): 72		
		Velocity (m/s)	Friction Loss (m/100m)	Friction Loss (m)
2.7	1,800	0.7	1.0	18.1

- Considering the above calculations the following is recommended:

    - Install one 75 mm diameter force main from the SPS to the manhole on Concession Rd. 6.
    - This forcemain will provide velocities within the recommended MOE guidelines and acceptable friction losses.

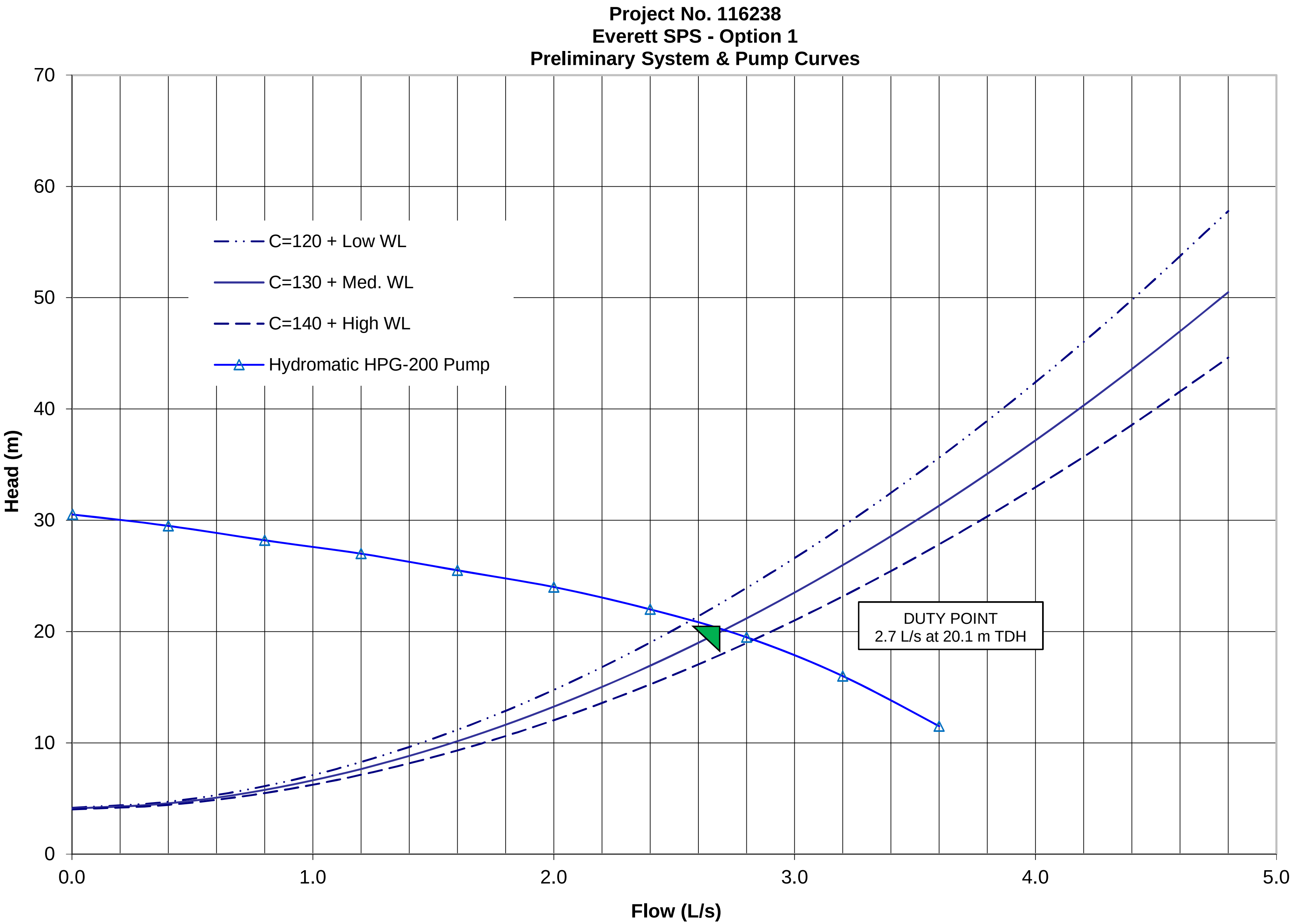
TATHAM ENGINEERING	Project:	Everett SPS - Option 1	Date:	9/4/2018
	File No.:	116238	Designed:	JRC
	Subject:	SPS Preliminary Design - Forcemain Calculations	Checked:	ST
	Revisions:			

Length of Forcemain	=	1,800	m
Forcemain Discharge Elevation	=	236.52	m
Pump Wet Well HLL	=	232.50	m
MLL	=	232.42	m
LLL	=	232.35	m
Pipe Type	H.D.P.E.	DR 11	
Nominal Pipe Diameter	=	0.075	m
Actual Pipe Diameter	=	0.072	m
Pipe Area	=	0.0040	m^2
Minor Losses ('K' Factor)	=	16.2	

	Minor Losses		
	k	#	T
45^o Elbow	0.42	0	0.0
90^o Elbow	0.30	2	0.6
90^o - Tee	1.80	1	1.8
180^o - Tee	1.80	0	0.0
22.5 Elbow	0.15	0	0.0
11.5 Elbow	0.10	0	0.0
Control Valve	7.00	0	0.0
Increaser	0.25	1	0.3
Reducer	0.25	0	0.0
Flow Meter	9.70	1	9.7
Gate Valve	0.19	2	0.4
Check Valve	2.50	1	2.5
"Y"	2.90	0	0.0
Exit	1.00	1	1.0
		Total	16.2

		C = 120	C = 130	C = 140
Design Pump Capacity (L/s)	=	2.6	2.7	2.8
Static Head (m)	=	4.17	4.10	4.02
Friction Loss (m)	=	16.9	15.6	14.5
Minor Losses (m)	=	0.34	0.37	0.40
Total Dyanamic Head (m)	=	21.4	20.1	19.0

100% Flow (m^3/sec)													
	0.000	0.000	0.001	0.001	0.002	0.002	0.002	0.003	0.003	0.004	0.004	0.004	0.005
100% Flow (L/sec)													
	0.0	0.4	0.8	1.2	1.6	2.0	2.4	2.8	3.2	3.6	4.0	4.4	4.8
C Factor	TDH (m)												
120	4.170	4.707	6.108	8.278	11.171	14.755	19.009	23.915	29.459	35.627	42.410	49.797	57.781
130	4.096	4.560	5.772	7.649	10.151	13.252	16.933	21.178	25.975	31.313	37.184	43.578	50.488
140	4.022	4.427	5.487	7.129	9.318	12.031	15.251	18.966	23.164	27.836	32.974	38.571	44.620
2 HP 5.25 in Impeller Hydromatic Model HPG-200													
Pump	30.52	29.50	28.20	27.00	25.50	24.00	22.00	19.50	16.00	11.50			


Project No. 116238
Everett SPS - Option 1
Preliminary System & Pump Curves
Head (m)
Flow (L/s)
70
60
50
40
30
20
10
0
0.0
1.0
2.0
3.0
4.0
5.0
C=120 + Low WL
C=130 + Med. WL
C=140 + High WL
Hydromatic HPG-200 Pump
DUTY POINT
2.7 L/s at 20.1 m TDH

	Project:	Everett SPS - Option 2	Date:	9/4/2018
TATHAM ENGINEERING	File No.:	116238	Designed:	JRC
	Subject:	SPS Preliminary Design - Wet Well Calculations	Checked	ST
	Revisions:			

Background Information

- Sanitary design flows from Everett MSP, Sanitary Sewer Design Sheet - Option F.
- SPS to service entire service area from MS-E to CM-SPS as shown on Everett Secondary Plan - Option WWC-F drawing by Greenland Consulting Engineers, Dated Mar. 2018.

Design Criteria - as per Everett MSP Addendum #2

Per capita flow	=	340	L/cap/day
People per unit	=	3	
Peaking Factor	=	Harmon Equation	
Peak I&I	=	90	L/cap/day

$\rightarrow 1 + \frac{14.0}{4+p^{0.5}}$, where p = population in thousands, and 1.5 <= PF <= 4.0

Area Identifier	Number of Units	Pop
MS-E	40	120
CR5-E	14	42
DBR	3	9
PP-N	20	60
HP	13	39
GH-W	17	51
PP-S	7	21
GH-E	9	27
CM-E	32	96
CM-W	32	96
CM-N	45	135
Existing lots	7	21
Total	239	717

Wet Well Sizing and Pump Configuration

- Based on Sanitary Sewer Design sheet, the invert elevation of the inlet sewer to the SPS is 233.69 m, and proposed grade at SPS is 238.42 m.
- As per the MOE Design Guidelines for Sewage Works (2008):
  - The minimum surface plan area of the wet well should be 4.9 m^2 (2.25 m square or 2.50 m diameter).
  - The fill time should not exceed 30 minutes, based on design ADF.
  - The wet well operating volume should provide a minimum cycle time of 10-minutes for each pump.
- The pump station will have two constant speed pumps (duty and standby), with one pump in operation at a time.
- Wet well to include emergency capacity to accommodate 30 minutes of emergency condition (i.e. pump or power failure):

  Peak flow x 30 minutes = 11.7 L/s x 1800 seconds = 21.1 m^3
- Wet well to be sized based on peak and emergency storage requirements.
  - 5.5 m x 2.7 m reinforced concrete pumping station, with plan area of: 15.0 m^2
  - Wet well storage above high level alarm to accommodate emergency storage = 21.1 m^3 / 15.0 m^2 = 1.40 m

Wet Well Plan Area	Number of Units	Pop	Total ADF (L/s)	Peak I & I (L/s)	Peaking factor	Total PF (L/s)	Pump Configuration	Approx. Firm Pumping Capacity (L/s)	Min. Operating Volume (m^3)	Min. Operating Depth (m)	ADF Fill Time (min)	ADF Empty Time (min)
15.0	239	717	2.82	0.75	3.89	11.7	duty/standby	11.8	1.77	0.12	10	3

Pump Cycle Time

- Pump Cycle Time (ADF Fill Time + ADF Empty Time) = 13 minutes.
- Based on the configuration above, the wet well fill and pump cycle times (based on the minimum operating volume and ADF) are acceptable.

Project:	Everett SPS - Option 2	Date:	9/4/2018
File No.:	116238	Designed:	JRC
Subject:	SPS Preliminary Design - Wet Well Calculations	Checked	ST
Revisions:			

Wet Well Levels

- Wet well operating levels based on wet well sizing calculations above and MOE Guidelines and nominal grade, sewer and forcemain elevations assumed.
- Rest platform required as per OSHA O.Reg.213/91, S. 286. One will be provided.

Wet Well Elevations (m)				
Top of Wet Well	=	238.72	300	*mm above grade*
Finished Grade	=	238.42		*Based on Sanitary Sewer Design sheet*
Outlet Forcemain Invert at p/l	=	236.62	1.7	*m below grade*
Safety Platform	=	234.92	3.5	*m below grade*
Inlet Sewer Invert	=	233.69	4.73	*m below grade*
High Level Alarm	=	232.29	*1402*	*mm below inlet sewer invert for emergency storage.*
Start Duty Pump	=	232.14	*150*	*mm below high level alarm*
Stop Pump	=	231.95	188	*mm operating depth (See Wet Well Sizing - min. operating depth =* 118 mm)
Pump Lockout/Low Level Alarm	=	231.80	*150*	*mm below pump stop*
Bottom of Wet Well	=	231.50	300	*mm min submergence below low level alarm*

Total wet well depth below grade = 6.92 m

Pump Selection

- See attached TDH and system curve calculations.

Discharge Piping Sizing

- MOE Design Guidelines recommend a velocity for the 20-year or greater sewage flow in pump discharge piping in the low end of 0.8 to 4.0 m/s.
- Calculated velocities are based on actual inside diameter of Schedule 10S Stainless Steel pipe.

Nominal Diameter (mm)	Inner Diameter (mm)	Velocity at Firm Pumping Capacity 11.8 L/s (m/s)
50	55	5.0
75	83	2.2
100	108	1.3
150	161	0.6

- Nominal 100 mm piping will accommodate the 20-year/ultimate sewage flow, while falling within the recommended velocity.

Force Main Sizing

- Sewage will be pumped along Concession Rd. 6 and discharge into the gravity sewer approx. 1,800 m away, that flows to the Farsight WWTP.
- The force main elevation has been assumed to be consistent at 236.62 m
- MOE Design Guidelines recommend velocity in force main within range of 0.6 to 3.0 m/s.
- CCTA recommends a minimum velocity of 0.75 m/s to resuspend settled solids in the force main.
- The force main sizing must consider force main velocities and friction losses. The following friction loss calculations have been performed to aid in selecting the optimal force main configuration. Detailed head loss calculations, including friction losses, minor losses, and static head for the force main can be found in the forcemain calculations.

- Friction losses are estimated from the Hazen-Williams equation with C = 120 and an inside diameter (ID) of HDPE DR 11 pipe.

		150 mm DIAMETER		
		Inner Diameter (mm):		136
Firm Pumping Capacity (L/s)	Force Main Length (m)	Velocity (m/s)	Friction Loss (m/100m)	Friction Loss (m)
11.8	1,800	0.8	0.7	12.4

- Considering the above calculations the following is recommended:
    - Install one 150 mm diameter force main from the SPS to the manhole on Concession Rd. 6.
    - This forcemain will provide velocities within the recommended MOE guidelines and acceptable friction losses.

TATHAM ENGINEERING

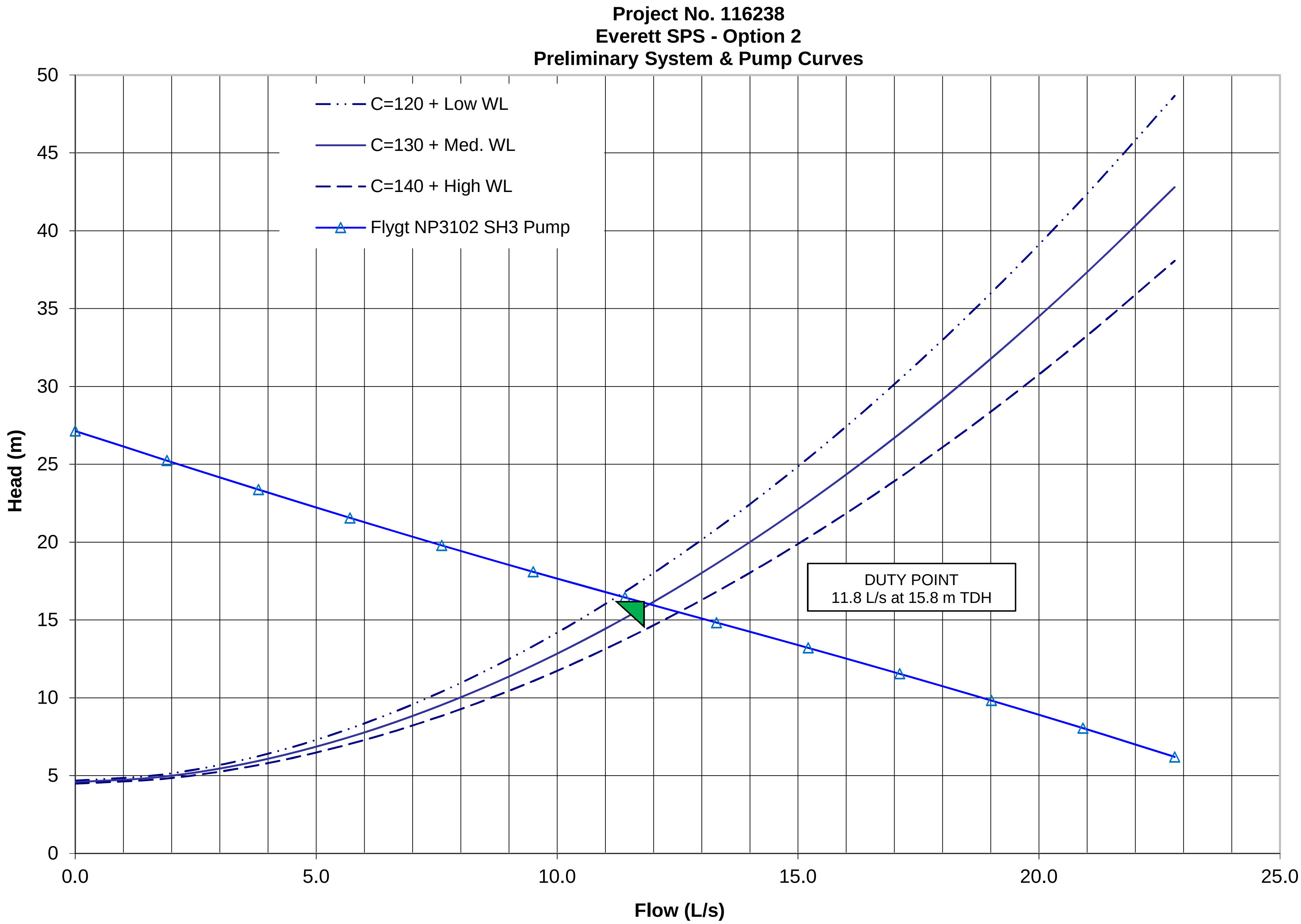
Project:	Everett SPS - Option 2	Date:	9/4/2018
File No.:	116238	Designed:	JRC
Subject:	SPS Preliminary Design - Forcemain Calculations	Checked:	ST
Revisions:			

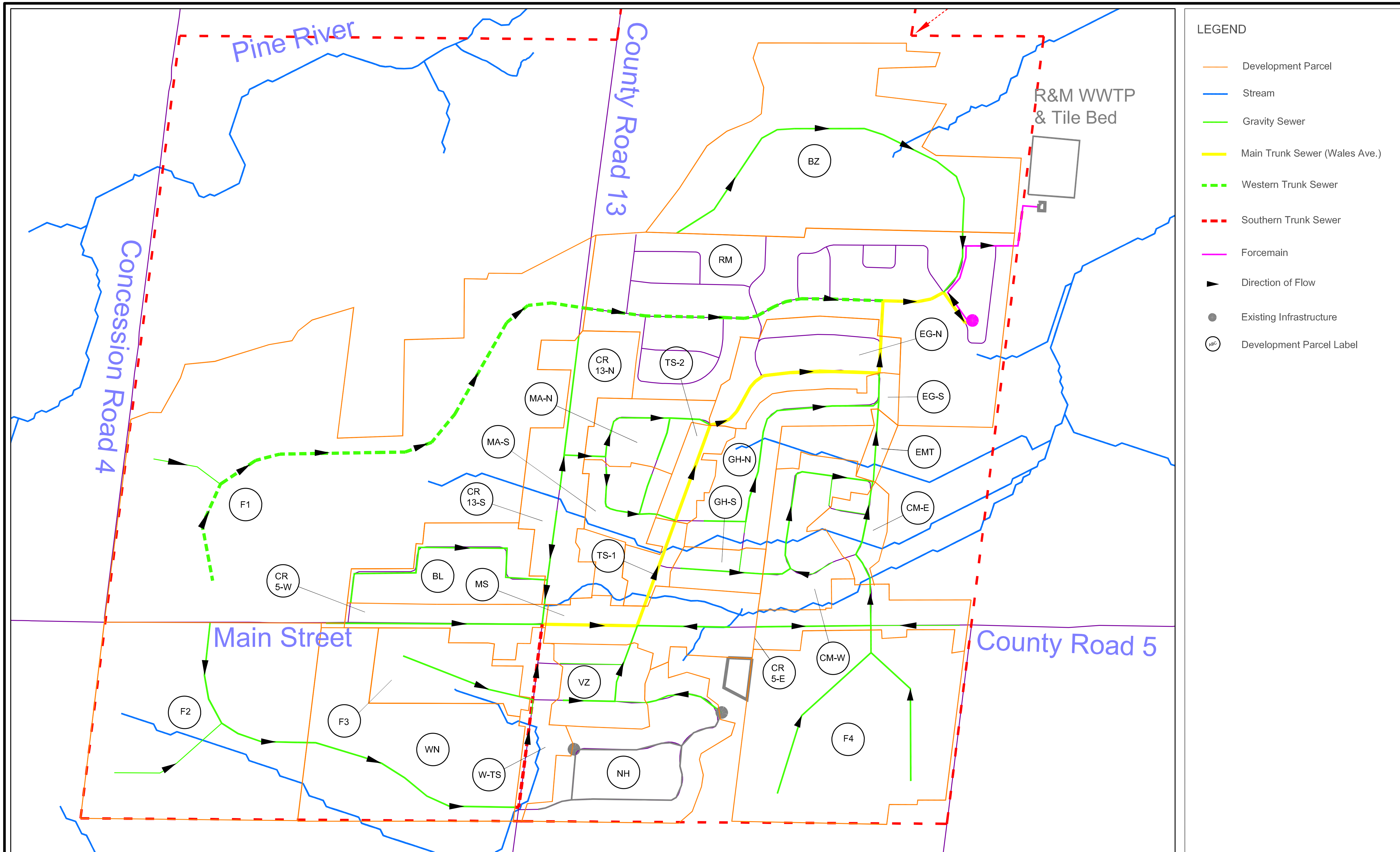
Length of Forcemain	=	1,800	m
Forcemain Discharge Elevation	=	236.62	m
Pump Wet Well HLL	=	232.14	m
MLL	=	232.04	m
LLL	=	231.95	m
Pipe Type	H.D.P.E.	DR 11	
Nominal Pipe Diameter	=	0.150	m
Actual Pipe Diameter	=	0.136	m
Pipe Area	=	0.0145	m^2
Minor Losses ('K' Factor)	=	16.2	

	Minor Losses		
	k	#	T
45^o Elbow	0.42	0	0.0
90^o Elbow	0.30	2	0.6
90^o - Tee	1.80	1	1.8
180^o - Tee	1.80	0	0.0
22.5 Elbow	0.15	0	0.0
11.5 Elbow	0.10	0	0.0
Control Valve	7.00	0	0.0
Increaser	0.25	1	0.3
Reducer	0.25	0	0.0
Flow Meter	9.70	1	9.7
Gate Valve	0.19	2	0.4
Check Valve	2.50	1	2.5
"Y"	2.90	0	0.0
Exit	1.00	1	1.0
		Total	16.2

		C = 120	C = 130	C = 140
Design Pump Capacity (L/s)	=	11.3	11.8	12.5
Static Head (m)	=	4.67	4.58	4.48
Friction Loss (m)	=	11.4	10.7	10.4
Minor Losses (m)	=	0.50	0.55	0.62
Total Dyanamic Head (m)	=	16.6	15.8	15.5

	100% Flow (m^3/sec)											
	0.000	0.002	0.004	0.006	0.008	0.010	0.011	0.013	0.015	0.017	0.019	0.021	0.023
	100% Flow (L/sec)												
	0.0	1.9	3.8	5.7	7.6	9.5	11.4	13.3	15.2	17.1	19.0	20.9	22.8
C Factor	TDH (m)												
120	4.670	5.107	6.251	8.025	10.393	13.329	16.817	20.841	25.391	30.456	36.027	42.098	48.661
130	4.576	4.955	5.948	7.487	9.543	12.093	15.122	18.617	22.570	26.971	31.813	37.090	42.795
140	4.482	4.814	5.685	7.037	8.842	11.081	13.742	16.814	20.288	24.156	28.412	33.051	38.067
	5 HP 125 mm Impeller Flygt Model NP3102 SH3												
Pump	27.13	25.24	23.37	21.55	19.79	18.09	16.45	14.83	13.20	11.55	9.83	8.04	6.20


Project No. 116238
Everett SPS - Option 2
Preliminary System & Pump Curves
C=120 + Low WL
C=130 + Med. WL
C=140 + High WL
Flygt NP3102 SH3 Pump
DUTY POINT
11.8 L/s at 15.8 m TDH
Head (m)
Flow (L/s)
0
5
10
15
20
25
30
35
40
45
50
0.0
5.0
10.0
15.0
20.0
25.0



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2. Do not scale the drawings.

NOTES:

N

No.	REVISION	DATE	INIT.
3.			
2.			
1.			

APPROVED

PROJECT TITLE

EVERETT SECONDARY PLAN

DRAWING TITLE

Sewage Collection Option B

GREENLAND® Consulting Engineers
120 Hume Street
Collingwood, Ontario, L9Y 1V5
Tel: (705) 444-8805
Fax: (705) 444-5482
E-mail: greenland@grnland.com
Website: www.grnland.com

SCALE: NTS

PROJECT No.: 12-G-2804

DESIGN: J.M.

CHECKED: J. HARTMAN

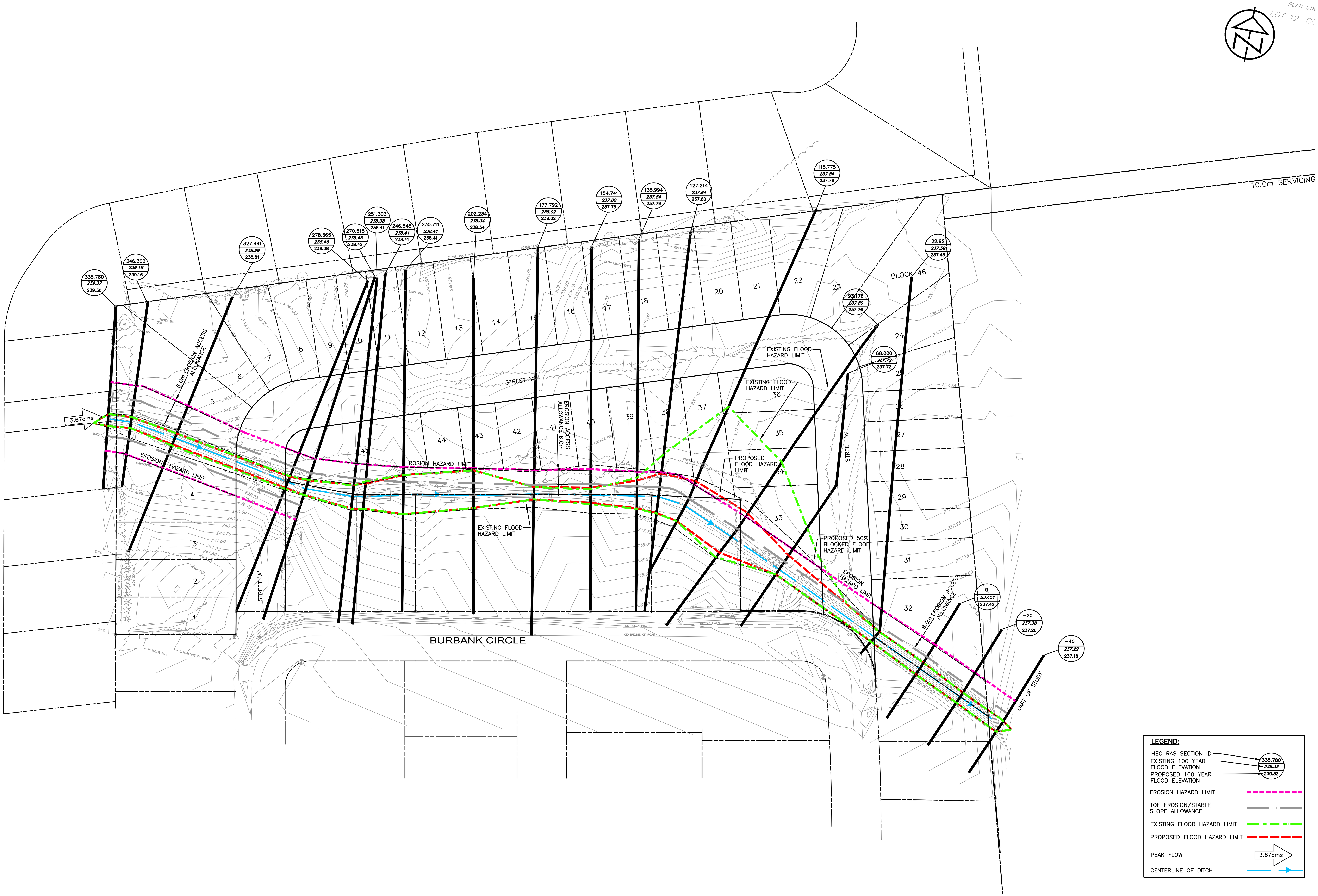
DRAWN: J.M.

DATE: OCT. 2012

DWG No. FIGURE A-4

T:\2804_Everett MSP\MSP in Progress\CAD Files\Everett MSP_2012-10-24-SANITARY FIGURES.dwg

Date Plotted: Dec 11, 2012 – 10:44am



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NOTES

TOPOGRAPHIC SURVEY OF THE WATERCOURSE AND FLOODPLAIN AREA PROVIDED BY RODNEY GEYER, OLS, DWG. 16-2535T1, DATED APRIL 21, 2016.

No.	REVISION DESCRIPTION	DATE
1.	1ST SUBMISSION	NOV 05/19

ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER 19184 R. S. SIMPSON PROVINCE OF ONTARIO

CUMAC SUBDIVISION - PH. 2

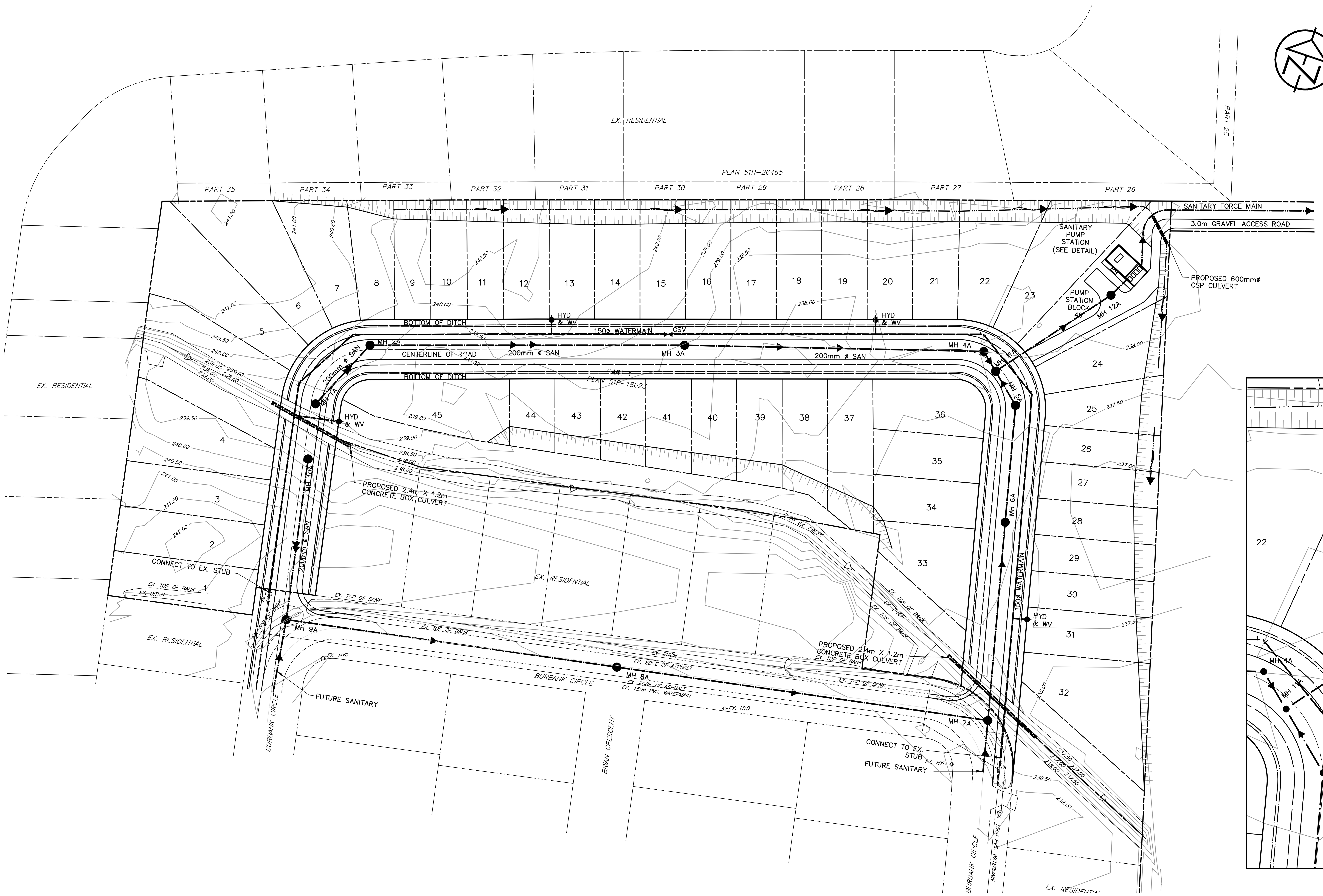
TOWNSHIP OF ADJALA-TOSORONTIO

NATURAL HAZARDS MAPPING PLAN

TATHAM ENGINEERING

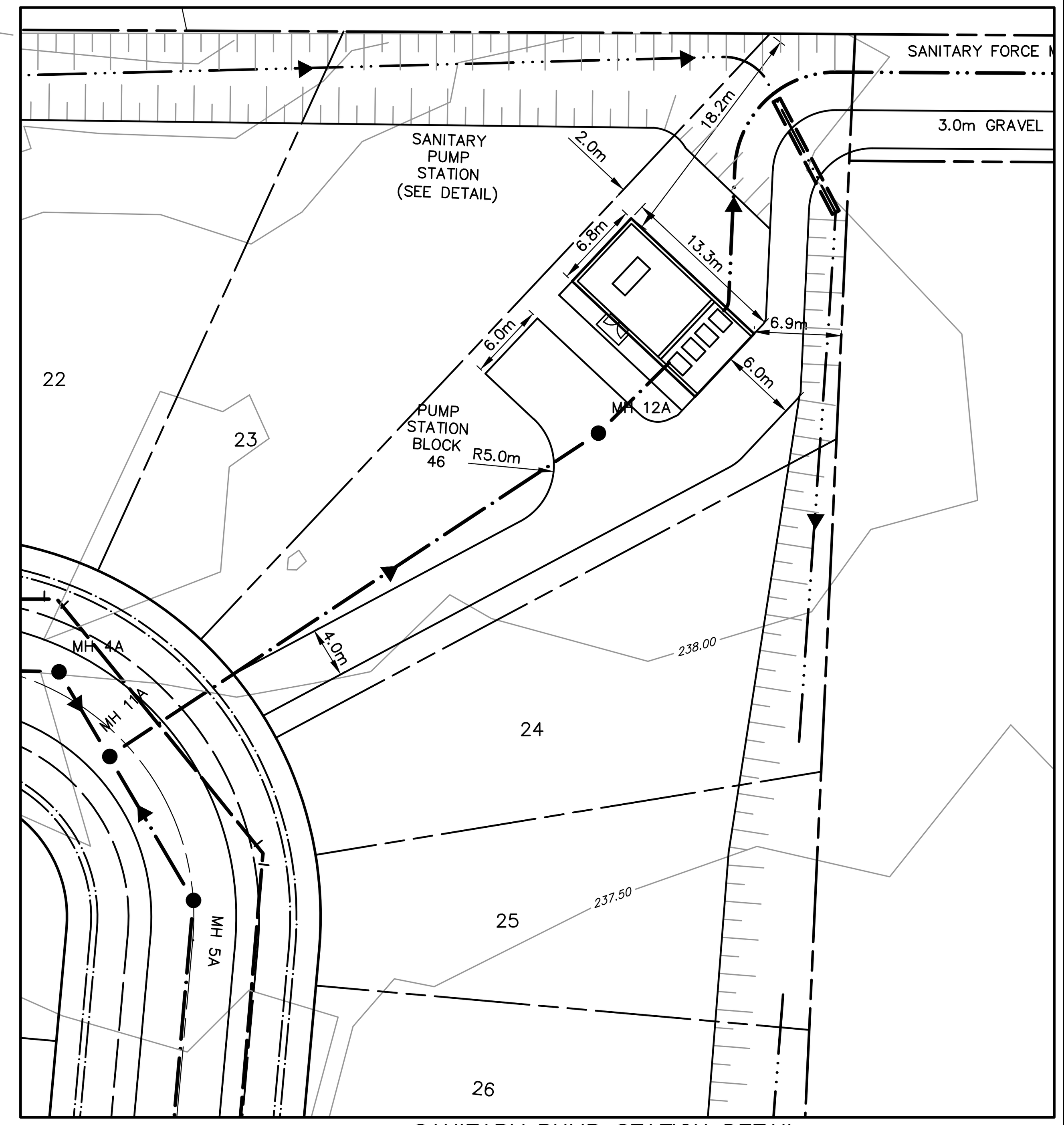
DESIGN: AW	FILE: 116238	DWG: FM-1
DRAWN: DEP	DATE: OCT 2016	
CHECK: DRT	SCALE: 1:750	

Drawing Name: 116238-FM-1.dwg, Plotted: Nov 05, 2019

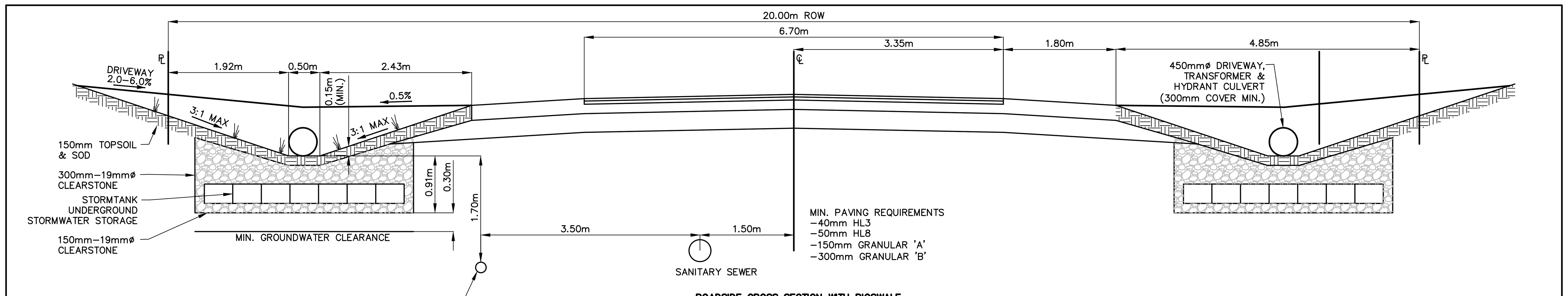


KEY PLAN
SCALE: NTS

PUMP STATION & BLOCK AREAS	
PUMP STATION BUILDING	90m²
PUMP STATION BLOCK	1,182m²



SANITARY PUMP STATION DETAIL
SCALE: 1:400



ROADSIDE CROSS SECTION WITH BIOSWALE
SCALE: N.T.S.

LEGEND

PROPERTY LINE	
EXISTING WATERMAIN	
PROPOSED WATERMAIN	
PROPOSED HYDRANT AND VALVE	HYD & WV
EXISTING HYDRANT	EX. HYD.
PROPOSED SANITARY SEWER MAIN	
PROPOSED SANITARY MAINTENANCE HOLE	
PROPOSED SANITARY FLOW DIRECTION	
℄ OF EX. CREEK AND FLOW DIRECTION	

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NOTES

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No.	REVISION DESCRIPTION	DATE
1.	1ST SUBMISSION	NOV 04/19

ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER
R. S. SIMPSON
PROVINCE OF ONTARIO
19/11/4

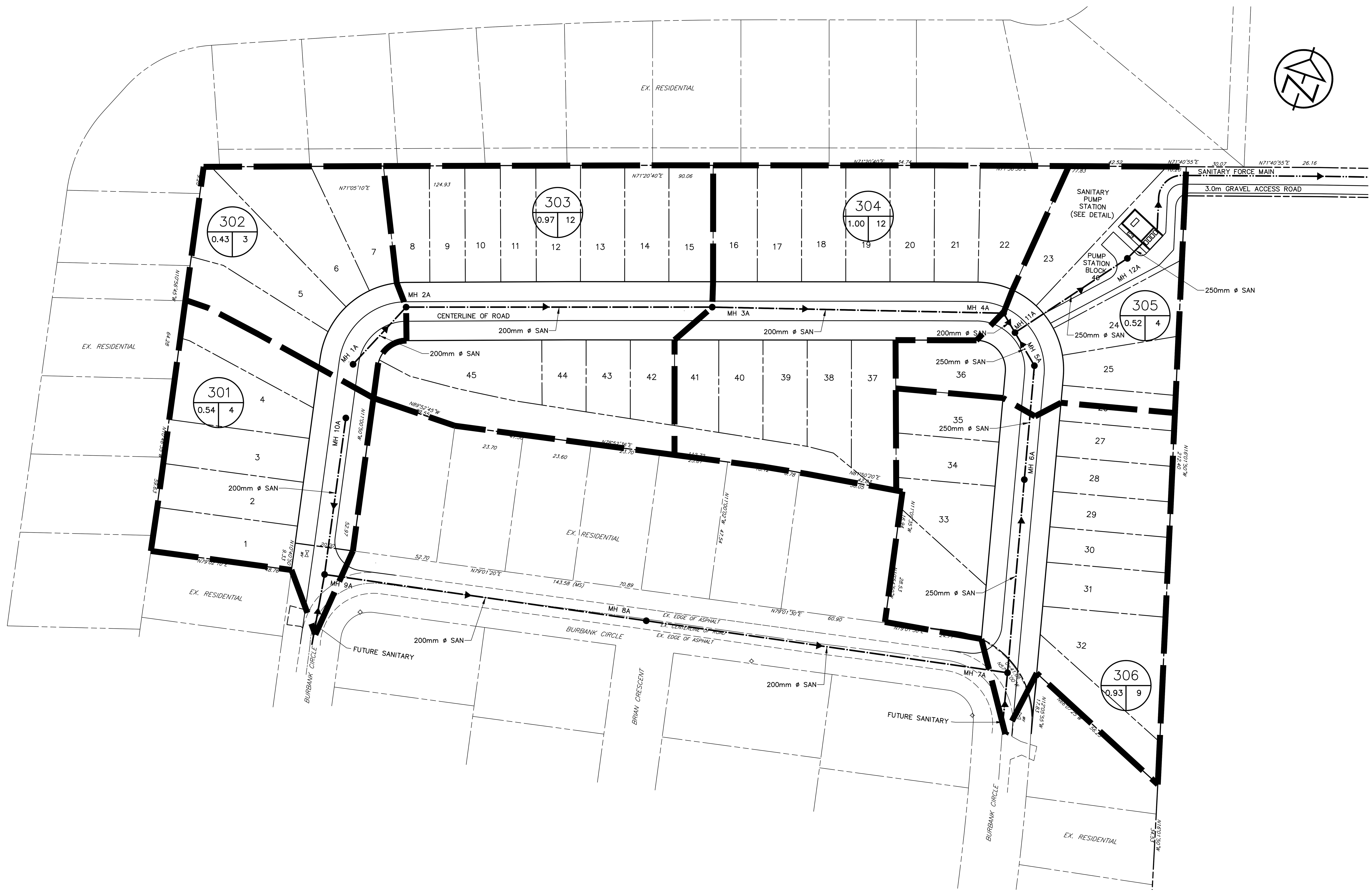
CUMAC SUBDIVISION - PH. 2
TOWNSHIP OF ADJALA-TOSORONTIO

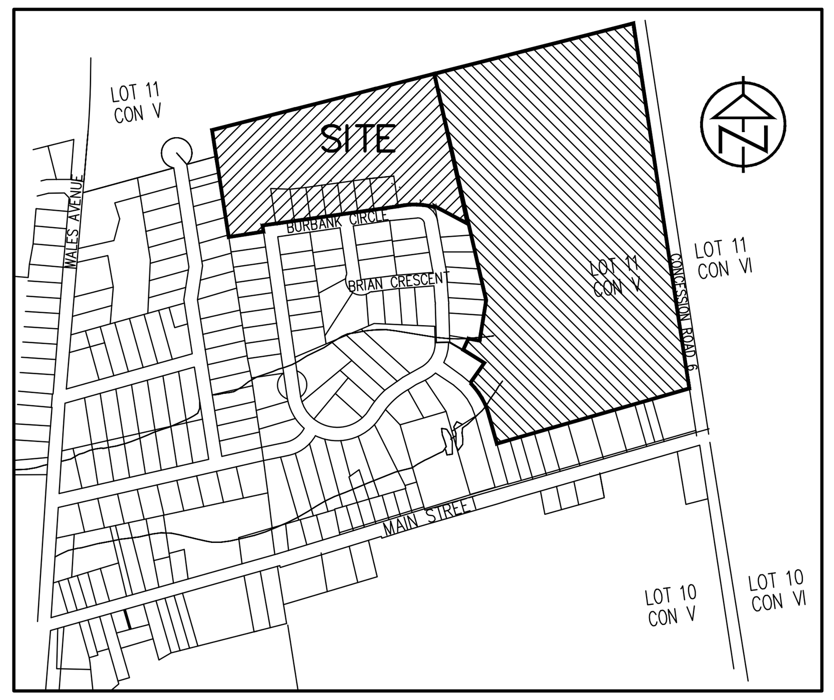
GENERAL SERVICING PLAN

TATHAM ENGINEERING

DESIGN: DDH	FILE: 116238	DWG: GS-1
DRAWN: SDH	DATE: MAR 2017	
CHECK: RS	SCALE: 1:750	

Drawing Name: 116238-GS01.dwg, Plotted: Nov 05, 2019





KEY PLAN
SCALE: NTS

LEGEND

DRAINAGE AREA
AREA IN HECTARES
\# OF UNITS
DRAINAGE AREA BOUNDARY
PROPOSED SANITARY SEWER MAIN
PROPOSED SANITARY MAINTENANCE HOLE
PROPOSED SANITARY FLOW DIRECTION
PROPOSED PROPERTY LINE

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CONTRACTOR MUST VERIFY ALL DIMENSIONS AND BE RESPONSIBLE FOR SAME. ANY DISCREPANCIES MUST BE REPORTED TO THE ENGINEER BEFORE COMMENCING WORK. DRAWINGS ARE NOT TO BE SCALED.

NOTES

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No.	REVISION DESCRIPTION	DATE
1.	1ST SUBMISSION	NOV 05/19

ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER
R. S. SIMPSON
PROVINCE OF ONTARIO

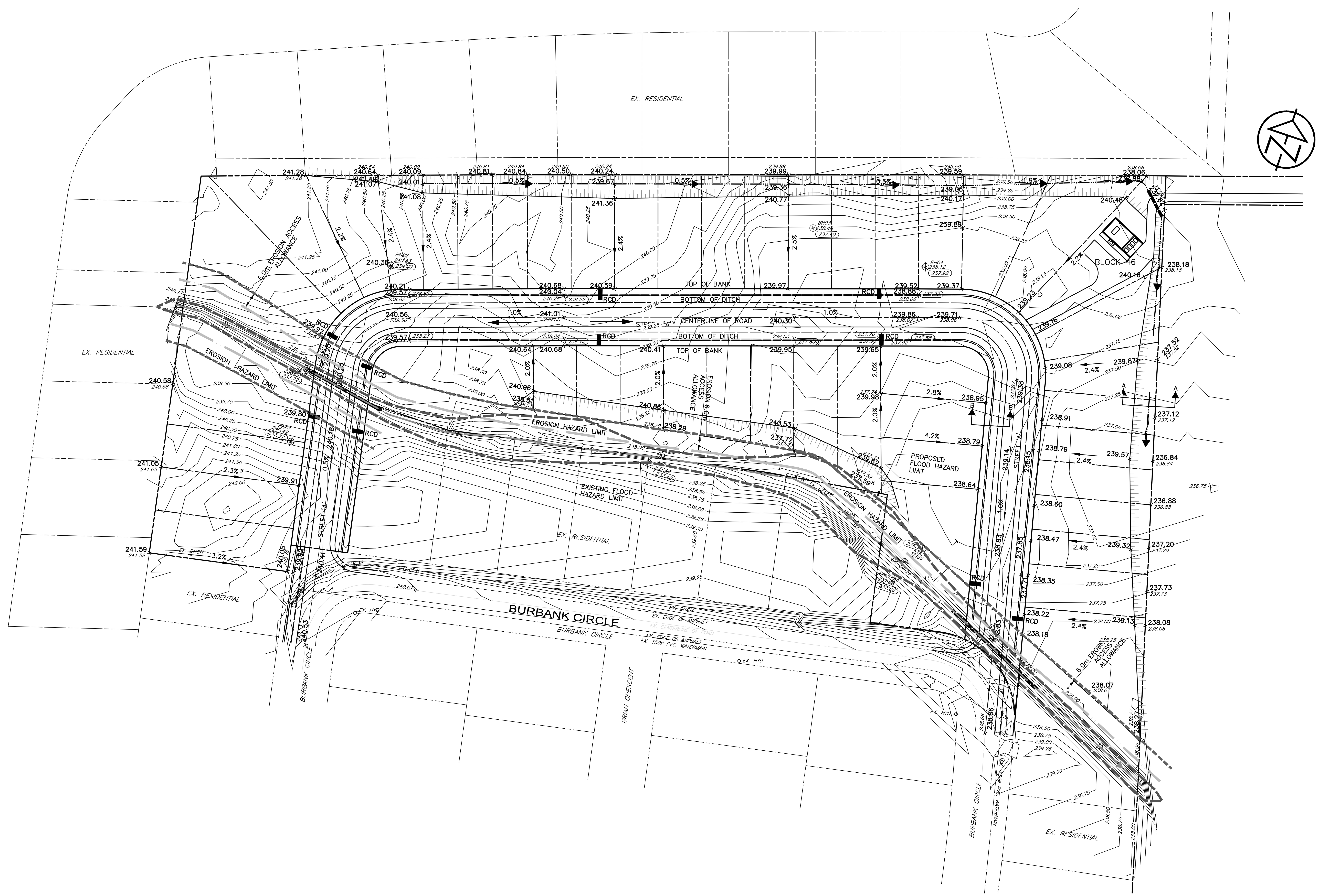
CUMAC SUBDIVISION - PH. 2
TOWNSHIP OF ADJALA-TOSORONTIO

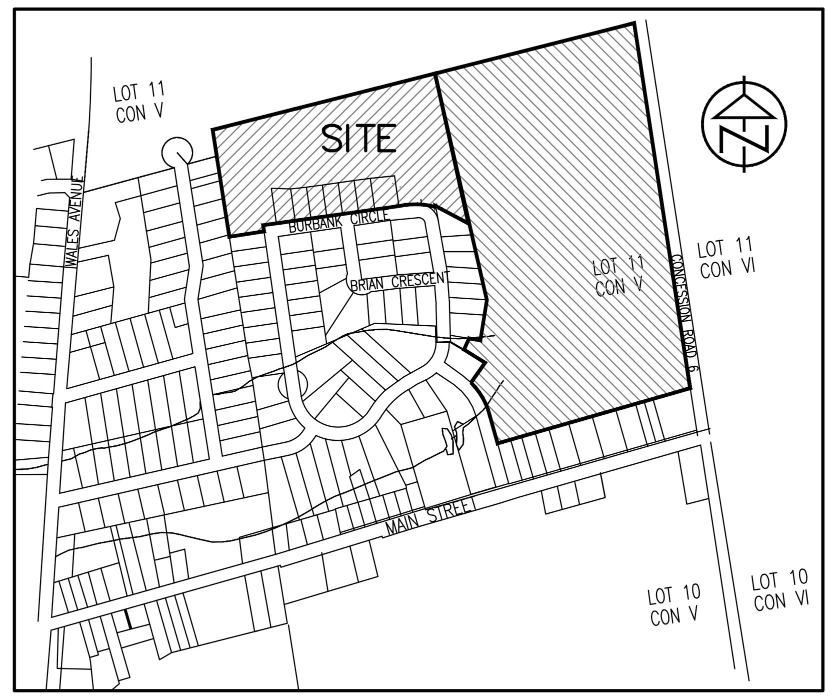
SANITARY CATCHMENT AREA PLAN

TATHAM ENGINEERING

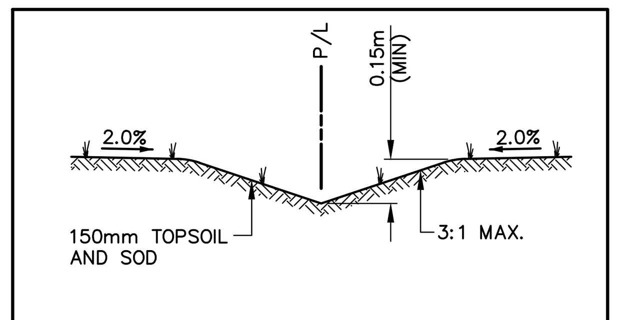
DESIGN: DDH	FILE: 116238	DWG:
DRAWN: SDH	DATE: MAR 2017	**SAN-1**
CHECK: RS	SCALE: 1:750	

Drawing Name: 116238-SAN01.dwg, Plotted: Nov 05, 2019

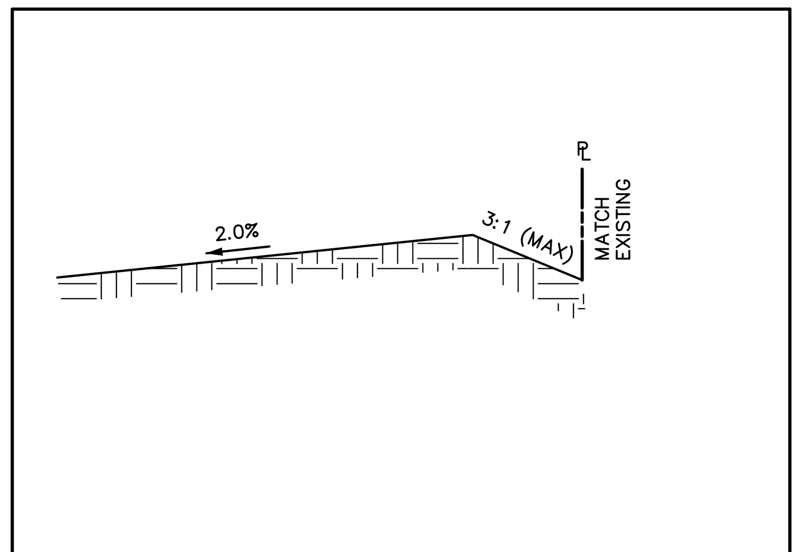




KEY PLAN
SCALE: NTS



TYPICAL SIDEYARD SWALE DETAIL
NTS



TYPICAL REAR YARD
SECTION A-A
SCALE: NTS

LEGEND

PROPERTY LINE	
PROPOSED SWALE/DITCH	
PROPOSED HIGH POINT	× HP
PROPOSED SPOT ELEVATION	× 363.92
PROPOSED GRADING DIRECTION/SLOPE	4.3%
PROPOSED SPOT ELEVATION	
EXISTING DITCH FLOW	▶
TYPICAL LOT GRADING DETAIL TYPE	A,B,C

NOTES

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ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER
R. S. SIMPSON
PROVINCE OF ONTARIO

CUMAC SUBDIVISION - PH. 2
TOWNSHIP OF ADJALA-TOSORONTIO

TATHAM ENGINEERING

OVERALL GRADING PLAN

DESIGN: DDH	FILE: 116238	DWG:
DRAWN: SDH	DATE: MAR 2017	LG-1
CHECK: RS	SCALE: 1:750	

Drawing Name: 116238-LG01.dwg, Plotted: Nov 05, 2019

GENERAL

A. ALL WORK TO BE CARRIED OUT IN ACCORDANCE WITH TOWNSHIP OF ADJALA–TOSORONTIO AND OPS STANDARDS. WHERE CONFLICT OCCURS, TOWNSHIP STANDARDS TO GOVERN.
B. THE CONTRACTOR MUST OBTAIN A ROAD OCCUPANCY PERMIT FROM PUBLIC WORKS PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.
C. THE OWNERS ENGINEER SHALL PROVIDE BENCHMARK ELEVATIONS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DETAILED LAYOUT OF THE WORK.
D. ALL PROPERTY BARS TO BE PRESERVED AND REPLACED BY OLS AT CONTRACTORS EXPENSE IF REMOVED DURING CONSTRUCTION.
E. THE CONTRACTOR SHALL MAKE ARRANGEMENTS FOR THE SUPPLY OF TEMPORARY WATER AND POWER.
F. DEWATERING TO BE CARRIED OUT IN ACCORDANCE WITH OPSS 517 AND OPSS 518. MAINTAIN ALL TRENCHES IN A DRY CONDITION.
G. ALL ENGINE DRIVEN PUMPS TO BE ADEQUATELY SILENCED, SUITABLE FOR OPERATION IN A RESIDENTIAL DISTRICT.
H. GENERAL INSTALLATION AND TESTING OF SEWERS, WATERMAIN AND APPURTENANCES TO BE IN ACCORDANCE WITH OPSS 407, 408, 409 (CCTV), 410, 421, AND 441 AND ALL SPECIFICATIONS REFERENCED WITHIN THESE SECTIONS.
I. ALL MAINTENANCE HOLES ARE 1200 mm DIAMETER, UNLESS OTHERWISE SPECIFIED.
J. ALL STRUCTURES TO BE INSTALLED WITH FROST STRAPS TO OPSD 701.100.
K. PIPE SUPPORT AT ALL STRUCTURES TO OPSD 708.020.
L. ALL MAINTENANCE HOLE FRAME AND GRATES TO BE SET TO BASE COURSE ASPHALT ELEVATION IN ACCORDANCE WITH OPSD 704.010. FRAME AND GRATES TO BE RAISED TO FINISHED GRADE PRIOR TO THE PLACEMENT OF SURFACE COURSE ASPHALT USING CONCRETE ADJUSTMENT UNITS. MAXIMUM COMBINED HEIGHT OF ADJUSTMENT UNITS SHALL BE 450 mm.
M. TRENCH BACKFILL TO BE SELECT NATIVE MATERIAL OR IMPORTED SELECT SUBGRADE MATERIAL TO OPSS 1010. BACKFILL TO BE PLACED IN MAXIMUM 200 mm THICK LIFTS (OR AS OTHERWISE DIRECTED BY THE GEOTECHNICAL CONSULTANT) AND COMPACTED TO A DRY DENSITY OF AT LEAST 95% OF THE MATERIAL'S STANDARD PROCTOR MAXIMUM DRY DENSITY (SPMDD).
N. PIPE EMBEDMENT TO BE COMPACTED TO A DRY DENSITY OF AT LEAST 95% OF THE MATERIAL'S SPMDD. BACKFILL AND EMBEDMENT TO OPSD 802.010 (FLEXIBLE PIPE), GRANULAR 'A' EMBEDMENT OR OPSD 802.031 (RIGID PIPE) CLASS "B", GRANULAR 'A' BEDDING, GRANULAR 'B' COVER (MAX. AGGREGATE SIZE 25 mm). MINIMUM BEDDING DEPTH 150 mm, MINIMUM COVER DEPTH 300 mm ON ALL PIPES. WHERE EXCESSIVELY WET OR POOR SUBGRADE IS ENCOUNTERED AT THE INVERT LEVEL, IT MAY BE NECESSARY TO INCREASE THE BEDDING THICKNESS.
O. CLEAR STONE COMPLETELY WRAPPED IN FILTER FABRIC MAY BE SUBSTITUTED FOR EMBEDMENT MATERIAL IF APPROVED BY THE ENGINEER.
P. DISTURBED AREAS TO BE REINSTATED TO PREVIOUS CONDITION OR BETTER.
Q. REINSTATEMENT OF ALL DISTURBED BOULEVARDS AND DITCHES TO INCLUDE REGRADING, PLACEMENT OF 150 mm TOPSOIL AND SOD IN ACCORDANCE WITH OPSS 802 AND OPSS 803. SOD TO BE STAKED WHERE NECESSARY TO AVOID MOVEMENT.
R. THE CONTRACTOR IS RESPONSIBLE FOR THE PRESERVATION OF ALL EXISTING INFRASTRUCTURE/FACILITIES AS WELL AS NOTIFYING ALL UTILITY COMPANIES PRIOR TO COMMENCING WORK AND CO–ORDINATE CONSTRUCTION ACCORDINGLY.
S. ALL ON–SITE MATERIAL SHALL BE PROPERLY STORED, SECURED, MONITORED AND COVERED AS REQUIRED. SPECIFICALLY, ALL PVC PIPE SHALL BE COVERED WHILE STORED ON–SITE.
T. ALL SIGNAGE TO COMPLY WITH THE TOWNSHIP OF ADJALA–TOSORONTIO SIGN BY–LAW.
U. REFER TO LANDSCAPE PLANS FOR TREE CLEARING AND TREE PROTECTION.
V. UNDERGROUND STORAGE SYSTEMS TO BE INSTALLED AS PER MANUFACTURE'S INSTRUCTION AND SPECIFICATIONS. SEE GS–1 FOR ADDITIONAL DETAILS.

WATERMAIN

A. ALL WORK ON EXISTING WATERMAIN TO BE COORDINATED WITH THE TOWNSHIP.
B. MINIMUM GROUND COVER OVER WATERMAIN, SERVICE LATERALS AND HYDRANT LEADS TO BE 1.8 m AT ALL POINTS, MAXIMUM GROUND COVER OVER WATERMAIN TO BE 2.5 m.
C. WHERE SPECIFIED, INSULATION TO BE INSTALLED OVER WATERMAIN OR SERVICES WITH LESS THAN 1.8 m DEPTH OF COVER AS NOTED ON THE DRAWINGS OR MINIMUM AS FOLLOWS:
- DEPTH OF COVER BETWEEN 1.4 METRES TO 1.8 METRES REQUIRES 50mm INSULATION.
- DEPTH OF COVER BETWEEN 1.2 METRES TO 1.4 METRES REQUIRES 100mm INSULATION.
- WATER MAIN NOT TO BE INSTALLED WITH LESS THAN 1.2 METRES DEPTH OF COVER.

D. THRUST BLOCKS OR PIPE RESTRAINTS TO BE PROVIDED AT ALL CHANGES IN PIPE DIRECTION, TERMINATIONS AND ANY LOCATION WHERE THRUST PRESSURES MAY OCCUR. WATER VALVES SHALL BE RESTRAINED ON EITHER SIDE TO THE SAME STANDARD THAT A DEAD END WOULD BE. WHERE SOIL CONDITIONS ARE SUSPECT, SUCH AS IN DISTURBED SOILS OR SOILS WITH BEARING STRENGTH OF LESS THAN 200 kPa, PIPE RESTRAINERS SHALL BE USED. IN LIEU OF THRUST BLOCKS PIPE RESTRAINTS FOR PVC SHALL BE PER TOWNSHIP STANDARDS. THRUST BLOCKS TO OPSD 1103.010 AND 1103.020.
E. CATHODIC PROTECTION OF ALL WATERMAIN FITTINGS AND APPURTENANCES TO BE PROVIDED AS PER TOWNSHIP STANDARD.
F. RESIDENTIAL SERVICE CONNECTIONS TO OPSD 1104.010, 25 mm DIAMETER, 300 mm DEPTH GRANULAR 'A' EMBEDMENT.
G. RESIDENTIAL SERVICE CONNECTIONS TO TERMINATE AT PROPERTY LINE COMPLETE WITH CURB STOP VALVE, TESTING TAIL TO SURFACE CAPPED OR CRIMPED AND AN 89 mm x 38 mm MARKER FROM THE INVERT OF THE SERVICE TO 600 mm ABOVE GRADE PAINTED BLUE.
H. ALL WATER SERVICES TO INCLUDE THE INSTALLATION OF AN INDIVIDUAL PRV WITHIN EACH BUILDING. PRV TO BE SUPPLIED AND INSTALLED BY THE BUILDER DURING HOUSE CONSTRUCTION.
I. SERVICES SHALL BE LOCATED AT THE CENTRE OF EACH LOT UNLESS IN CONFLICT WITH DRIVEWAY LOCATION OR FRONT YARD TILE BED.
J. HYDRANTS TO BE INSTALLED TO OPSD 1105.010 AND TOWNSHIP STANDARDS.
K. HYDRANTS TO BE PAINTED RED AND INCLUDE A FLEXSTAKE HYDRANT MARKER MODEL FHV804, 1.2 m LONG, COLOUR YELLOW WITH REFLECTIVE GRAPHIC ON BOTH SIDES AT THE TOP OF THE MARKER. MARKER TO BE POSITIONED ON THE RIGHT PORT AS VIEWED FROM THE STREET. A FIRE HYDRANT MARKER POST AND SIGN SHALL BE INSTALLED 0.3 m BEHIND EACH HYDRANT. THE SIGN SHALL BE REFLECTIVE WITH A RED HYDRANT ON A WHITE BACKGROUND AND MEASURE 0.3 x 0.3 m. THE SIGN SHALL BE MOUNTED 1.5 m ABOVE GRADE.
L. ALL PVC WATERMAIN AND PE RESIDENTIAL SERVICES TO HAVE TRACER WIRE BETWEEN HYDRANTS AND OTHER CONDUCTING APPURTENANCES. CONTRACTOR SHALL TEST ALL TRACER WIRE TO CONFIRM CONNECTIVITY.
M. TRACER WIRE TO BE 10 GAUGE, MULTI–STRAND SHALL BE PLACED ON TOP AND ATTACHED IN TWO PLACES ON EACH LENGTH OF PVC OR PE PIPE. ALL CONNECTIONS SHALL BE MADE WITH "DRYCONN WATERPROOF CONNECTORS" OR APPROVED EQUAL.
N. VERTICAL CLEARANCE BETWEEN WATERMAINS AND SEWERS TO BE A MINIMUM OF 0.5 m, HORIZONTAL CLEARANCE BETWEEN WATERMAINS AND SEWERS TO BE A MINIMUM OF 2.5 m.
O. THE COMPLETE WATER SYSTEM, INCLUDING RESIDENTIAL SERVICE CONNECTIONS TO THE PROPERTY LINE AND HYDRANTS SHALL BE TESTED IN ACCORDANCE WITH THE TOWNSHIP'S WATERMAIN COMMISSIONING PROTOCOL. CONTRACTOR TO PROVIDE DETAILED WRITTEN WATERMAIN COMMISSIONING PROTOCOL FOR APPROVAL PRIOR TO COMMENCING TESTING OPERATIONS. CONNECTIONS TO EXISTING MAINS SHALL NOT BE MADE UNTIL WRITTEN AUTHORIZATION IS PROVIDED BY THE ENGINEER AND THE TOWNSHIP.
P. FOLLOWING TESTING, CONTRACTOR SHALL OPERATE EACH SERVICE TO VERIFY FULL FLOW AND PRESSURE AT CURB STOP TO SATISFACTION OF THE ENGINEER.
Q. EXISTING WATER SERVICES THAT ARE TO BE ABANDONED MUST BE CAPPED AT MAIN INCLUDING MAIN STOP REMOVED, PLUG INSERTED TO TOWNSHIP STANDARDS AND REINSTATEMENT OF ALL DISTURBED AREAS TO EXISTING CONDITION OR BETTER.
R. WATER VALVES TO BE OPERATED BY TOWNSHIP STAFF ONLY.
S. BLOWOFFS TO OPSD 1104.030 (50 mm DIA.)

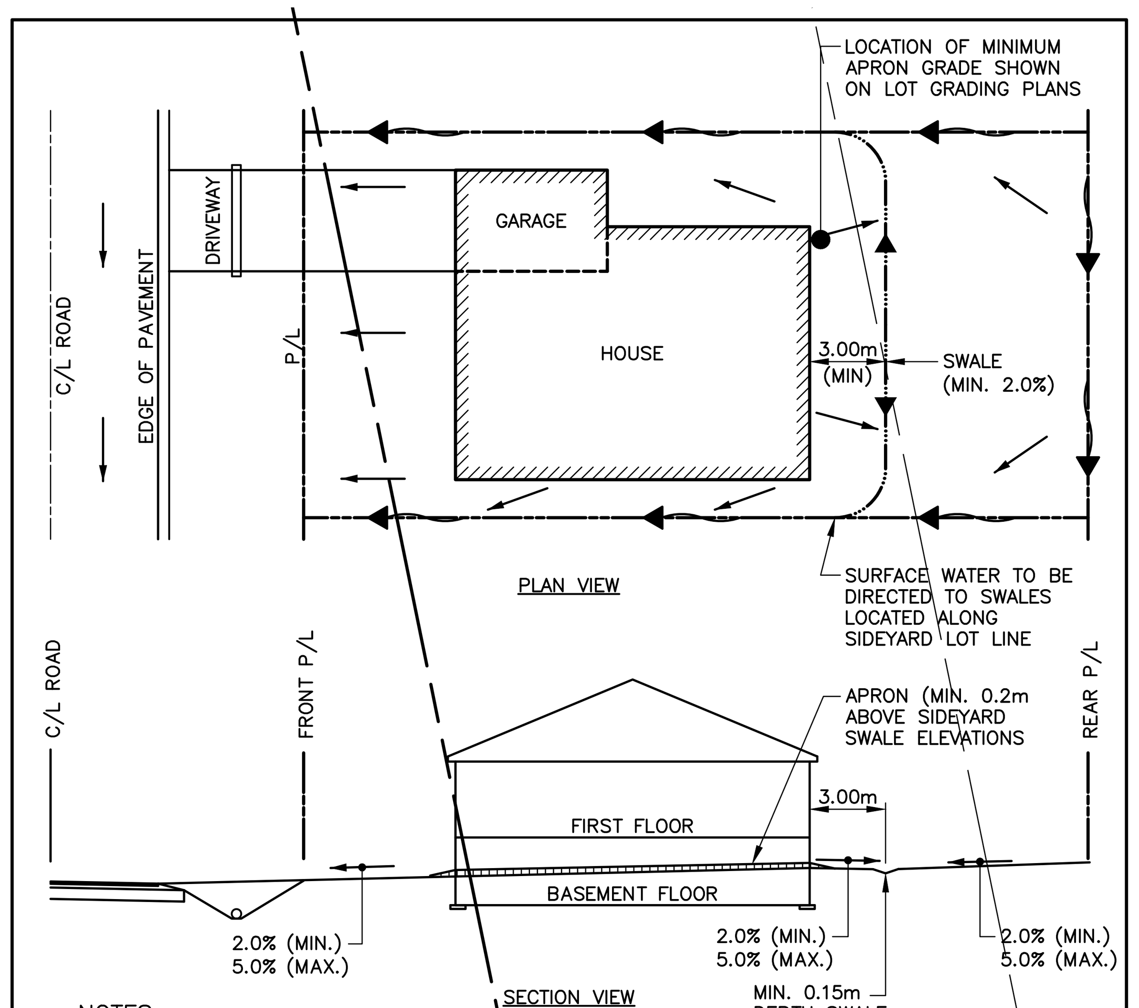
MATERIALS

A. ALL MATERIAL TO COMPLY WITH CSA, OPSS AND TOWNSHIP STANDARDS.
B. SANITARY SEWER – PVC DR 35.
C. SANITARY SERVICE CONNECTIONS – PVC SDR 28.
D. CULVERTS – GALVANIZED CORRUGATED STEEL PIPE. MIN. WALL THICKNESS 2.0 mm. ALL CULVERTS TO HAVE END PROTECTION TO OPSD 810.010 (BOTH ENDS), TYPE B – COMPLETE WITH FILTER FABRIC.
E. PERFORATED SUBDRAIN – BIG 'O' WITH GEOTEXTILE FILTER SOCK OR APPROVED EQUAL.
F. ALL WATERMAIN MATERIALS TO BE IN ACCORDANCE WITH NSF60 AND NSF61.
G. WATERMAIN – PVC DR 18.
H. WATER SERVICE CONNECTIONS TO BE TYPE 'K' COPPER PIPE, REHAU'S MUNICIPLEX (BLUE) OR SERIES 160 PE.
I. WATER SERVICE FITTINGS SHALL BE:
   - MAIN STOP – MUELLER H25008
   - CURB STOP – MUELLER H25209
   - SERVICE SADDLE – ROBAR 2706 DOUBLE STRAP
   - TAPPING SADDLE – ROBAR 6906
   - SERVICE BOXES – MUELLER A–726, STAINLESS STEEL RODS

J. PIPE RESTRAINERS – SIGMA C–900.
K. HYDRANTS – CANADA VALVE, OPEN LEFT, WITH STORTZ CONNECTIONS ON ALL STEAMER PORTS. HYDRANT SETS SHALL BE INSTALLED NOT LESS THAN 0.9 m FROM THE CENTER OF THE VALVE TO THE CENTER OF THE HYDRANT. TRACER WIRE SHALL BE ATTACHED TO THE OUTSIDE OF THE VALVE BOX AND WIRE BROUGHT INTO VALVE BOX UNDER CAP.
L. LIVE TAP SADDLES TO BE EPOXY COATED COMPLETE WITH STAINLESS STEEL BOLTS.
M. MECHANICAL JOINT DUCTILE FITTINGS TO AWWA/ANSI C153/A21.53. INCLUDING PROTECTO–CAPS, CAT NO. 175P190 OR APPROVED EQUAL.
N. ISOLATION VALVES TO BE RESILIENT SEAT GATE VALVES WITH MECHANICAL JOINTS, OPEN LEFT, CLOW OR MUELLER. VALVE BOXES TO BE 5–SL–48 SLIDING OR MUELLER MVB COMPOSITE COMPLETE WITH GUIDE PLATE AND DUCTILE ADJUSTABLE TOP AND LID OR APPROVED EQUAL. CAPS TO BE PAINTED BLUE.
O. AUTOMATIC FLUSHING DEVICE – KUPFERLE FOUNDRY COMPANY, MODEL 9800. TOWNSHIP TO PROVIDE DIRECTION REGARDING DESIRED FLUSHING CYCLE.
P. ALL SPECIFIED AGGREGATES TO OPSD 1010.
Q. RIPRAP TO OPSS 1004.05.05, ON FILTER FABRIC.
R. FILTER FABRIC – TERRAFIX 270R OR APPROVED EQUAL.
S. INSULATION – STYROFOAM HIGHLOAD 40 EXTRUDED POLYSTYRENE FOAM INSULATION, 50mm THICK SHEETS.

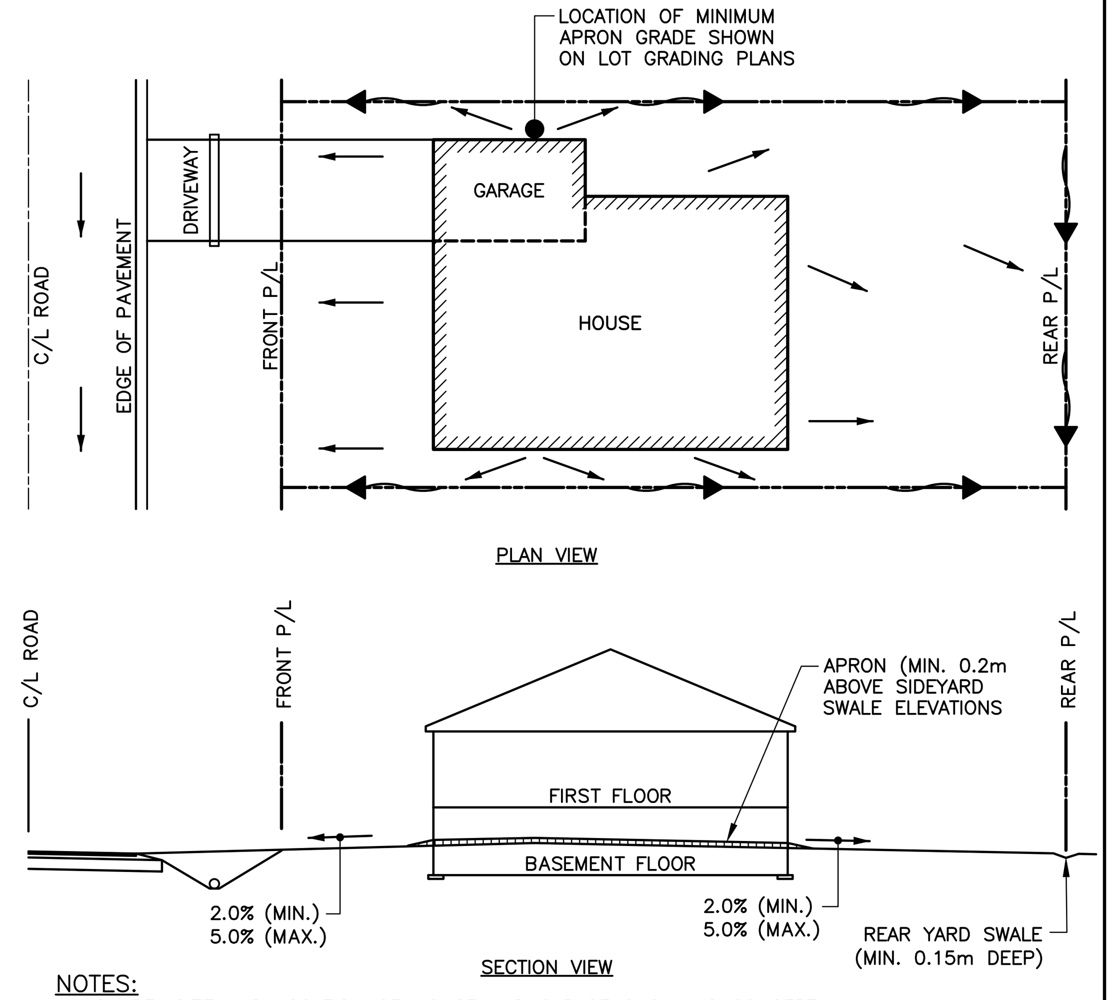
SANITARY SEWER

A. MAINTENANCE HOLES TO OPSD 701.010.
B. MAINTENANCE HOLES TO BE BENCHED TO OPSD 701.021 ALL CONNECTIONS TO MAINTENANCE HOLES TO INCLUDE KOR–N–SEAL RUBBER BOOT PI CONNECTION.
C. MAINTENANCE HOLE STEPS TO OPSD 405.010
D. MAINTENANCE HOLE FRAME AND COVER TO OPSD 401.010 TYPE 'A' CLOSED COVER. WHERE SPECIFIED, WATER TIGHT FRAME AND GRATE TO OP 401.050 SHALL BE USED.
E. MAINTENANCE HOLE STRUCTURES EXCEEDING 5.0m IN DEPTH TO INCLUDE SAFETY PLATFORM TO OPSD 404.020.
F. DROP STRUCTURES AT MAINTENANCE HOLES TO OPSD 1003.020, AND REQUIRED WHEN INLET & OUTLET ELEVATIONS DIFFER BY 0.90m OR MORE.
G. RESIDENTIAL SERVICE CONNECTIONS TO OPSD 1006.020, 125 mm DIAMETER, GRANULAR 'A' EMBEDMENT (MIN. 150 mm BEDDING AND 300 mm COVE RADIUS BENDS TO BE USED ON ALL SEWER CONNECTIONS WHERE THE ANGLE OF CONNECTION BETWEEN THE SERVICE AND SEWER EXCEEDS 90°.
H. RESIDENTIAL SERVICE CONNECTIONS TO BE TERMINATED AT THE PROPERTY LINE WITH A TEST FITTING, 125 mm x 100 mm REDUCER, PLUG SUITAB BRACED TO WITHSTAND TEST PRESSURES AND AN 89 mm x 38 mm MARKER PLACED FROM THE INVERT OF THE CONNECTION TO 600 mm ABO FINISHED GRADE PAINTED GREEN. MINIMUM GRADE OF SERVICE TO BE 2%, MAXIMUM GRADE TO BE 8%. TERMINATE AT AN ELEVATION AT LEAST 2.8 BELOW PROPOSED GRADE AT PROPERTY LINE.
I. STUBS FOR FUTURE SANITARY SEWERS TO BE MIN. 1.0 m LONG COMPLETE WITH PRE–MANUFACTURED CAP.
J. SERVICES SHALL BE INSTALLED 2.0m RIGHT OF WATER SERVICE AND 1.2m OFF LOT LINE, EXCEPT WHEN IN CONFLICT WITH DRIVEWAYS.
K. SANITARY SEWER TESTING SHALL INCLUDE INFILTRATION, EXFILTRATION, DEFLECTION (MANDREL) AND CCTV.



NOTES:
1. SHAPE, SIZE AND LOCATION OF HOUSE AND GARAGE SHOWN IS CONCEPTUAL.
2. DRIVEWAY AND GARAGE MAY BE ON OPPOSITE SIDE OF LOT.
3. SWALES ALONG THE REAR PROPERTY LINE ARE NOT REQUIRED WHERE CONTINUOUS POSITIVE DRAINAGE CAN BE ACHIEVED. ALTERNATIVE TREATMENT MAY BE REQUIRED FOR LOTS BACKING ONTO PARK BLOCKS OR ENVIRONMENTAL BUFFERS (I.E. RETAINING WALL OR SLOPE).
4. INDIVIDUAL LOT GRADING PLANS TO BE PREPARED AND APPROVED BY ENGINEER PRIOR TO CONSTRUCTION. CONTRACTOR TO REFER TO THE APPROVED PLAN FOR FINAL GRADING DETAILS.

TYPICAL REAR TO FRONT LOT DRAINAGE WITH ATTACHED GARAGE
TYPE – A
NTS



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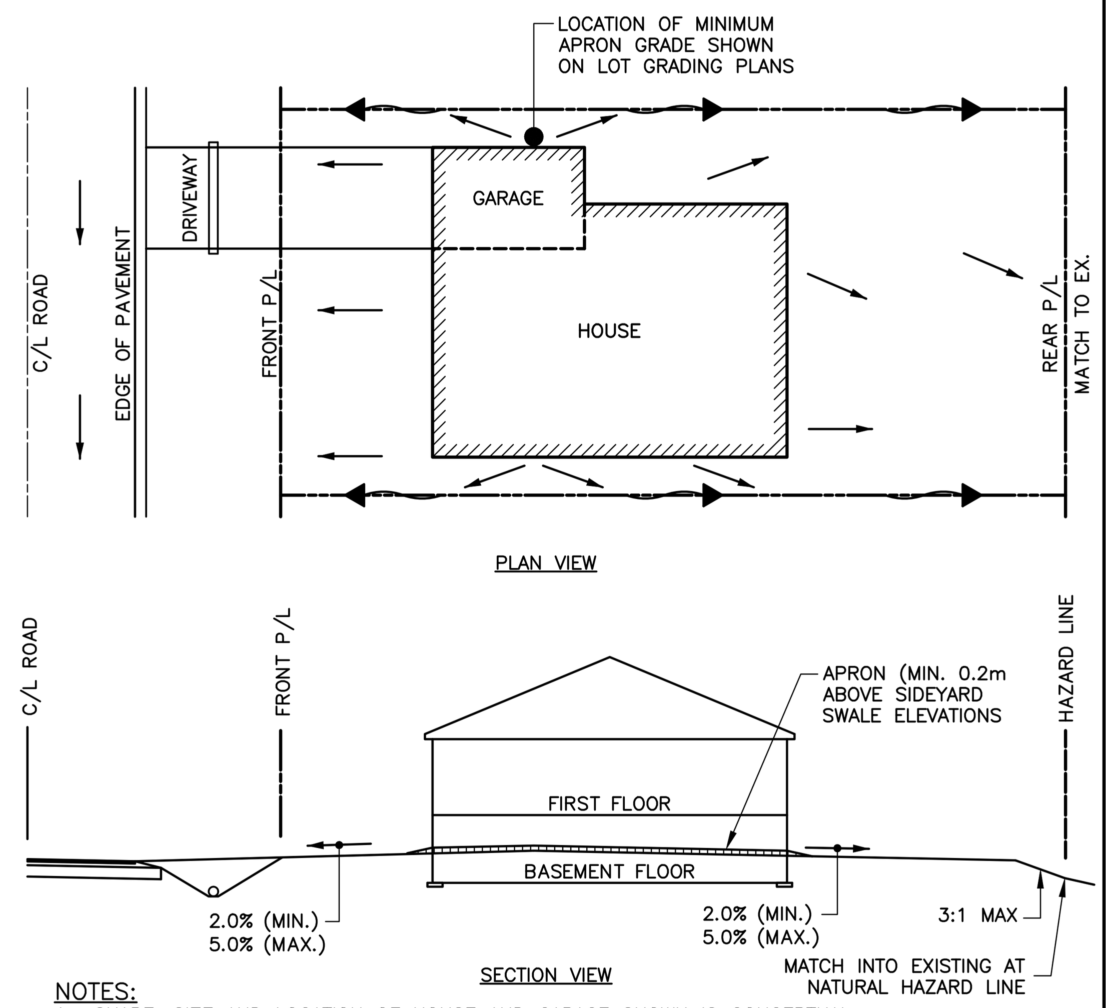
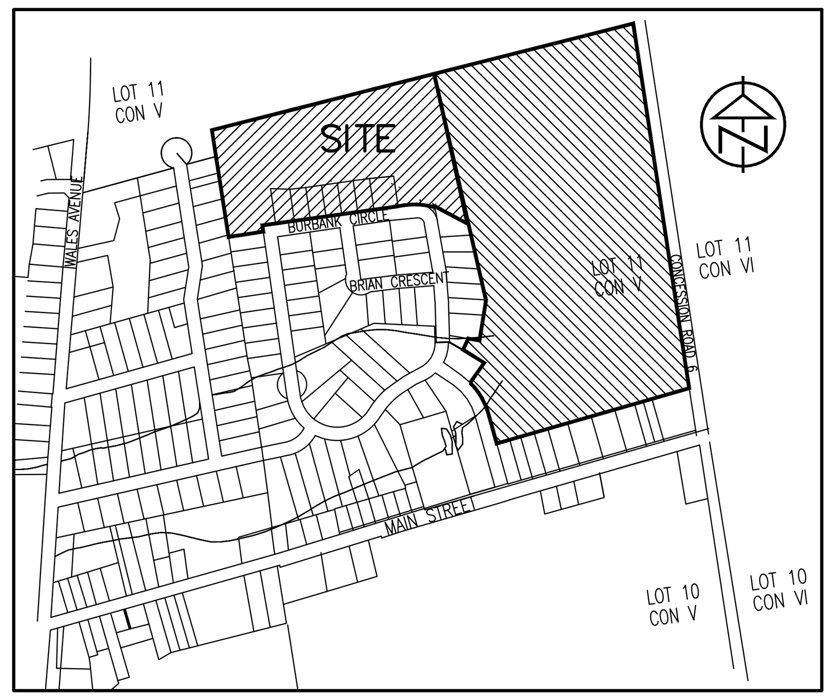
4. INDIVIDUAL LOT GRADING PLANS TO BE PREPARED AND APPROVED BY ENGINEER PRIOR TO CONSTRUCTION. CONTRACTOR TO REFER TO THE APPROVED PLAN FOR FINAL GRADING DETAILS.

TYPICAL SPLIT LOT DRAINAGE WITH ATTACHED GARAGE
TYPE – B
NTS

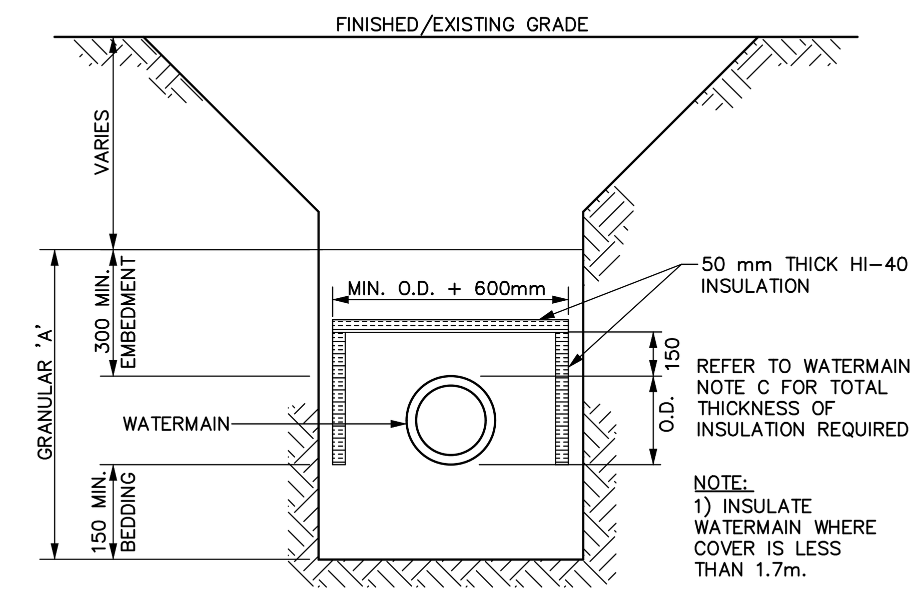


NOTES:
1. SHAPE, SIZE AND LOCATION OF HOUSE AND GARAGE SHOWN IS CONCEPTUAL.
2. DRIVEWAY AND GARAGE MAY BE ON OPPOSITE SIDE OF LOT.
3. SWALES ALONG THE REAR PROPERTY LINE ARE NOT REQUIRED WHERE CONTINUOUS POSITIVE DRAINAGE CAN BE ACHIEVED. ALTERNATIVE TREATMENT MAY BE REQUIRED FOR LOTS BACKING ONTO PARK BLOCKS OR ENVIRONMENTAL BUFFERS (I.E. RETAINING WALL OR SLOPE).
4. INDIVIDUAL LOT GRADING PLANS TO BE PREPARED AND APPROVED BY ENGINEER PRIOR TO CONSTRUCTION. CONTRACTOR TO REFER TO THE APPROVED PLAN FOR FINAL GRADING DETAILS.

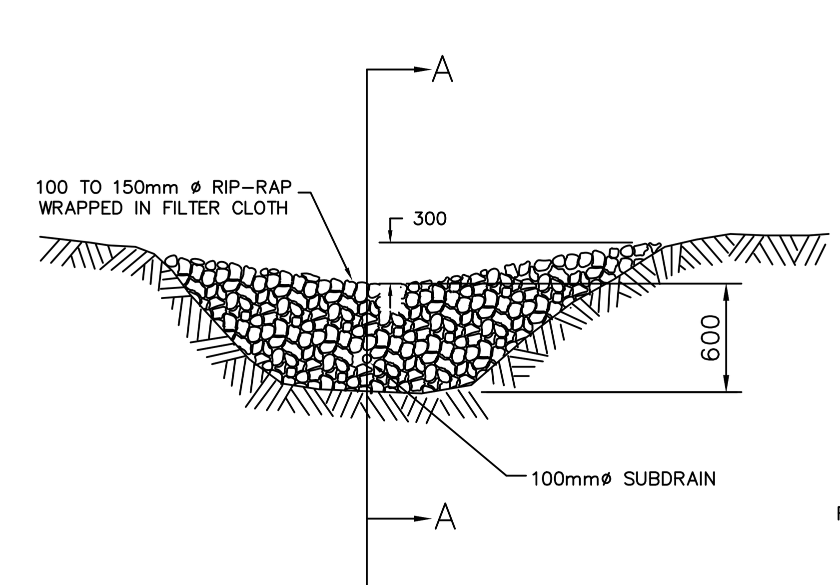
TYPICAL SPLIT LOT DRAINAGE WITH ATTACHED GARAGE
TYPE – C
NTS

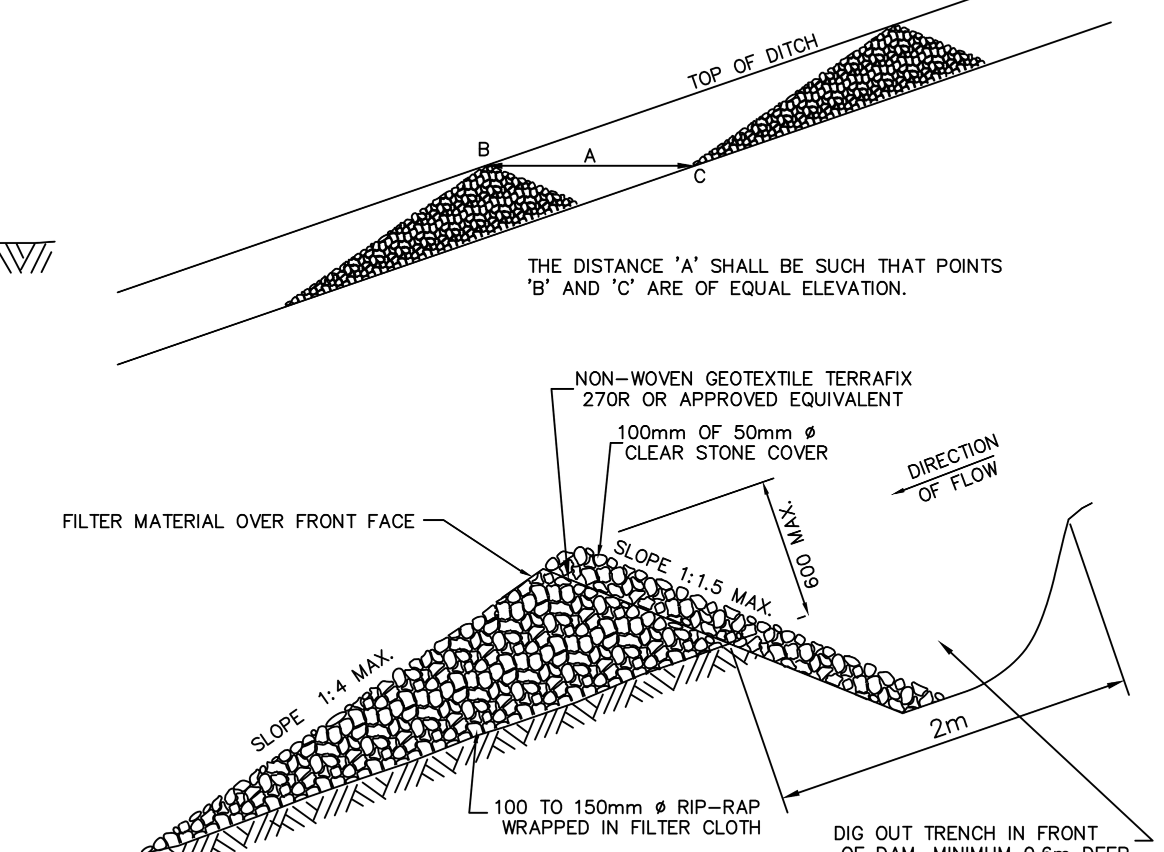


KEY PLAN
SCALE: NTS



TYPICAL WATERMAIN INSULATION DETAIL
NTS





SECTION A - A

NOTES:
1. SEDIMENT SHALL BE REMOVED AND TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA IN SUCH A MANNER THAT IT WILL NOT ERODE. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRS MADE AS NEEDED. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND WATER POLLUTION IS MINIMIZED.
2. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.

Nottawasaga Valley Conservation Authority

TYPICAL ROCK CHECK DAM
EROSION CONTROL DEVICE

NO.	REVISION	APR'D	DATE
1	TRENCH ADDED AND FABRIC EXTENDED INTO IT		2003.02.19

APR'D: | DATE: 92.05.15
DRAWN: L.A.J. | SCALE: N.T.S.

BSD-24 DRAFT

DISCLAIMER AND COPYRIGHT

CONTRACTOR MUST VERIFY ALL DIMENSIONS AND BE RESPONSIBLE FOR SAME. ANY DISCREPANCIES MUST BE REPORTED TO THE ENGINEER BEFORE COMMENCING WORK. DRAWINGS ARE NOT TO BE SCALED.

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ENGINEER STAMP

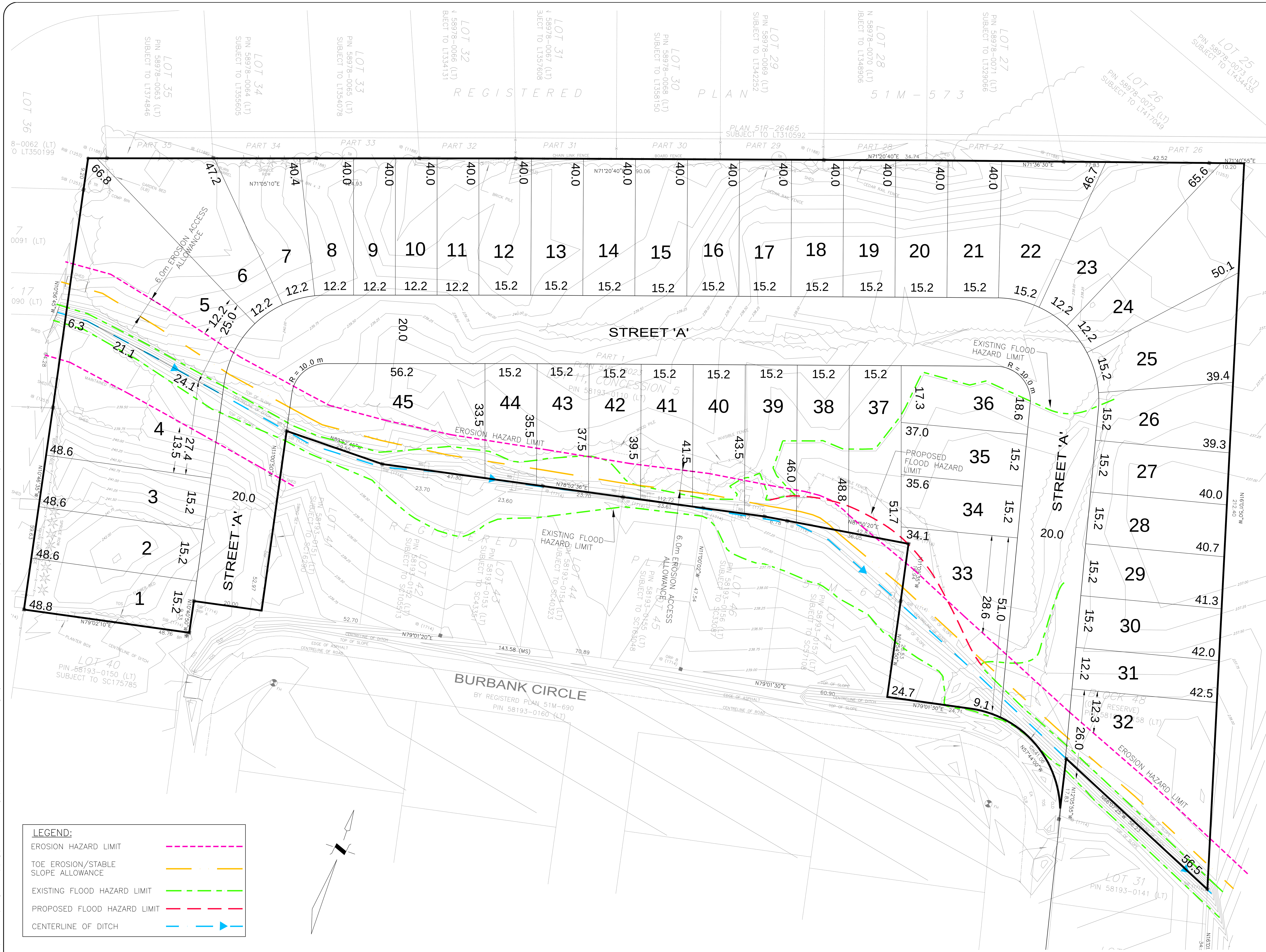
CUMAC SUBDIVISION - PH. 2
TOWNSHIP OF ADJALA-TOSORONTIO

TATHAM ENGINEERING

DETAILS AND NOTES

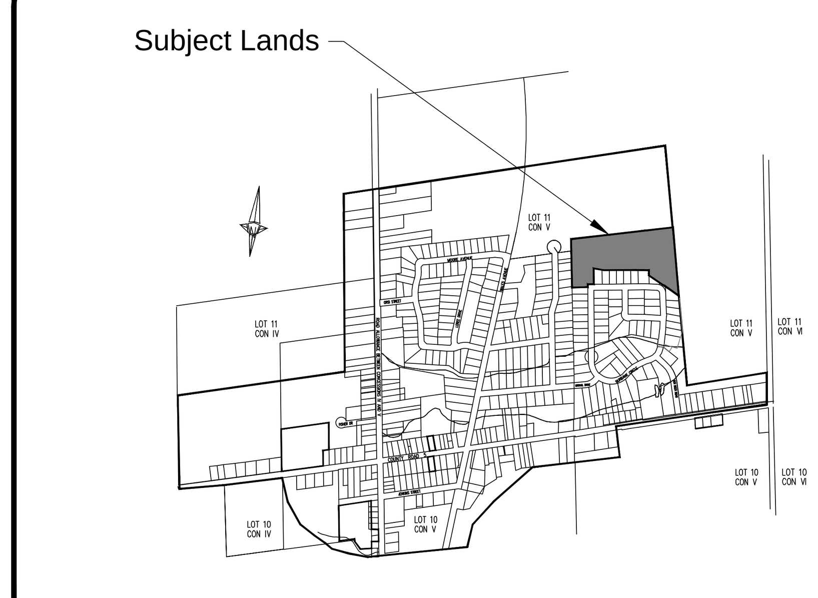
DESIGN: DDH	FILE: 116238	DWG:
DRAWN: SDH	DATE: MAR 2017	DE-1
CHECK: RS	SCALE: 1:750	

Drawing Name: 116238–DE01.dwg, Plotted: Nov 05, 2019



WINZEN CUMAC PHASE 2

TOWNSHIP OF ADJALA-TOSORONTIO



KEY PLAN SCALE 1:20,000

Draft Plan of Subdivision

Part of East Half Lot 11, Concession 5
Geographical Township of Tosorontio,
Now in the
Township of Adjala-Tosorontio
County of Simcoe
2017

OWNER'S CERTIFICATE

I, THE UNDERSIGNED, BEING THE REGISTERED OWNER OF THE SUBJECT LANDS, HEREBY AUTHORIZE THE JONES CONSULTING GROUP LTD., TO PREPARE THIS DRAFT PLAN OF SUBDIVISION AND TO SUBMIT SAME TO THE TOWNSHIP OF ADJALA-TOSORONTIO FOR APPROVAL.

DATE WINZEN DEVELOPMENTS INC.

SURVEYOR'S CERTIFICATE

I CERTIFY THAT THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED AND THEIR RELATIONSHIP TO ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN.

DATE RODNEY GEYER, OLS
ONTARIO LAND SURVEYOR

ADDITIONAL INFORMATION REQUIRED UNDER
SECTION 51(17) OF THE PLANNING ACT

a) SHOWN ON DRAFT PLAN
b) SHOWN ON DRAFT PLAN
c) SHOWN ON KEY PLAN
d) RESIDENTIAL,
e) SHOWN ON DRAFT PLAN
f) SHOWN ON DRAFT PLAN
g) SHOWN ON DRAFT PLAN
h) MUNICIPAL PIPED WATER TO BE PROVIDED
i) SANDY SILT
j) SHOWN ON DRAFT PLAN
k) ALL MUNICIPAL SERVICES TO BE PROVIDED
l) SHOWN ON DRAFT PLAN

SUBDIVISION STATISTICS	AREA (ha.)	UNITS
SINGLE RESIDENTIAL - 12.2m (LOTS 6-11, 23 & 24, 31 & 32)	0.81 ha.	10 units
SINGLE RESIDENTIAL - 15.2m (LOTS 1-5, 12-22, 25-30, & 33-45)	2.68 ha.	35 units
ROAD (STREET 'A')	0.83 ha.	
TOTAL	4.33 ha.	45 units

20 0 20 40 METRES
SCALE = 1:500 (A1)

WINZEN CUMAC PHASE 2

DRAFT PLAN OF SUBDIVISION

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SCHEDULE OF REVISIONS

DATE	DESCRIPTION	DRAWN

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