Report
Project: 125600-6.04.01

DESIGN BRIEF
4639 BANK STREET
CITY OF OTTAWA

Prepared for Glenview Homes
by IBI GROUP

August, 2020

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1 INTRODUCTION

IBI Group Professional Services Inc. (IBI Group) has been retained by Glenview Homes to provide professional engineering services for the preparation of detail design of the private services to support the ZBA and SPA for the parcel known as 4639 Bank St. The site is located in the Leitrim Area of Ottawa South. The subject site is approximately 1.2Ha and is bounded by Rotary Way to the North, existing residential to the south, Rotary facility to the east and Bank St. to the west. Refer to key plan on **Figure 1.1** for site location.

Figure 1.1 Site Location

The proposed development includes 6 stacked townhouse buildings with a total of 112 units. A copy of the proposed site plan and legal plan for this site are included in appendix A.

A pre-consultation meeting was held with City of Ottawa on September 12, 2019. No major servicing issues were noted at the meeting. City staff did note, SWM and servicing to follow the Sundance Village Ph1 servicing report. A copy of the meeting notes are included in appendix A. No pre-consultation meetings were requested from the Rideau Valley Conservation Authority (RVCA) or the Ontario Ministry of Environment, Conservation and Parks (MECP), as the services to support this development will connect to existing municipal infrastructure which was designed to accommodate the site.

2 WATER DISTRIBUTION

2.1 Existing Conditions

There is an existing 300mm watermain in Rotary Way to the north of the site, an existing 400mm watermain in Bank St to the west of the site. The proposed development was considered in the water model for the Sundance Village Phase 1 development, which is part of the overall Leitrim area water model.

2.2 Design Criteria

2.2.1 Water Demands

The site consists of 112 stacked townhouse units. Per unit population density and consumption rates are taken from **Tables 4.1** and **4.2** of the Ottawa Design Guidelines – Water Distribution and are summarized as follows:

- Single Family 3.4 person per unit
- Townhouse and Semi-Detached 2.7 person per unit
- Average Apartment 1.8 person per unit

- Average Day Demand 350 l/cap/day
- Peak Daily Demand 875 l/cap/day
- Peak Hour Demand 1,925 l/cap/day

A water demand calculation sheet is included in **Appendix A** and the total water demands are summarized as follows:

- Average Day 1.23 l/s
- Maximum Day 3.06 l/s
- Peak Hour 6.74 l/s

As the Leitrim Development Area has a population larger than 3,000 persons, the City of Ottawa has provided system level demands for large growth areas. The system level demands were used in the Draft 2015 report hydraulic analysis and is used in this analysis for all existing lands in the Leitrim Development Area. The system level demands are summarized in **Table 2.1**.

Table 2.1 – LDA Unit Water Demands

	AVERAGE (l/Unit/Day)	OUTDOOR WATER DEMAND (l/Unit/Day)	MAX. DAY (l/Unit/Day)	PEAK DAY (l/Unit/Day)*
Single Family	567	1049	Average + OWD	2.1 x Max Day
Townhouse (Medium Density)	558	0	Average	1.6 x Max Day
Apartment (High Density)	400	0	Average	1.6 x Max Day
Employee* (ICI)	85	0	Average	1.5 x Max Day
Water Loss per Connection	80	N/A	Average	Average

* 100 employees/hectare assumed for ICI land use

The City of Ottawa has also provided external water demand criteria for locations downstream of the LDA, summarized in **Table 2.2**.

Table 2.2 – External Water Demand Criteria for Locations Downstream of the LDA

LOCATION	CRITERIA
Carlsbad Trickle Feed	829 Dwelling Units
Existing South of FCV	200 Dwelling Units
Russell	11.8 MLD pumped over 20 hours

The Russell demand will be added to the average and maximum day demand, but will not be included in the peak hour calculations as the pumping is stopped during the peak hour period. Correspondence from the City of Ottawa regarding the LDA water demands is included in **Appendix A**.

2.2.2 System Pressures

The 2010 City of Ottawa Water Distribution Guidelines states that the preferred practice for design of a new distribution system is to have normal operating pressures range between 345 kPa (50 psi) and 552 kPa (80 psi) under maximum daily flow conditions. Other pressure criteria identified in the guidelines are as follows:

Minimum Pressure — Minimum system pressure under peak hour demand conditions shall not be less than 276 kPa (40 psi).

Fire Flow — During the period of maximum day demand, the system pressure shall not be less than 140 kPa (20 psi) during a fire flow event.

Maximum Pressure — Maximum pressure at any point in the distribution system in unoccupied areas shall not exceed 689 kPa (100 psi). In accordance with the Ontario Building/Plumbing Code the maximum pressure should not exceed 552 kPa (80 psi) in occupied areas. Pressure reduction controls may be required for buildings where it is not possible/feasible to maintain the system pressure below 552 kPa.

2.2.3 Fire Flow Rate

The site consists of six blocks of stacked townhouses. Fire Underwriters Survey (FUS) calculations have been carried out on Building 1 which is adjacent to Rotary Way, Building 3 which is representative of the four buildings in the middle of the site with largest floor area, and Building 4 at the south end of the site. The FUS calculations are included in **Appendix A** and summerized as follows:

Building 1	13,000 l/min (216.7 l/s)
Building 3	16,000 l/min (266.7 l/s)
Building 4	12,000 l/min (200.0 l/s)

2.2.4 Hydraulic Model

A computer model for the Leitrim development area water distribution system has been developed using the Info Water 12.4 program. The source of water is the Ottawa South Pumping Station (OSPS) which is located approximately 1 km north of Leitrim Road adjacent to the future rapid rail transit corridor.

The City of Ottawa has been supplying potable water to the Leitrim area for decades. Over the years the City has made modifications and improvements to the delivery network. The Gloucester South Pump Station was decommissioned in 2005 and the Ottawa South Pumping Station (OSPS) were brought into service in 2001. The latter facility is currently delivering water to the downstream customers at the hydraulic grade line of about 155 m.

In an effort to better integrate the downstream areas including Riverside South, Longfields/Davidson Heights in Barrhaven and Leitrim, the City is planning to lower the hydraulic grade line at the Ottawa South station to about 146 m. For the hydraulic analysis of the water distribution system, a hydraulic boundary condition has been provided by the City at Leitrim Road and the rail corridor at the northwest corner of the LDA. A hydraulic grade line elevation of 144 meters is to be used for peak hour and maximum day plus fire analysis which represents the 146 meter level at the OSPS and the demands from the Riverside South community. For average day analysis the current level of 155 meters at the OSPS will be applied at the boundary condition to determine the maximum pressure in the water system. Correspondence from the City of Ottawa concerning boundary conditions is included in **Appendix A**.

2.3 Proposed Water Plan

The site is serviced by a proposed 250 mm diameter watermain which will connect to the existing 300 mm diameter watermain on Rotary Way and the existing 400 mm diameter watermain on Bank Street. As each unit requires an individual water service a combination of 100 mm and 50 mm diameter are proposed to reach all the units. Three fire hydrants are proposed to provide the required coverage to the buildings, there is an existing hydrant on Rotary Way adjacent to Building 1.

The hydrant model was run under average day (max HGL), to evaluate fire flows and peak hour (min HGL). The model is run for the Leitrim development area. The results of the hydraulic analysis is included in **Appendix A** and summarized for the site as follows:

Basic Day (Max HGL) Pressure (kPa)	453.8 – 460.3
Basic Day maximum Water Age (hrs)	22.8
Peak Hour Pressure (kPa)	332.7 – 339.9
Design Fire Flow @ 140 kPa Residual Pressure (l/s)	261.1 – 296.3

A comparison of the results and design criteria is summarized as follows:

Maximum Pressure	Under Basic Day using the HGL of 155 m at the OSPS there are no areas in which the pressure exceeds 552 kPa (80 psi) therefore pressure reducing control is not required for this site. There is no area where the pressure exceeds the maximum level of 689 kPa (100 psi) in unoccupied areas.
Water Age	The water age is calculated from the boundary condition at Leitrim and the rail corridor. The highest water age is 22.8 hours (0.95 days) from the boundary condition. While the water age is adequate under basic day conditions, the age may be a concern during the early stage of house construction due to low demand. Should water quality become a concern, an automatic flushing unit in accordance with City Detail W3.2 can be installed on the water system in order to increase circulation.
Minimum Pressure	The lowest minimum pressure during peak hour conditions is 332.7 kPa which exceeds the minimum 276 kPa (40 psi) requirement.
Fire Flow	The design fire flow at the three hydrant locations vary from 261.1 to 278.0 l/s while the design fire flow at the hydrant location on Rotary Way is 293.3 l/s. The highest fire flow demand is 266.7 l/s (16,000 l/min) per Section 2.2.3 which is very close to lowest design flow of 261.1 l/s. Technical Bulletin IS7B-2018-02 states that a Class A-A hydrant can contribute 5,700 l/min within 75 m of a building and 3,800 l/min within 150 m from a building. Buildings 1, 2, 3, 5 and 6 are within 75m of three hydrants for a combined fire flow of 17,000 l/min (285 l/s) which exceeds the fire flow requirement for Building 3 of 16,000 l/min (266.7 l/s). Building 4 has two hydrants within 75 m and one within 150 m for a combined fire flow of 15,200 l/min (253.3 l/s) which exceeds the 12,000 l/min (200 l/s) required for Building 4.

3 WASTEWATER

3.1 Existing Conditions

The Leitrim Pump Station is the wastewater outlet for all developed lands within the LDA, including the subject property. In 2002, the City constructed the station, associated forcemains and outlet sewers in Bank Street and Conroy Road. Sewage from the LDA outlets to the Conroy Road Trunk Sewer eventually discharging to a sewage treatment plant located near the Ottawa River. The Sundance Village Phase 1 report prepared by IBI Group included the subject property when designing the downstream sewers.

3.1.1 Verification of Existing Sanitary Sewer Capacity

There is an existing 200mm sanitary sewer in Rotary Way which will service this property, that sewer connects to the existing 200mm sanitary sewer in Fairweather St, then to the 375 mm diameter sub-trunk sewer in Finley Creek Drive. In the previous Sundance Village Phase 1 report, the subject property was zoned for commercial use and a peak design flow of 1.47l/s a copy of he design sheet is included in appendix A. A review of those design sheets notes the minimum available spare capacity along the downstream sewer is 15.18 l/s. The proposed usage for this block is being changed to meet market conditions and it is now proposed to be residential with 112 urban flat units. Utilizing the City of Ottawa new design criteria of 280 liter per capita per day and 2.7 ppu and infiltration allowance of 0.33 l/s/Ha, the calculated sanitary flow rate is 3.76 l/s, which is greater than the 1.47 l/s in the original design for this block. However as noted previously the system was designed with a minimum 15.18 l/s spare capacity, the additional 2.29l/s can be accommodated within that spare capacity; therefore, the existing sanitary sewer has adequate capacity for the subject site, and there will be no negative effect to the downstream sanitary system.

3.2 Proposed Sewers

All on-site sewers have been designed to City of Ottawa and MOE design criteria which include but are not limited to the below listed criteria. A copy of the detailed sanitary tributary area plan 400 and the sanitary sewer design sheets are included in **Appendix B** illustrate the population densities and sewers which provide the necessary outlets, the general plan in appendix A illustrates the proposed layout of the sanitary sewer system.

3.2.1 Design Flow:

Average Residential Flow	-	280 l/cap/day
Peak Residential Factor	-	Harmon Formula
Infiltration Allowance	-	0.33 l/sec/Ha
Minimum Pipe Size	-	200mm diameter

3.2.2 Population Density:

Single Family	-	3.4 person/unit
Townhouse Units	-	2.7 person/unit
Apartment Units	-	1.8 person/unit
External Low Density Land	-	120 units/gross Ha

4 SITE STORMWATER MANAGEMENT

4.1 Objective

The purpose of this evaluation is to prepare the dual drainage design, including the minor and major system, for the proposed development. The design includes the assignment of inlet control devices, on-site storage, maximum depth of surface ponding and hydraulic grade line analysis. The evaluation takes into consideration the City of Ottawa Sewer Design Guidelines (OSDG) (October 2012), the February 2014 Technical Bulletin ISDTB-2014-01, the September 2016 Technical Bulletin PIEDTB-2016-01 and the June 2018 Technical Bulletin ISTB-2018-04.

4.2 Design Criteria

The stormwater system was designed following the principles of dual drainage, making accommodations for both major and minor flow.

Some of the key criteria include the following:

- Design Storm — 1:2 year return (Ottawa)
- Rational Method Sewer Sizing
- Initial Time of Concentration — 10 minutes
- Runoff Coefficients
  - Landscaped Areas — C = 0.2
  - Landscaped Area with Pathway — C = 0.5
  - Building and Roof Area — C = 0.9
  - Parking Area and Driveway — C = 0.9
- Pipe Velocities — 0.80 m/s to 3.0 m/s
- Minimum Pipe Size — 250 mm diameter (200 mm CB Leads)

4.3 System Concept

According to the Sundance Village Phase 1 report prepared by IBI Group, the development of the adjacent downstream properties included the expected stormwater servicing needs of the subject property. The existing storm sewers constructed adjacent to the site were oversized to provide the needed capacity for minor storm runoff from the subject site. Minor storm runoff from the subject site will connect to the existing 600 mmØ sewer along Rotary Way. See appendix D for Sundance Village Ph 1 sewer design sheet, and tributary area plan.

4.3.1 Dual Drainage Design

The dual drainage system proposed for the subject site will accommodate both major and minor stormwater runoff. Minor flow from the subject site will be conveyed through the storm sewer network and discharge into the existing 600 mmØ sewer in Rotary Way.

The surface flow not captured by the minor system during rainfalls more than the 1:100yr event will be conveyed via the major system. Storage will be provided in subsurface storage facility (Stormtech units) sized to accommodate the 1:100yr rainfall events, to this end no ponding during the 1:2 year event will occur. If the maximum storage is utilized or if the inlet is blocked, the excess flow will cascade to the next downstream sag. Major flow up to 100-year storm event will

be restricted and detained on-site, except a small area fronting Bank St.. Emergency overflow will be directed towards Rotary Way and Bank St.

4.3.2 Proposed Minor System

Using the criteria identified in Section 4.2, the proposed on-site storm sewers were sized accordingly. A detailed storm sewer design sheet and the associated storm sewer drainage area plan is included in **Appendix C**. The general plan of services, depicting all on-site storm sewers can be found in **Appendix A**.

The owner of the site will be responsible for regular maintenance of the on-site sewers, catch basins, storage chambers and inlet control devices (ICDs). Maintenance includes but is not limited to the cost of regular cleaning of the structures and ICDs as necessary. The site owner will also be responsible for replacement of damaged or missing catch basin structures, grates or ICDs as needed.

4.4 Stormwater Management

4.4.1 Water Quality Control

The subject site is part of the larger Sundance Village development where an end of pipe quality control Storm Water Management facility has been constructed and is operational.

4.4.2 Water Quantity Control

Based on the Sundance Village Phase 1 design report the subject site will be limited to a maximum minor system release rate of 85 L/s/Ha for the 1.28 Ha area, which this equates to 108.8 l/s into the existing Rotary Way storm sewer system. This will be achieved through a combination of inlet control devices (ICD's) at inlet locations and underground storage facilities will accommodate the storage of runoff up to the 1:100yr rainfall event.

Surface flows in excess of the site's allowable release rate will be stored in strategic subsurface storage facilities and gradually released into the minor system to respect the site's allowable release rate. Due to the proposed sloped roofs, and relatively flat site grading roof top or surface storage are not being utilized. The proposed storage system is an underground storage system SteormTech (or approved equal), it has been sized to accommodate the design volume up to the 1:100yr event. However should an inlet be blocked or during extreme events the maximum surface ponding depth located within the developed areas will be limited to less than 300mm. Overland flow routes are provided to permit emergency overland flow away from buildings and out to the adjacent ROW. A copy of Stormtech info sheet for the model SC3500 is included in appendix C.

Along a portion of the sites western limits the opportunity to capture and store runoff is limited due to grading constraints and building geometry, these areas total approximately 0.1ha. Given under predevelopment conditions the entire 1.28 Ha site drained to the Bank St ditch it is anticipated the post development flow will not have a negative impact on the downstream system.

The Modified Rational Method (MRM) was used to determine the volume, since the storage is subsurface, the release rate used in calculating the storage volume was reduced by 50% per City requirements, the MRM spreadsheet is included appendix D and illustrates the required volume for each cell and required release rate, and is summarized in the table below.

DRAINAGE AREA #	STORAGE REQUIRED (M^3)	STORAGE PROVIDED (M^3)	ICD LOCATION (MH #)	RELEASE RATE (L/S)	HEAD (M)
1	29.9	31.66	8	8.57	2.68
2/3	43.4	47.60	9	13.97	2.93
4	41.1	41.2	10	11.78	2.96
5/6	98.56	104.10	11	30.72	2.86
7	63.53	65.10	13	18.2	3.01
8	51.11	52.0	12	15.93	2.95
9	28.55	30.30	14	9.64	2.80
TOTAL	**356.15**	**371.96**		**108.81**	

5 SOURCE CONTROLS

5.1 General

On site level or source control management of runoff will be provided to provide quality control for the subject lands. Such controls or mitigative measures are proposed for the development not only for final development but also during construction and build out. Some of these measures are:

- flat lot grading;
- split lot drainage;
- Roof-leaders to vegetated areas;
- vegetation planting; and
- groundwater recharge.

5.2 Lot Grading

The proposed building type lends itself to a flat site where landscaped areas will be directed into a swale drainage system which connects to the storm sewer system. Typically swales will have slopes of 2%, however where subdrains are present the slopes are reduced to 1% to promote infiltration.

5.3 Roof Leaders

This development will consist of stacked homes and apartments. It is proposed that roof leaders from these units be constructed such that runoff is directed to landscaped areas adjacent to the units. This will promote water quality treatment through settling, absorption, filtration and infiltration and a slow release rate to the conveyance network.

5.4 Vegetation

As with most site plan agreements, the developer will be required to complete a vegetation and planting program. Vegetation throughout the development including planting along roadsides and within private site will provide some opportunities to re-create lost natural habitat.

6 CONVEYANCE CONTROLS

6.1 General

Besides source controls, the development also proposes to use several conveyance control measures to improve runoff quality. These will include:

- flat vegetated swales;
- catchbasin and maintenance hole sumps; and
- pervious rear yard drainage.

6.2 Flat Vegetated Swales

The development will make use of relatively flat vegetated swales where possible to encourage infiltration and runoff treatment.

6.3 Catchbasins

All catchbasins within the development, either rear yard or street, will be constructed with minimum 600 mm deep sumps. These sumps trap pollutants, sand, grit and debris which can be mechanically removed prior to being flushed into the minor pipe system. Both rear yard and street catchbasins will be fabricated to OPSD 705.010 or 705.020. All storm sewer maintenance holes servicing local sewers less than 900 mm diameter shall be constructed with a 300 mm sump as per City standards.

6.4 Pervious Landscaped Area Drainage

Some of the landscaped area swales make use of a filter wrapped perforated drainage pipe constructed below the rear yard swale. This perforated system is designed to provide some ground water recharge and generally reduce both volumetric and pollutant loadings that enter the minor pipe system.

7 SEDIMENT AND EROSION CONTROL PLAN

7.1 General

During construction, existing stream and conveyance systems can be exposed to significant sediment loadings. Although construction is only a temporary situation, it is proposed to introduce a number of mitigative construction techniques to reduce unnecessary construction sediment loadings. These will include:

- groundwater in trench will be pumped into a filter mechanism prior to release to the environment;
- bulkhead barriers will be installed at the nearest downstream manhole in each sewer which connects to an existing downstream sewer;
- seepage barriers will be constructed in any temporary drainage ditches; and
- silt sacks will remain on open surface structure such as manholes and catchbasins until these structures are commissioned and put into use.

A copy of the Sediment and Erosion Control Plan is included in Appendix D

7.2 Trench Dewatering

During construction of municipal services, any trench dewatering using pumps will be discharged into a filter trap made up of geotextile filters and straw bales similar in design to the OPSD 219.240 Dewatering Trap. These will be constructed in a bowl shape with the fabric forming the bottom and the straw bales forming the sides. Any pumped groundwater will be filtered prior to release to the existing surface runoff. The contractor will inspect and maintain the filters as needed including sediment removal and disposal and material replacement as needed.

7.3 Bulkhead Barriers

At the first manhole constructed immediately upstream of an existing sewer, a ½ diameter bulkhead will be constructed over the lower half of the outletting sewer. This bulkhead will trap any sediment carrying flows, thus preventing any construction –related contamination of existing sewers. The bulkheads will be inspected and maintained including periodic sediment removal as needed.

7.4 Seepage Barriers

These barriers will consist of both the Light Duty Straw Bale Barrier as per OPSD 219.100 or the Light Duty Silt Fence Barrier as per OPSD 219.110 and will be installed in accordance with the sediment and erosion control drawing. The barriers are typically made of layers of straw bales or geotextile fabric staked in place. All seepage barriers will be inspected and maintained as needed.

7.5 Surface Structure Filters

All catchbasins, and to a lesser degree manholes, convey surface water to sewers. However, until the surrounding surface has been completed these structures will be covered to prevent sediment from entering the minor storm sewer system. Until rear yards are sodded or until streets are asphalted and curbed, all catchbasins and manholes will be equipped with geotextile filter socks. These will stay in place and be maintained during construction and build until it is appropriate to remove them.

7.6 Stockpile Management

During construction of any development similar to that being proposed both imported and native soils are stockpiled. Mitigative measures and proper management to prevent these materials entering the sewer systems is needed.

During construction of the deeper municipal services, water, sewers and service connections, imported granular bedding materials are temporarily stockpiled on site. These materials are however quickly used up and generally before any catchbasins are installed. Street catchbasins are installed at the time of roadway construction and rearyard catchbasins are usually installed after base course asphalt is placed.

Contamination of the environment as a result of stockpiling of imported construction materials is generally not a concern since these materials are quickly used and the mitigative measures stated previously, especially the use of filter fabric in catchbasins and manholes help to manage these concerns.

The roadway granular materials are not stockpiled on site. They are immediately placed in the roadway and have little opportunity of contamination. Lot grading sometimes generates stockpiles of native materials. However, this is only a temporary event since the materials are quickly moved off site.

8 ROADS AND NOISE ATTENUATION

Vehicular access to the site is provided by a private entrance from Rotary Way.

There are 146 proposed surface parking spots within the private site.

Environmental noise has been evaluated by IBI Group, and recommendations are provided under a separate cover.

9 SOILS

Golder Associates Ltd. was retained to prepare a geotechnical investigation for the proposed development. The objectives of the investigation were to prepare a report to:

- Determine the subsoil and groundwater conditions at the site by means of test pits and boreholes and;
- To provide geotechnical recommendations pertaining to design of the proposed development including construction considerations.

The geotechnical report 19128449 was prepared by Golder Associates Ltd. in October 2019. A copy of the report is included in **Appendix D**. The report contains recommendations which include but are not limited to the following:

- There is no practical restriction to thickness of grade raise on this site.
- Fill placed below the foundations to meet OPSS Granular ‘B’ Type II placed in 300 mm lifts compacted to 95% SPMDD.
- Fill for roads to be suitable native material or OPSS Select Subgrade Material placed in 300mm lifts compared to 95% SPMDD

Pavement Structure:

CAR PARKING AREAS	THICKNESS
Asphaltic Concrete (Superpave 12.5)	50mm
OPSS Granular A Base	150mm
OPSS Granular B Type II Subbase	300mm

ACCESS AND TRUCK LANES	THICKNESS
Asphaltic Concrete (Superpave 12.5)	40mm
Asphaltic Concrete (Superpave 19.0)	50mm
OPSS Granular A Base	150mm
OPSS Granular B Type II Subbase	450mm

- Pipe bedding and cover; bedding to be minimum 150 mm OPSS Granular 'A' up to spring line of pipe. Cover to be 300 mm OPSS A (PUC and concrete pipes) or sand for concrete pipes. Both bedding and cover to be placed in maximum 225 mm lifts compacted to 95% SPMDD.

A copy of the grading plan is included in **Appendix D**, along with topographic survey from JD Barnes.

10 RECOMMENDATIONS

Water, wastewater and stormwater systems required to service 4639 Bank St are available and exiting adjacent to the site, and are of sufficient capacity to service the proposed usage under the ZBA. All onsite services will be designed in accordance with MOE and City of Ottawa's current level of service requirements, to satisfy SPA.

The use of lot level controls, conveyance controls and end of pipe controls outlined in the report will result in effective treatment of surface stormwater runoff from the site. Adherence to the proposed sediment and erosion control plan during construction will minimize harmful impacts on surface water.

Final detail design will be subject to governmental approval prior to construction, including but not limited to the following:

- ZBA: City of Ottawa
- Commence Work Order: City of Ottawa
- ECA (sewers): MECP (Transfer of Review)
- Watermain Approval: City of Ottawa
- Commence Work Order (utilities): City of Ottawa

Report prepared by:

Demetrius Yannoulopoulos, P.Eng.
Director

APPENDIX A

Glenview Homes Site Plan by M. David Blakely Architects
JD Barnes Plan of Survey
Water Distribution Model
125600-001 General Plan of Services

4639 Bank Street
Meeting Summary Notes
Sept 12, 2019, Ottawa City Hall

Attendees:

- Michael Michaud, Glenview Homes
- Jake Shabinsky, Glenview Homes
- Matt McElligott, Fotenn Consultants
- Josiane Gervais, Transportation Project Manager, City of Ottawa
- Brad Wright, South Nation
- Golam Sharif, Project Manager, City of Ottawa
- Christopher Moise, Urban Designer, Architect, City of Ottawa
- Tracey Scaramozzino, File Lead, Planner, City of Ottawa

Issue of Discussion:

- Rezoning from Development Reserve to General Mixed-Use
- Site Plan for 96 Back-to-back Stacked Residential Units

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1. **Official Plan -** designated “General Urban Area”.

2. **Secondary Plan/CDP –** Leitrim CDP – “Mixed-Use”

3. **Zoning Information –** currently zoned “DR”

4. **Infrastructure/Servicing (Golam Sharif):**

- SWM and servicing criteria for this site is outlined in the Sundance Village Phase 1 Servicing Report.
- This lot should receive services through its Rotary Drive frontage. On Bank, the sanitary sewers are forcemains and the water service is a trunk. There is no storm sewer on Bank.
- Existing stubs were left at the property on the Rotary frontage. Ideally, these stubs would be used.
- Plans and Report: Servicing and Stormwater Management Report, Geotech report, Noise report (if needed), Servicing plan, drainage plan, grading plan, SWM plan, erosion and sediment control plan.

5. Initial Planning (Tracey Scaramozzino):

- Ensure proposal complies with CDP for mixed-use designation/label
- We would like to see this as mixed-use development
- If mixed-use isn’t viable at this time, provide an intensification plan to show how it will evolve over time with additions to/ new bldgs. Another possible solution would be to construct the buildings with a higher floor-ceiling height on the ground floor to allow these units to be converted to commercial uses over time**.**

6. Initial Design Comments (Christopher Moise):

- As the condition along Bank Street will be a sensitive one, we recommend that some attention be put towards how the project can mitigate the negative impact of highway speeds for residents accessing units facing the street;
- If a mixed-use building is more desirable in this location, but can not be accommodated in the short term, we recommend efforts be made to allow a future retro-fit be possible by having grade related access and higher ground floor ceiling heights;
- Site amenity space should be indicated and protected from Bank street;
- Large areas of asphalt should be broken up by green space and pedestrian access across the site;

7. Parks

- Cash-in-lieu of parkland will be required up to a maximum of 10% of the land value.

8. Conservation Authority (Brad Wright, South Nation):

- Stormwater quantity: post-development flows to equal pre-development flows

- Stormwater quality: 80% total suspended solids removal
- Watercourses: A desktop review indicates that no watercourses were found located on the subject property
- Please note that SNC has recently updated technical review fee charges. A flat fee is charged for the 1st submission, and an hourly technical review fee is charged for subsequent reviews.

9. Transportation (Josiane Gervais)

- Follow Traffic Impact Assessment Guidelines
    - Traffic Impact Assessment will be required due to number of proposed units.
    - The process is iterative and should be commenced asap. An application cannot be deemed complete until the submission of the draft step 1-4, including the functional draft RMA package (if applicable) and/or monitoring report (if applicable).
    - Request base mapping asap if RMA is required. Contact Engineering Services (https://ottawa.ca/en/city-hall/planning-and-development/engineering-services)

10. Noise Impact Study would be required for the following:
    - Road
    - Stationary, if there will be any exposed mechanical equipment due to the proximity to neighboring noise sensitive land uses.

As a follow-up to the questions raised:

11. There is no defined construction year for the Bank Street widening project as of yet. As was mentioned at the meeting, the widening is identified for the 2020-2025 horizon as part of the TMP.
12. The plans for the widening project are not yet finalized.
13. Note that if the proposed site is planned to be constructed before the widening of Bank Street takes place, the RI/RO access off Bank Street proposed on the concept plan would require modification to only allow RI/RO movements. If opening day of the proposed site is after Bank Street widening takes place, this would be a non-issue, as the new Bank Street cross-section would provide for a raised median.
14. The approved 'typical' cross-sections for City arterials are located at the following link: https://documents.ottawa.ca/sites/documents/files/arterial_road_xsections_en.pdf

Technical requirements to keep in mind while preparing the site plan:

15. ROW protection on Bank between Leitrim and Analdea is 44.5m even. (Official Plan Annex 1)
16. Corner triangles as per OP Annex 1 - Road Classification and Rights-of-Way at the following locations on the final plan will be required (no structure above or below this triangle):
    - Collector Road to Arterial Road: 5 m x 5 m, measured on the property line/ROW protected line
17. Sight triangle as per Zoning by-law (Section 57) is 6 m x 6 m, measured on the curb line.

18. Clear throat requirements for apartments that are <100 units are:
    - For an arterial (i.e. Bank Street): 15m, if providing the access off Bank Street as a right-in/right-out, this requirement must still be met. The throat length for the access on Bank Street would be measured from the widened roadway property line.
    - For a collector (i.e. Rotary Way): 8m.
19. On site plan:
    - Show all details of the roads abutting the site up to and including the opposite curb; include such items as pavement markings, accesses and/or sidewalks.
    - Turning templates will be required for all accesses showing the largest vehicle to access the site; required for internal movements and at all access (entering and exiting and going in both directions).
    - Show all curb radii measurements; ensure that all curb radii are reduced as much as possible
    - Show lane/aisle widths.
    - Sidewalk is to be continuous across access as per City Specification 7.1.
    - Grey out any area that will not be impacted by this application.

20. Waste Collection

- Please see City's Waste Management Guidelines for multi-unit residential: http://ottawa.ca/calendar/ottawa/citycouncil/pec/2012/11-13/Solid%20Waste%20Collection%20Guidelines%20-%20Doc%201.pdf

21. Process/Required Applications

- Zoning By-law Amendment, Major
- Site Plan, Complex, Public, Manager Approval
- Please name electronic files in the following format:
    1. June XX, Street Address, Landscape
    2. June XX, Street Address, SWM

    Etc Etc

22. General Information

- Please ensure the zoning table on the site plan is in the following format. Ensure that all zoning provisions and rates are shown and differentiate those that require a re-zoning or variance.

ZONING INFORMATION: MC16		
PROPOSED 8 STOREY BUILDING (MID-RISE APARTMENT)		
	REQUIRED	PROPOSED
MINIMUM LOT WIDTH	NO MINIMUM	27.824m
MINIMUM LOT AREA	NO MINIMUM	881.37m²
MINIMUM BUILDING HEIGHT	6.7	27m
MAXIMUM BUILDING HEIGHT	27m	27m
MINIMUM FRONT YARD SETBACK	NO MINIMUM	2m
MINIMUM CORNER SIDE YARD SETBACK	N/A	N/A
MINIMUM REAR YARD SETBACK	3m & 7.5 ABOVE 3RD FLOOR	3m & 7.5 ABOVE 3RD FLOOR
MINIMUM INTERIOR SIDE YARD SETBACK	NO MINIMUM	0.6m & 2.44m
Parking Rate		
Motor Vehicle	NO	14 spaces
Bicycle Parking (0.5/unit)	26 spaces	27 spaces

- Ensure that all plans and studies are prepared as per City guidelines – as available online…
  https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans

Servicing study guidelines for development applications

4. Development Servicing Study Checklist

The following section describes the checklist of the required content of servicing studies. It is expected that the proponent will address each one of the following items for the study to be deemed complete and ready for review by City of Ottawa Infrastructure Approvals staff.

The level of required detail in the Servicing Study will increase depending on the type of application. For example, for Official Plan amendments and re-zoning applications, the main issues will be to determine the capacity requirements for the proposed change in land use and confirm this against the existing capacity constraint, and to define the solutions, phasing of works and the financing of works to address the capacity constraint. For subdivisions and site plans, the above will be required with additional detailed information supporting the servicing within the development boundary.

4.1 General Content

- ☐ Executive Summary (for larger reports only).
- ☒ Date and revision number of the report.
- ☒ Location map and plan showing municipal address, boundary, and layout of proposed development.
- ☒ Plan showing the site and location of all existing services.
- ☒ Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.
- ☒ Summary of Pre-consultation Meetings with City and other approval agencies.
- ☒ Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.
- ☒ Statement of objectives and servicing criteria.
- ☒ Identification of existing and proposed infrastructure available in the immediate area.
- ☐ Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).
- ☒ Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.
- ☐ Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.
- ☐ Proposed phasing of the development, if applicable.

☒ Reference to geotechnical studies and recommendations concerning servicing.

☒ All preliminary and formal site plan submissions should have the following information:
- Metric scale
- North arrow (including construction North)
- Key plan
- Name and contact information of applicant and property owner
- Property limits including bearings and dimensions
- Existing and proposed structures and parking areas
- Easements, road widening and rights-of-way
- Adjacent street names

4.2 Development Servicing Report: Water

☒ Confirm consistency with Master Servicing Study, if available
☒ Availability of public infrastructure to service proposed development
☒ Identification of system constraints
☒ Identify boundary conditions
☒ Confirmation of adequate domestic supply and pressure
☒ Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.
☒ Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.
☐ Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design
☒ Address reliability requirements such as appropriate location of shut-off valves
☒ Check on the necessity of a pressure zone boundary modification.
☒ Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range

- ☒ Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.
- ☐ Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.
- ☒ Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.
- ☒ Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.

4.3 Development Servicing Report: Wastewater

- ☒ Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).
- ☒ Confirm consistency with Master Servicing Study and/or justifications for deviations.
- ☐ Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.
- ☒ Description of existing sanitary sewer available for discharge of wastewater from proposed development.
- ☒ Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)
- ☒ Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix ‘C’) format.
- ☒ Description of proposed sewer network including sewers, pumping stations, and forcemains.
- ☐ Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).
- ☐ Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.
- ☐ Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.
- ☐ Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.
- ☐ Special considerations such as contamination, corrosive environment etc.

4.4 Development Servicing Report: Stormwater Checklist

- ☒ Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)
- ☒ Analysis of available capacity in existing public infrastructure.
- ☒ A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.
- ☒ Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.
- ☒ Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.
- ☒ Description of the stormwater management concept with facility locations and descriptions with references and supporting information.
- ☐ Set-back from private sewage disposal systems.
- ☐ Watercourse and hazard lands setbacks.
- ☐ Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.
- ☒ Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.
- ☒ Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).
- ☐ Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.
- ☐ Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.
- ☐ Any proposed diversion of drainage catchment areas from one outlet to another.
- ☒ Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.
- ☐ If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100 year return period storm event.
- ☐ Identification of potential impacts to receiving watercourses
- ☐ Identification of municipal drains and related approval requirements.
- ☒ Descriptions of how the conveyance and storage capacity will be achieved for the development.
- ☒ 100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.

- ☐ Inclusion of hydraulic analysis including hydraulic grade line elevations.
- ☒ Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.
- ☐ Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.
- ☐ Identification of fill constraints related to floodplain and geotechnical investigation.

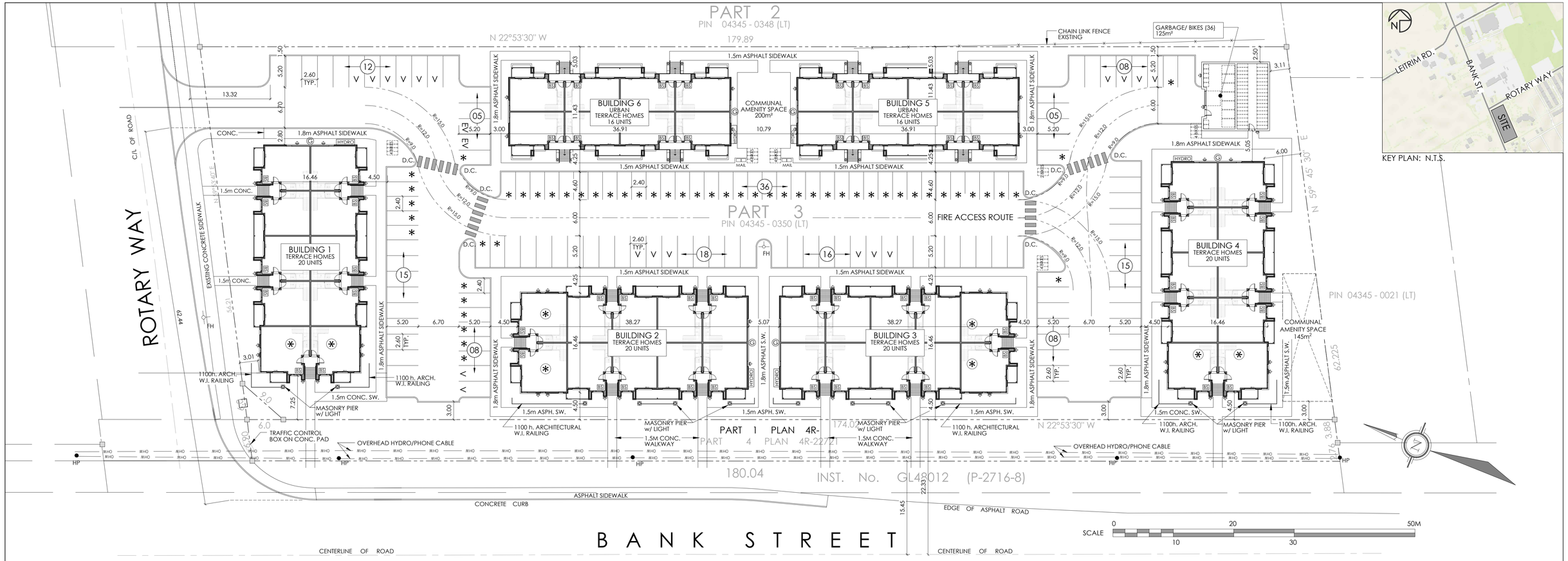
4.5 Approval and Permit Requirements: Checklist

The Servicing Study shall provide a list of applicable permits and regulatory approvals necessary for the proposed development as well as the relevant issues affecting each approval. The approval and permitting shall include but not be limited to the following:

- ☐ Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement Act. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act.
- ☒ Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.
- ☐ Changes to Municipal Drains.
- ☐ Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)

4.6 Conclusion Checklist

- ☒ Clearly stated conclusions and recommendations
- ☐ Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.
- ☐ All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario



SITE INFORMATION:

SITE AREA : 12,342.74 m² = 1.23 ha (3.05 A)
ZONING : EXISTING - DR PROPOSED - GM

PERMITTED USES:
- PLANNED UNIT DEVELOPMENT
- STACKED DWELLING
- HOME-BASED BUSINESS

	REQUIRED :	PROVIDED :
LOT WIDTH (MIN.):	NO MINIMUM	68.56 m
LOT AREA (MIN.):	NO MINIMUM	12,342.74 m²
BUILDING HEIGHT (MAX.):	18.0 m	12.00 m
FRONT YARD (MIN.) :	3.0 m	3.01 m
REAR YARD (MIN.) :	7.5 m	6.00 m
INTERIOR SIDE YARD (MIN.) :	3.0 m	5.03 m
CORNER SIDE YARD (MIN.) :	3.0 m	4.50 m
FLOOR SPACE INDEX (MAX) :	2	1.04
MINIMUM WIDTH OF LANDSCAPED AREA : ABUTTING A STREET	3.0 m	3.0 m
ABUTTING AN INSTITUTIONAL ZONE	3.0 m	1.5 m
TOTAL LANDSCAPED AREA PROVIDED:		5,349.24m² (43.34%)
PLANNED UNIT DEVELOPMENT REQUIREMENTS:		
MINIMUM WIDTH OF PRIVATE WAY:	6.0 m	6.0 m
BUILDING WALL SETBACK FROM PRIVATE WAY (MIN.):	1.8 m	2.8 m
SEPARATION BETWEEN BUILDINGS (MIN.):	1.2 m	5.07 m
AMENITY SPACE REQUIREMENTS:		
AMENITY SPACE REQUIRED @ 6.0m/ UNIT (STACKED DWELLING) =	672.00m²	
COMMUNAL AMENITY SPACE REQUIRED (50%) =	336.00m²	
AMENITY SPACE PROVIDED: PRIVATE (BALCONIES)	545.92m²	
COMMUNAL	345.00m²	
TOTAL	890.92m²	
ACCESSORY BUILDING PROVISIONS:		
INTERIOR SIDE YARD (MIN.): NOT ABUTTING RESIDENTIAL ZONE	0.00m²	2.50 m
REAR YARD (MIN.): NOT ABUTTING RESIDENTIAL ZONE OR STREET	0.00m²	3.11 m
MAXIMUM PERMITTED HEIGHT:	4.50m²	TBD m
MAXIMUM PERMITTED SIZE:	200 m²	125 m²

BUILDING INFORMATION:

BUILDING No. :		BUILDING AREA:	GROSS FLOOR AREA:	No. UNITS:
BUILDING 1 =	TRADITIONAL BACK-TO-BACK TERRACE HOMES	615.9 m²	2,399.52 m²	20 UNITS
BUILDING 2 =	TRADITIONAL BACK-TO-BACK TERRACE HOMES	615.9 m²	2,399.52 m²	20 UNITS
BUILDING 3 =	TRADITIONAL BACK-TO-BACK TERRACE HOMES	615.9 m²	2,399.52 m²	20 UNITS
BUILDING 4 =	TRADITIONAL BACK-TO-BACK TERRACE HOMES	615.9 m²	2,399.52 m²	20 UNITS
BUILDING 5 =	URBAN BACK-TO-BACK TERRACE HOMES	409.2 m²	1,636.8 m²	16 UNITS
BUILDING 6 =	URBAN BACK-TO-BACK TERRACE HOMES	409.2 m²	1,636.8 m²	16 UNITS
ACCESSORY BUILDING:		125.0 m²	125.0 m²	
TOTAL =		3,407.0 m²	12,996.68 m	112 UNITS

PARKING :

PARKING REQUIRED : 1.2 Spaces / (112) d.u. + 0.2 / (112) d.u. (Visitor) = 134 + 22 = 156 Spaces

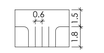
PARKING PROVIDED : UNDERGROUND - 00 Spaces
SURFACE 128 Spaces + 18 Visitor Spaces = 146 Spaces
TOTAL: = 146 Spaces

53 PARKING SPACES (36.3% total) INDICATED WITH AN * HAVE A WIDTH OF 2.4m, A LENGTH OF 4.6m, OR BOTH AS PER SECTION 106 (3)(a)

V = VISITOR PARKING
EV = ELECTRICAL VEHICLE PARKING

BICYCLE PARKING REQUIRED : 0.5 / d.u.(112) = 56 Spaces
BICYCLE PARKING PROVIDED : 36 (Accessory bldg.) + 22 (Surface) = 58 spaces

SNOW STORAGE : CLEARED SNOW TO BE STORED OFF SITE.



BICYCLE STORAGE DIMENSIONS

LEGEND/ ABBREVIATIONS :

- GAS METERS LOCATION
- BS BUILDING SERVICES LOCATION (IN LOWER LEVEL)
- D.C. DEPRESSED CURB
- WALL MOUNTED LIGHT FIXTURE
- FIRE HYDRANT
- LS LIGHT STANDARD
- TRANSFORMER

NOTE:
SITE PLAN TO BE READ IN CONJUNCTION WITH :
- SITE SERVICING AND GRADING PLAN PREPARED BY IBI GROUP
- LANDSCAPING PLAN PREPARED BY JAMES B. LENNOX AND ASSOCIATES INC.

BOUNDARIES DERIVED FROM: PLAN 4R -_____
PREPARED BY J.D. BARNES LIMITED
DATED MAY 21, 2020

M. David Blakely Architect Inc.
2200 Prince of Wales Dr. Suite 101 Ottawa, Ontario
Phone (613) 226-8811 Fax (613) 226-7942 K2E 6Z9

GENERAL NOTES:
1. THE CONTRACTOR IS RESPONSIBLE FOR CHECKING AND VERIFYING ALL DIMENSIONS. ANY DISCREPANCY MUST BE REPORTED TO M. DAVID BLAKELY ARCHITECT INC.
2. ALL WORK AND MATERIALS TO BE IN COMPLAINCE WITH ALL CODES, REGULATIONS, & BY-LAWS
3. ADDITIONAL DRAWINGS MAY BE ISSUED FOR CLARIFICATION TO ASSIST THE PROPER EXECUTION OF WORK. SUCH DRAWINGS WILL HAVE THE SAME MEANING AND INTENT AS IF THEY WERE INCLUDED WITH THE PLANS IN CONTRACT DOCUMENTS
4. DO NOT SCALE DRAWINGS.
5. THIS DRAWING SHALL NOT BE USED OR COPIED WITHOUT THE AUTHORIZATION OF THE ARCHITECT
6. THIS DRAWING SHALL NOT BE USED FOR PERMIT OR CONSTRUCTION UNLESS THE DRAWING BEARS THE ARCHITECT'S SEAL AND SIGNATURE

SEAL

No.	DATE	DESCRIPTION	INIT.
12.			
11.			
10.			
9.			
8.			
7.	17/08/2020	ZONING/ SITE INFO UPDATED/ BLDG. LIGHTING ADDED	MB
6.	13/08/2020	BUILDING 5&6 SHIFTED EAST/ FOR COORDINATION	MB
5.	27/07/2020	FOR CONSULTANTS	MB
4.	24/07/2020	SITE INFO UPDATED	MB
3.	22/07/2020	SITE INFO UPDATED	MB
2.	20/07/2020	AMENITY SPACE RELOCATED	MB
1.	06/07/2020	FOR REVIEW	MB

REVISIONS

No.	DATE	DESCRIPTION	INIT.
24.			
23.			
22.			
21.			
20.			
19.			
18.			
17.			
16.			
15.			
14.			
13.			

REVISIONS

A - DETAIL NUMBER
B - SHEET NUMBER (DETAIL REQUIRED)
C - SHEET NUMBER (DETAIL LOCATION)

PROJECT:
PLANNED UNIT DEVELOPMENT
4639 BANK STREET
OTTAWA, ONTARIO

CLIENT: Glenview homes

DRAWING TITLE:
PRELIMINARY SITE PLAN

DATE: JULY 2020
SCALE: 1 : 300
DRAWN BY: mdb
CHECKED: MDB
SHEET No.: SP1

SCHEDULE				
PART	LOT	CONCESSION	PIN	AREA
1	PART OF 17	5 (RIDEAU FRONT)	ALL OF 04345-0350 (LT)	1237.5 sq.m
2				17.8 sq.m
3				11087.9 sq.m

I REQUIRE THIS PLAN TO BE DEPOSITED UNDER THE LAND TITLES ACT.

DATE MAY 21, 2020

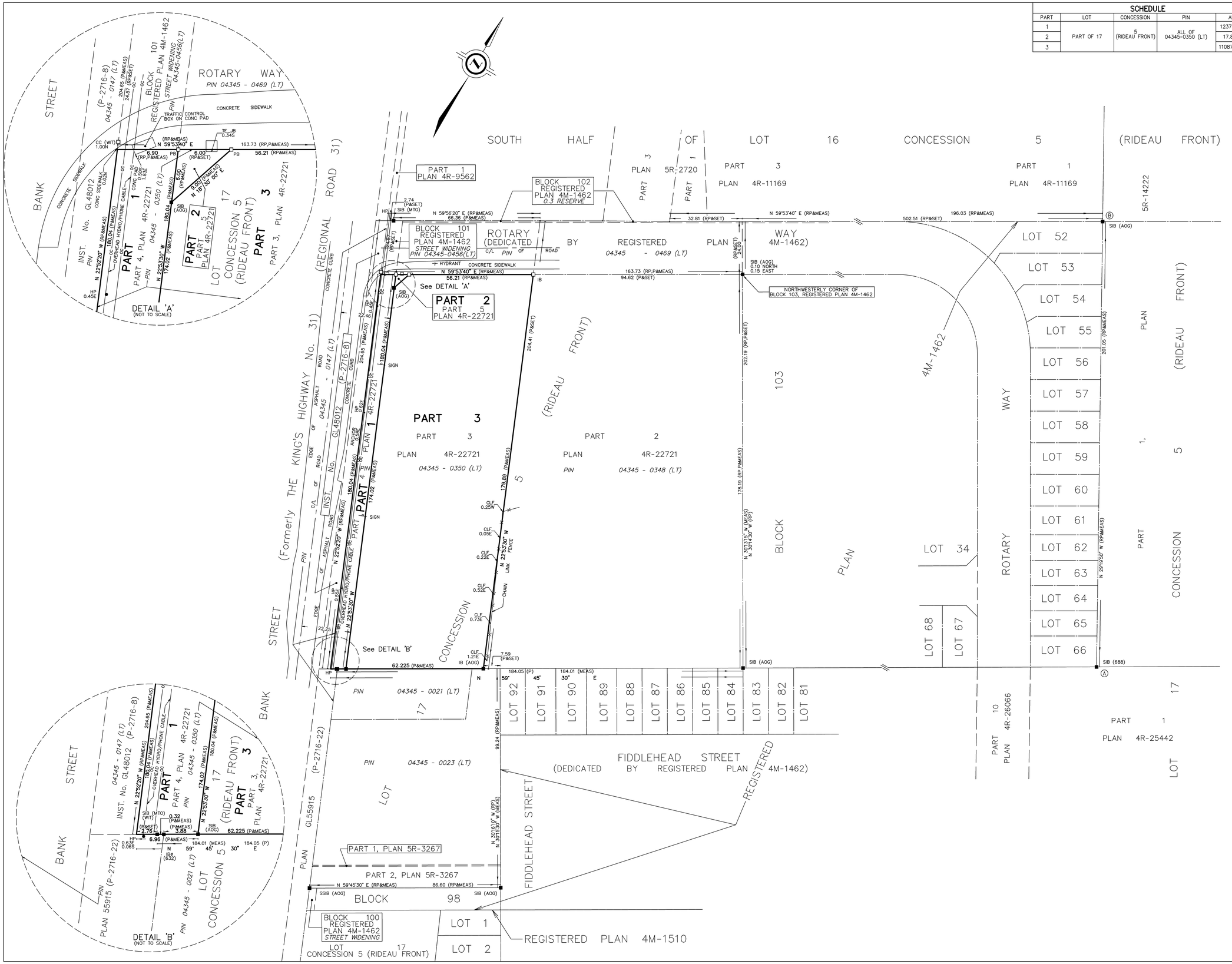
GEORGE ZERVOS
ONTARIO LAND SURVEYOR

PLAN 4R-

RECEIVED AND DEPOSITED

DATE

REPRESENTATIVE FOR THE LAND REGISTRAR FOR THE LAND TITLES DIVISION OF OTTAWA-CARLETON (No 4)



PLAN OF SURVEY OF

PART OF LOT 17
CONCESSION 5 (RIDEAU FRONT)

GEOGRAPHIC TOWNSHIP OF GLOUCESTER

CITY OF OTTAWA

SCALE 1 : 750

25 0 10 20 30 40 50 metres

THE INTENDED PLOT SIZE OF THIS PLAN IS 915mm IN WIDTH BY 609mm IN HEIGHT WHEN PLOTTED AT A SCALE OF 1:750

J.D. BARNES LIMITED

METRIC DISTANCES AND/OR COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

NOTES

BEARINGS ARE MTM GRID, DERIVED FROM OBSERVED REFERENCE POINTS A AND B, BY REAL TIME NETWORK (RTN) OBSERVATIONS, MTM ZONE 9, NAD83 (ORIGINAL) (2010.0).

DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 0.99995.

INTEGRATION DATA		
OBSERVED REFERENCE POINTS (ORPs): MTM ZONE 9, NAD83 (ORIGINAL) (2010.0).		
COORDINATES TO URBAN ACCURACY PER SECTION 14 (2) OF O.REG 216/10.		
POINT ID	EASTING	NORTHING
ORP (A)	376 205.97	5 021 401.13
ORP (B)	376 107.49	5 021 576.42

COORDINATES CANNOT, IN THEMSELVES, BE USED TO RE-ESTABLISH CORNERS OR BOUNDARIES SHOWN ON THIS PLAN.

LEGEND

■	DENOTES	SURVEY MONUMENT FOUND
□	DENOTES	SURVEY MONUMENT SET
SIB	DENOTES	STANDARD IRON BAR
SSIB	DENOTES	SHORT STANDARD IRON BAR
IB	DENOTES	IRON BAR
IBø	DENOTES	ROUND IRON BAR
CC	DENOTES	CUT CROSS
WIT	DENOTES	WITNESS
MEAS	DENOTES	MEASURED
RP	DENOTES	REGISTERED PLAN 4M-1462
P	DENOTES	PLAN 4R-22721
632	DENOTES	O.C. McROSTIE, O.L.S.
688	DENOTES	C.D. COPELAND, O.L.S.
AOG	DENOTES	ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
MTO	DENOTES	MINISTRY OF TRANSPORTATION OF ONTARIO
INST.	DENOTES	INSTRUMENT
No.	DENOTES	NUMBER
CONC	DENOTES	CONCRETE
HP	DENOTES	HYDRO POLE
C/L	DENOTES	CENTRELINE
TE-JB	DENOTES	TELEPHONE JUNCTION BOX

N=NORTH S=SOUTH E=EAST W=WEST

ALL SET SSIB AND PB MONUMENTS WERE USED DUE TO LACK OF OVERBURDEN AND/OR PROXIMITY OF UNDERGROUND UTILITIES IN ACCORDANCE WITH SECTION 11 (4) OF O.REG. 525/91.

SURVEYOR'S CERTIFICATE

I CERTIFY THAT:

1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, THE SURVEYORS ACT AND THE LAND TITLES ACT AND THE REGULATIONS MADE UNDER THEM.
2. THE SURVEY WAS COMPLETED ON MARCH 10, 2020.

MARCH 17, 2020
DATE

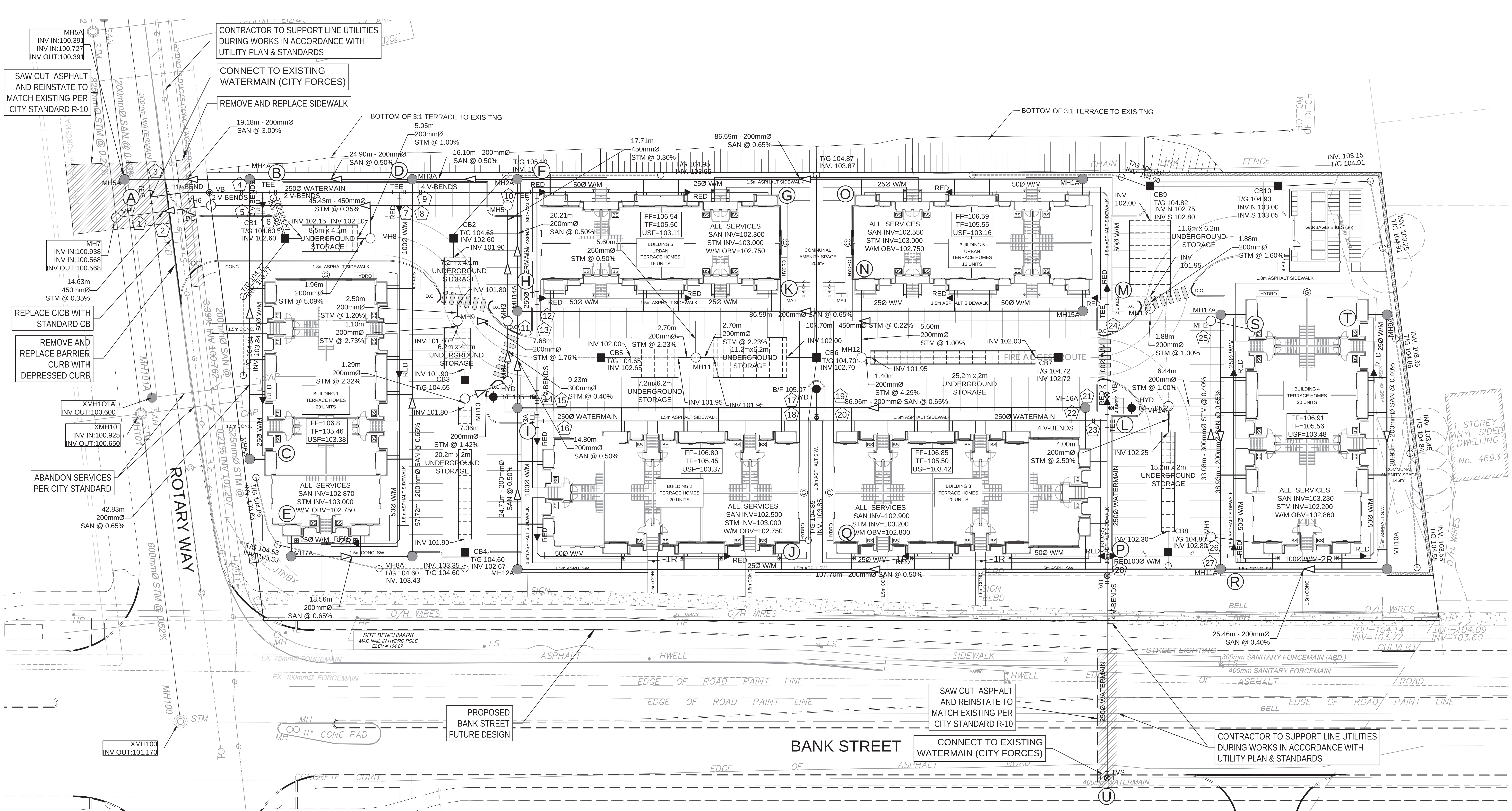
GEORGE ZERVOS
ONTARIO LAND SURVEYOR

J.D.BARNES LIMITED
SURVEYING MAPPING GIS
LAND INFORMATION SPECIALISTS
2430 DON REID DRIVE, SUITE 204, OTTAWA, ON K1H 1E1
T: (613) 731-7244 F: (613) 731-8955 www.jdbarnes.com

DRAWN BY:	CHECKED BY:	REFERENCE NO.:
RP	GZ	20-10-013-00

FILE: G:\20-10-013\00\Drawing\RPLAN\20-10-013-00-RPLAN.dgn

ICD LOCATION (MH #)	RELEASE RATE (L/s)	HEAD (m)	ICD
8	8.57	2.68	Tempest MHF plate
9	13.97	2.93	Tempest MHF plate
10	11.78	2.96	Tempest MHF plate
11	30.72	2.86	Tempest MHF plate
12	15.93	2.95	Tempest MHF plate
13	18.20	3.01	Tempest MHF plate
14	9.64	2.80	Tempest MHF plate



CLIENT

GLENVIEW HOMES

190 O'Connor St., 11th floor, Ottawa, ON

ISSUES

No.	DESCRIPTION	DATE
1	SUBMITTED FOR ZBA AND SPA	2020-08-28

NOT FOR CONSTRUCTION

KEY PLAN

SITE

CONSULTANTS

Project Coordinator
Terrain Development Consulting
Architect:
M. David Blakely Architects Inc.
Landscape:
James B. Lennox & Assoc. Inc.
Surveyor:
J.D.Barnes Ltd.
Geotech:
Golder Associates Ltd.

SEAL

IBI GROUP
Suite 400 – 333 Preston Street
Ottawa ON K1S 5N4 Canada
tel 613 225 1311 / 613 241 3300 fax 613 225 9868
ibigroup.com

PROJECT

4639 BANK STREET

4639 Bank Street

PROJECT NO:	
125600	
DRAWN BY: D.D./E.H.	CHECKED BY: R.M.
PROJECT MGR: D.Y.	APPROVED BY: D.Y.

SHEET TITLE

GENERAL PLAN OF SERVICES

SHEET NUMBER	ISSUE
C-001	1

IBI GROUP
333 PRESTON STREET
OTTAWA, ONTARIO
K1S 5N4

WATERMAIN DEMAND CALCULATION SHEET

PROJECT : 4639 Bank Street
CLIENT : Glenview Homes

FILE: 125600-6.4.4
DATE PRINTED: 28-Aug-20
DESIGN: RM
PAGE: 1 OF 1

NODE	RESIDENTIAL				NON-RESIDENTIAL (ICI)			AVERAGE DAILY DEMAND (l/s)			MAXIMUM DAILY DEMAND (l/s)			MAXIMUM HOURLY DEMAND (l/s)			FIRE DEMAND (l/min)
	SINGLE FAMILY UNITS	Stacked Townhouse UNITS		POPULATION	INDUST. (ha)	COMM. (ha)	INSTIT. (ha)	RESIDENTIAL	ICI	TOTAL	RESIDENTIAL	ICI	TOTAL	RESIDENTIAL	ICI	TOTAL	
C-3		8		22				0.09		0.09	0.22		0.22	0.48		0.48	
C-5		6		16				0.07		0.07	0.16		0.16	0.36		0.36	
C-6		6		16				0.07		0.07	0.16		0.16	0.36		0.36	
C-7		8		22				0.09		0.09	0.22		0.22	0.48		0.48	
C-9		8		22				0.09		0.09	0.22		0.22	0.48		0.48	
C-12		6		16				0.07		0.07	0.16		0.16	0.36		0.36	
C-13		6		16				0.07		0.07	0.16		0.16	0.36		0.36	
C-14		16		43				0.18		0.18	0.44		0.44	0.96		0.96	16,000
C-17		8		22				0.09		0.09	0.22		0.22	0.48		0.48	
C-18		8		22				0.09		0.09	0.22		0.22	0.48		0.48	
C-19		6		16				0.07		0.07	0.16		0.16	0.36		0.36	
C-20		6		16				0.07		0.07	0.16		0.16	0.36		0.36	
C-22		8		22				0.09		0.09	0.22		0.22	0.48		0.48	
C-23		6		16				0.07		0.07	0.16		0.16	0.36		0.36	
C-24		6		16				0.07		0.07	0.16		0.16	0.36		0.36	
Totals		112		302						1.23			3.06			6.74	

POPULATION DENSITY

Single Family 3.4 persons/unit

Stacked Towns\ 2.7 persons/unit

WATER DEMAND RATES

Residential 350 l/cap/day

Commercial Shopping Center 2,500 L/(1000m2)/day

PEAKING FACTORS

Maximum Daily
Residential 2.5 x avg. day
Commercial 1.5 x avg. day
Maximum Hourly
Residential 2.2 x avg. day
Commercial 1.8 x avg. day

FIRE DEMANDS

Building 3 16,000 l/min (266.7l/s)

Lance Erion

Subject: FW: Leitrim Serviceability Update, September 2014

From: Rogers, Christopher [mailto:Christopher.Rogers@ottawa.ca]
Sent: Friday, October 24, 2014 11:10 AM
To: Bob Wingate
Cc: Zagorski, Joseph; Diduch, Roman
Subject: Leitrim Serviceability Update, September 2014

Bob,

Comments on the draft report are as follows:

- An introduction is needed to explain the purpose of the report, as this strongly influences the level of detail expected.
- Construction of the new 610mm main on Leitrim was completed in 2014. The project limits included Leitrim Road, from the CPR corridor to Albion, and on Albion from Leitrim to Fenton. This project provides a redundant supply to the majority of the existing Zone 3C, including LDA, via Albion and Findlay Creek.
- The information used for the analysis is dated. Please note the following:

- System-level demands for large growth areas are now estimated as given in the table below. The numbers used in your analysis are conservative, except for the unit demands for apartments. These numbers should only be used for establishing the backbone of the proposed distribution system. Design guideline demands should be used for local system designs.
- The post zone reconfiguration OSPS HGL is currently expected to be 146m. Note that the current Zone 3C remains at 155m. The plan should consider post-reconfiguration boundary conditions for pressure minima, and pre-reconfiguration conditions for pressure maxima.
- Zone 3C will be supplied by two pumping facilities, the OSPS and the Barrhaven PS. Rather that updating the Riverside South development numbers, we propose using our estimated future boundary conditions at Leitrim/CPR = 144m for peak hour and max day + fire (i.e. no need to consider RS development in your model). The development downstream of FCV can be represented as given in Table 2.2, but consider 829 units for Carlsbad.

- Provide figure clearly illustrating existing and proposed service areas, sub-areas identified in OPA 76, existing watermains (including new 610), proposed future watermains. Watermains should be colour-coded to emphasize mains larger than 200mm (nominal).
- Figure 2.2 as referenced in Section 2.4 was not provided in my copy of the report. Review of proposed network cannot be completed without figure as requested above. Focus should be on backbone of network and connection points to existing system.
- Review of alternatives would be better focussed on viable options, such as sizing and configuration of backbone distribution system. For example, if the second E-W main from the north (pipe 1557) were to be sized at 305mm, could this potentially allow for downsizing of downstream mains, to increase number of 6" mains? The City's interest here is to ensure design demands will be met with minimum network pipe sizing, so as to avoid high water age in the system.
- Provide figure illustrating distribution of residual pressure at model nodes under various design conditions, employing a suitable colour-coding scheme.
- Notwithstanding the above point, local sizing and fire demands will need to be reviewed for each plan of subdivision and site plan, and local system sizing will need to be finalized based on the City's design guideline demands, rather than the system-level demands considered in this report.

	Average (L/unit/day)	Outdoor Water Demand (L/unit/day)	Max Day (L/unit/day)	Peak Hour
SFH (OGB)	567	1049	Average + OWD	2.1 x Max Day
MLT (OGB)	558	0	Average	1.6 x Max Day
APT (OGB)	400	0	Average	1.6 x Max Day
EMP (OGB)	85	0	Average	1.5 x Max Day
Water Loss per connection	80	N/A	Average	Average
	Sum above for total Average Day		Sum above for total Max Day	Sum above for to Peak Hour

Regards,

Chris Rogers, M.A.Sc., P.Eng.
Senior Project Manager
Policy Development and Urban Design Branch
Gestionnaire principal de projet
Direction de l'élaboration des politiques et de l'esthétique urbaine

City of Ottawa | Ville d'Ottawa
[redacted] 613.580.2424 ext./poste 27785
ottawa.ca/planning / ottawa.ca/urbanisme

Fire Flow Requirement from Fire Underwriters Survey

4639 Bank Street - Building 1

Building Floor Area

width	38.0	m
depth	16.0	m
stories	3	
Area	1,824.0	m^2

$F = 220C\sqrt{A}$

C	1.5	
A	1,824	m^2
F	14,094	l/min
use	14,000	l/min

C =

1.5	wood frame
1.0	ordinary
0.8	non-combustile
0.6	fire-resistive

Occupancy Adjustment

Use	-15%	
Adjustment	-2100	l/min
Fire flow	11,900	l/min

-25%	non-combustile
-15%	limited combustile
0%	combustile
+15%	free burning
+25%	rapid burning

Sprinkler Adjustment

Use	0%	
Adjustment	0	l/min

Exposure Adjustment

Building Face	Separation (m)	Adjacent Exposed Wall			Exposure Charge *
		Length	Stories	L*H Factor	
north	> 45				
east	> 45				
south	26.0	28.0	3	84	9%
west	> 45				
Total					9%

Adjustment	1,071	l/min
Total adjustments	1,071	l/min
Fire flow	12,971	l/min
Use	**13,000**	**l/min**
	216.7	**l/s**

* Exposure charges from Techinical Bulletin ISTB 2018-02 Appendix H (ISO Method)

Fire Flow Requirement from Fire Underwriters Survey

4639 Bank Street - Building 3

Building Floor Area

width	38.0	m
depth	16.0	m
stories	3	
Area	1,824.0	m^2

F = 220C√A

C	1.5		C =	1.5 wood frame
A	1,824	m^2		1.0 ordinary
				0.8 non-combustile
F	14,094	l/min		0.6 fire-resistive
use	14,000	l/min		

Occupancy Adjustment

		-25%	non-combustile
		-15%	limited combustile
Use	-15%	0%	combustile
		+15%	free burning
Adjustment	-2100 l/min	+25%	rapid burning
Fire flow	11,900 l/min		

Sprinkler Adjustment

Use	0%
Adjustment	0 l/min

Exposure Adjustment

Building Face	Separation (m)	Adjacent Exposed Wall			Exposure Charge *
		Length	Stories	L*H Factor	
north	5.0	16.0	3	48	18%
east	23.0	37.0	3	111	10%
south	26.0	36.0	3	108	10%
west	> 45				
Total					38%

Adjustment	4,522	l/min
Total adjustments	4,522	l/min
Fire flow	16,422	l/min
Use	**16,000**	**l/min**
	266.7	**l/s**

* Exposure charges from Techinical Bulletin ISTB 2018-02 Appendix H (ISO Method)

Fire Flow Requirement from Fire Underwriters Survey

4639 Bank Street - Building 4

Building Floor Area

width	38.0	m
depth	16.0	m
stories	3	
Area	1,824.0	m^2

$F = 220C\sqrt{A}$

C	1.5		C =	1.5 wood frame
A	1,824	m^2		1.0 ordinary
				0.8 non-combustile
F	14,094	l/min		0.6 fire-resistive
use	14,000	l/min		

Occupancy Adjustment

		-25%	non-combustile
		-15%	limited combustile
Use	-15%	0%	combustile
		+15%	free burning
Adjustment	-2100 l/min	+25%	rapid burning
Fire flow	11,900 l/min		

Sprinkler Adjustment

Use	0%
Adjustment	0 l/min

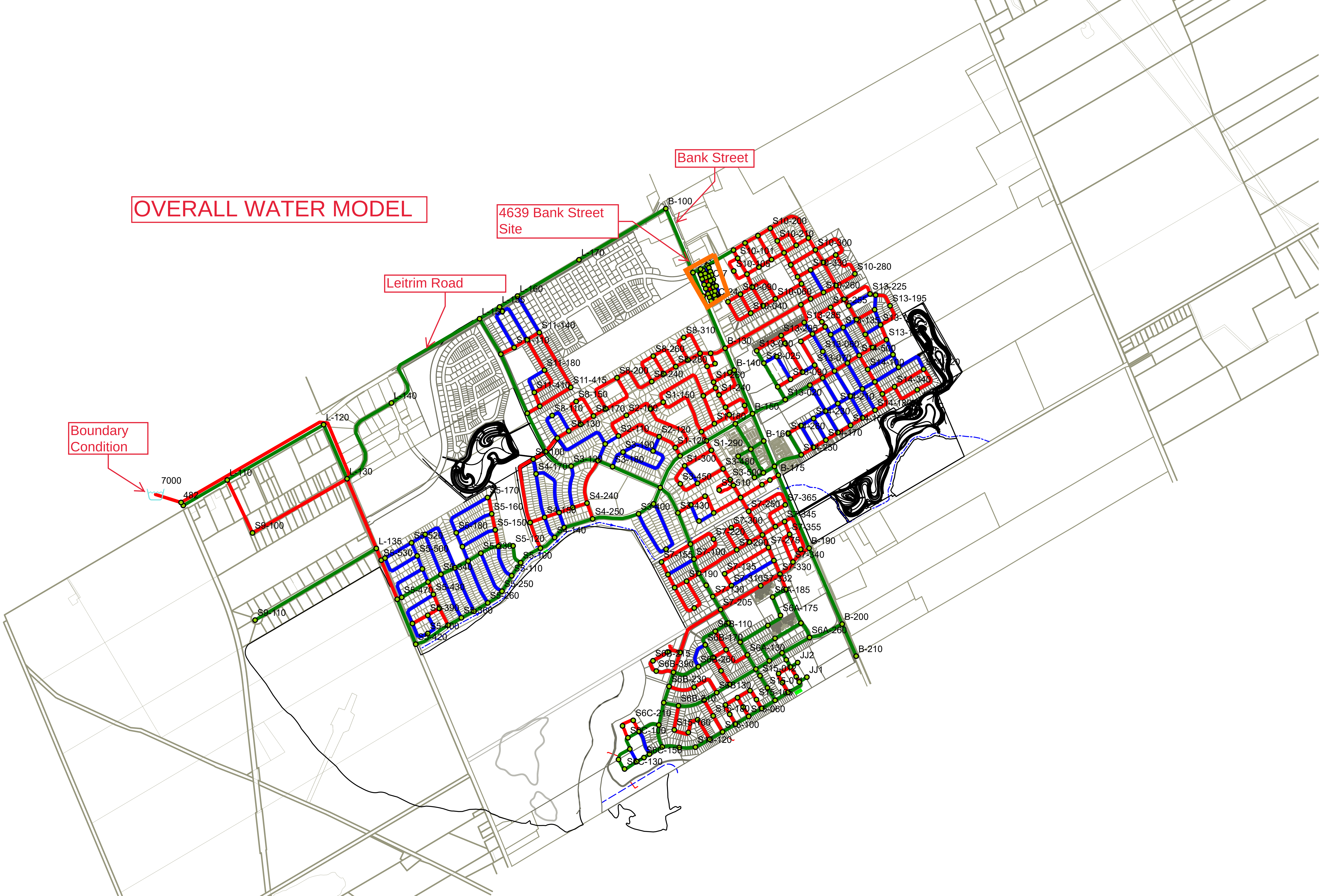
Exposure Adjustment

Building Face	Separation (m)	Adjacent Exposed Wall			Exposure Charge *
		Length	Stories	L*H Factor	
north	26.0	16.0	3	48	8%
east	> 45				
south	> 45				
west	> 45				
Total					8%

Adjustment	952	l/min
Total adjustments	952	l/min
Fire flow	12,852	l/min
Use	**12,000**	**l/min**
	200.0	**l/s**

* Exposure charges from Techinical Bulletin ISTB 2018-02 Appendix H (ISO Method)

OVERALL WATER MODEL



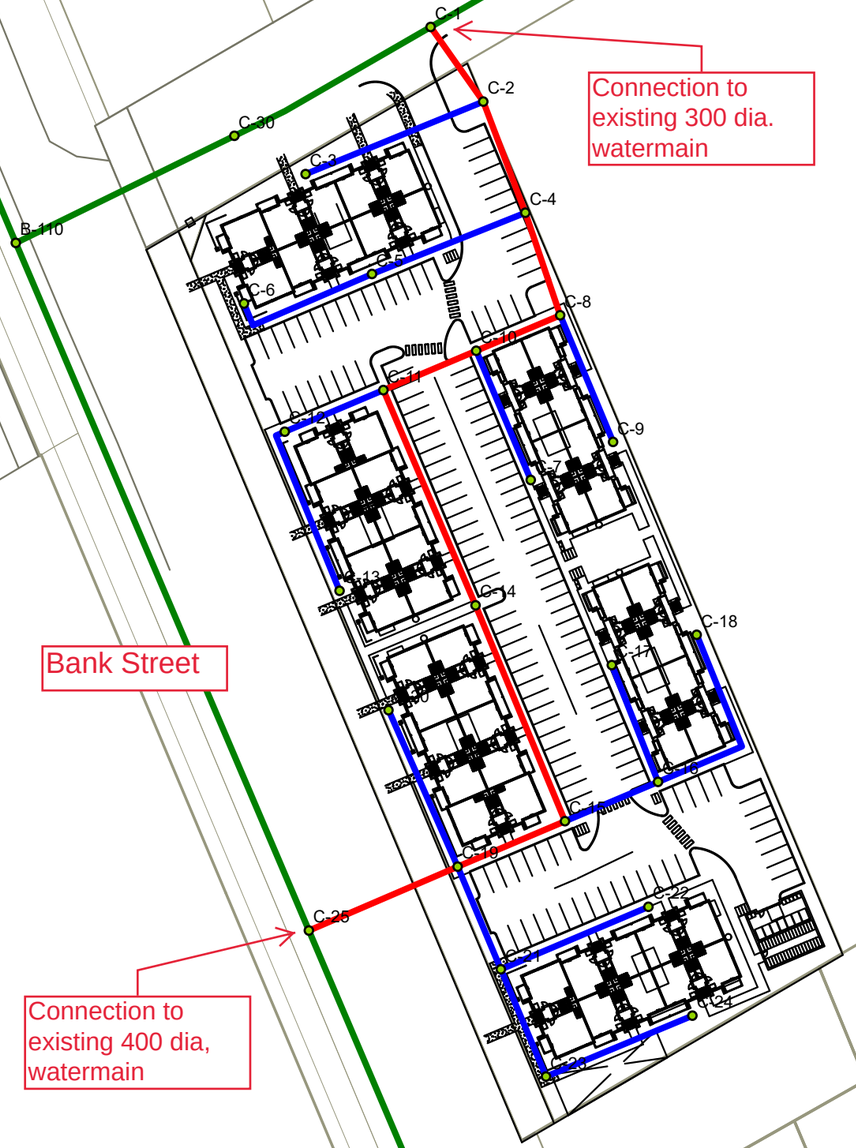
4623 BANK STREET WATER MODEL

Rotary Way

Bank Street

Connection to existing 300 dia. watermain

Connection to existing 400 dia, watermain



Basic Day (Max HGL) HGL 155m - Junction Report

		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)	Water Age (hrs)
1	☐	482	0.00	102.70	155.00	512.49	1.00
2	☐	B-100	0.52	104.60	151.83	462.83	8.81
3	☐	B-110	0.30	105.20	151.60	454.69	9.81
4	☐	B-130	0.07	103.20	151.48	473.06	13.40
5	☐	B-140	0.00	100.00	151.44	504.07	16.72
6	☐	B-150	0.00	94.60	151.34	556.04	18.36
7	☐	B-160	0.00	94.60	151.28	555.41	19.36
8	☐	B-170	0.00	93.30	151.22	567.60	24.08
9	☐	B-175	0.00	95.80	151.17	542.60	25.32
10	☐	B-190	0.34	95.00	150.72	545.97	27.04
11	☐	B-200	3.99	98.25	150.16	508.69	32.78
12	☐	B-210	144.28	98.25	149.41	501.33	33.78
13	☐	C-1	0.00	104.60	151.57	460.27	11.81
14	☐	C-10	0.00	105.15	151.57	454.85	15.81
15	☐	C-11	0.00	104.90	151.57	457.29	16.81
16	☐	C-12	0.07	105.20	151.57	454.35	17.81
17	☐	C-13	0.07	105.00	151.56	456.28	18.81
18	☐	C-14	0.18	104.85	151.57	457.77	17.81
19	☐	C-15	0.00	104.95	151.56	456.79	18.81
20	☐	C-16	0.00	105.00	151.56	456.29	19.81
21	☐	C-17	0.09	105.20	151.56	454.30	20.81
22	☐	C-18	0.09	105.20	151.56	454.28	20.81
23	☐	C-19	0.07	104.95	151.56	456.78	19.81
24	☐	C-2	0.00	104.90	151.57	457.32	12.81
25	☐	C-20	0.07	105.10	151.56	455.28	20.81
26	☐	C-21	0.00	105.25	151.56	453.84	20.81
27	☐	C-22	0.09	105.00	151.56	456.24	21.81
28	☐	C-23	0.07	105.20	151.56	454.33	21.81
29	☐	C-24	0.07	105.25	151.56	453.81	22.81
30	☐	C-25	0.00	104.60	151.56	460.21	11.28
31	☐	C-3	0.09	105.10	151.56	455.31	13.81
32	☐	C-30	0.00	104.90	151.58	457.47	10.81
33	☐	C-4	0.00	104.80	151.57	458.30	13.81
34	☐	C-5	0.07	105.20	151.57	454.37	14.81
35	☐	C-6	0.07	104.70	151.57	459.25	15.81
36	☐	C-7	0.07	104.70	151.56	459.23	16.81
37	☐	C-8	0.00	104.80	151.57	458.28	14.81
38	☐	C-9	0.09	105.20	151.56	454.33	15.81
39	☐	JJ1	0.51	106.50	150.49	431.05	39.66
40	☐	JJ2	0.51	104.80	150.48	447.60	41.62
41	☐	L-100	0.00	102.70	154.98	512.35	2.00
42	☐	L-110	0.95	101.60	154.79	521.22	3.00
43	☐	L-120	0.93	99.20	154.49	541.78	4.00
44	☐	L-130	0.53	97.60	154.33	555.94	2.77
45	☐	L-135	0.89	96.50	154.18	565.22	3.77
46	☐	L-140	1.94	95.30	153.56	570.93	3.77
47	☐	L-150	0.13	96.50	152.57	549.49	4.77
48	☐	L-155	0.00	96.20	152.49	551.57	5.77
49	☐	L-160	0.18	98.10	152.42	532.26	6.81
50	☐	L-170	0.17	99.50	152.17	516.15	7.81

Peak Hour (Min HGL) HGL 144m - Junction Report

		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)	Water Age (hrs)
1	☐	482	0.00	102.70	144.00	404.69	0.00
2	☐	B-100	0.78	104.60	139.62	343.20	0.00
3	☐	B-110	0.45	105.20	139.33	334.45	0.00
4	☐	B-130	0.40	103.20	139.22	352.93	0.00
5	☐	B-140	0.00	100.00	139.19	384.04	0.00
6	☐	B-150	0.00	94.60	139.12	436.24	0.00
7	☐	B-160	0.00	94.60	139.08	435.88	0.00
8	☐	B-170	0.00	93.30	139.05	448.28	0.00
9	☐	B-175	0.00	95.80	139.03	423.59	0.00
10	☐	B-190	0.50	95.00	138.83	429.53	0.00
11	☐	B-200	10.77	98.25	138.65	395.91	0.00
12	☐	B-210	41.37	98.25	138.58	395.18	0.00
13	☐	C-1	0.00	104.60	139.28	339.88	0.00
14	☐	C-10	0.00	105.15	139.28	334.48	0.00
15	☐	C-11	0.00	104.90	139.28	336.93	0.00
16	☐	C-12	0.36	105.20	139.28	333.95	0.00
17	☐	C-13	0.36	105.00	139.22	335.29	0.00
18	☐	C-14	0.96	104.85	139.28	337.42	0.00
19	☐	C-15	0.00	104.95	139.28	336.45	0.00
20	☐	C-16	0.00	105.00	139.28	335.89	0.00
21	☐	C-17	0.48	105.20	139.20	333.18	0.00
22	☐	C-18	0.48	105.20	139.15	332.67	0.00
23	☐	C-19	0.36	104.95	139.29	336.46	0.00
24	☐	C-2	0.00	104.90	139.28	336.94	0.00
25	☐	C-20	0.36	105.10	139.22	334.39	0.00
26	☐	C-21	0.00	105.25	139.27	333.39	0.00
27	☐	C-22	0.48	105.00	139.17	334.89	0.00
28	☐	C-23	0.36	105.20	139.27	333.83	0.00
29	☐	C-24	0.36	105.25	139.21	332.79	0.00
30	☐	C-25	0.00	104.60	139.29	339.91	0.00
31	☐	C-3	0.48	105.10	139.17	333.83	0.00
32	☐	C-30	0.00	104.90	139.31	337.15	0.00
33	☐	C-4	0.00	104.80	139.28	337.91	0.00
34	☐	C-5	0.36	105.20	139.28	333.92	0.00
35	☐	C-6	0.36	104.70	139.22	338.29	0.00
36	☐	C-7	0.48	104.70	139.20	338.06	0.00
37	☐	C-8	0.00	104.80	139.28	337.91	0.00
38	☐	C-9	0.48	105.20	139.20	333.17	0.00
39	☐	JJ1	2.79	106.50	138.64	314.95	0.00
40	☐	JJ2	2.79	104.80	138.64	331.65	0.00
41	☐	L-100	0.00	102.70	143.98	404.48	0.00
42	☐	L-110	1.42	101.60	143.68	412.38	0.00
43	☐	L-120	1.40	99.20	143.24	431.54	0.00
44	☐	L-130	0.79	97.60	143.01	445.00	0.00
45	☐	L-135	1.34	96.50	142.78	453.50	0.00
46	☐	L-140	2.90	95.30	141.94	457.04	0.00
47	☐	L-150	0.29	96.50	140.58	431.97	0.00
48	☐	L-155	0.00	96.20	140.46	433.74	0.00
49	☐	L-160	0.33	98.10	140.37	414.20	0.00
50	☐	L-170	0.26	99.50	140.06	397.43	0.00

Max Day + Fire HGL 144m - Fireflow Design Report

		ID	Total Demand (L/s)	Available Flow at Hydrant (L/s)	Critical Node ID	Critical Node Pressure (kPa)	Critical Node Head (m)	Design Flow (L/s)	Design Pressure (kPa)	Design Fire Node Pressure (kPa)
1	☐	B-100	250.52	325.29	S15-010	129.27	121.39	309.67	139.96	154.01
2	☐	B-110	250.30	314.86	S15-010	127.94	121.26	298.04	139.96	154.61
3	☐	B-130	166.74	336.12	S15-010	106.23	119.04	291.23	139.96	178.91
4	☐	B-140	250.00	369.86	S15-010	76.86	116.04	288.96	139.96	211.66
5	☐	B-150	250.00	423.43	S15-010	22.74	110.52	283.25	139.96	267.54
6	☐	B-160	250.00	416.44	S15-010	23.38	110.59	278.88	139.96	266.65
7	☐	B-170	250.00	425.58	S15-010	9.62	109.18	275.35	139.96	279.74
8	☐	B-190	250.34	367.38	S15-010	31.75	111.44	249.81	139.96	257.20
9	☐	B-200	255.98	314.14	S15-010	70.32	115.38	239.53	139.96	217.65
10	☐	B-210	310.95	405.66	S15-010	115.06	119.94	377.83	139.96	173.88
11	☐	C-11	266.70	261.08	C-11	139.96	119.18	261.08	139.96	139.97
12	☐	C-14	266.88	265.42	C-14	139.96	119.13	265.42	139.96	139.96
13	☐	C-15	266.70	275.95	C-15	139.96	119.23	275.95	139.96	139.97
14	☐	C-30	216.70	303.67	S15-010	134.72	121.95	296.33	139.96	146.82
15	☐	JJ1	201.27	162.33	JJ1	139.96	120.78	162.33	139.96	139.96
16	☐	JJ2	201.27	190.28	JJ2	139.96	119.08	190.28	139.96	139.98
17	☐	L-110	250.95	1,209.98	L-110	139.97	115.88	1,209.99	139.96	139.97
18	☐	L-120	250.93	1,036.99	L-120	139.97	113.48	1,037.00	139.96	139.97
19	☐	L-130	250.53	1,478.85	S15-010	-9.92	107.19	974.15	139.96	289.86
20	☐	L-135	250.89	1,192.60	S15-010	4.40	108.65	812.45	139.96	283.44
21	☐	L-140	251.94	663.56	S15-010	51.71	113.48	487.06	139.96	260.32
22	☐	L-150	166.80	513.19	S15-010	45.83	112.88	366.87	139.96	254.21
23	☐	L-160	166.85	457.58	S15-010	68.32	115.17	348.41	139.96	230.81
24	☐	L-170	166.84	400.46	S15-010	91.61	117.55	328.77	139.96	205.08
25	☐	S1-100	166.67	413.82	S15-010	41.31	112.42	289.42	139.96	257.44
26	☐	S1-110	166.67	422.05	S15-010	43.94	112.68	297.45	139.96	257.94
27	☐	S1-120	166.90	332.86	S15-010	117.17	120.16	300.87	139.96	183.04
28	☐	S1-140	166.84	270.82	S1-140	139.96	109.78	270.82	139.96	139.97
29	☐	S1-150	166.97	268.81	S1-150	139.96	110.18	268.81	139.96	139.97
30	☐	S1-170	166.82	333.16	S15-010	109.53	119.38	292.18	139.96	193.11
31	☐	S1-180	166.77	304.41	S15-010	131.58	121.63	292.89	139.96	157.09
32	☐	S1-190	167.03	291.94	S1-190	139.96	110.05	291.94	139.96	139.98
33	☐	S1-210	166.74	265.50	S1-210	139.96	109.72	265.50	139.96	139.97
34	☐	S1-220	166.80	213.95	S1-220	139.96	109.88	213.95	139.96	139.96
35	☐	S1-230	166.79	266.51	S1-230	139.96	109.93	266.51	139.96	139.97
36	☐	S1-240	166.80	308.40	S15-010	128.15	121.28	292.25	139.96	162.43
37	☐	S1-250	166.73	322.32	S15-010	117.97	120.24	292.53	139.96	177.72
38	☐	S1-260	166.77	324.09	S15-010	116.72	120.11	292.63	139.96	179.08
39	☐	S1-270	166.85	321.82	S15-010	116.87	120.13	290.85	139.96	174.21
40	☐	S1-290	166.80	296.50	S15-010	130.99	121.57	284.33	139.96	158.58
41	☐	S1-300	166.80	211.45	S1-300	139.96	108.93	211.45	139.96	139.96
42	☐	S10-010	166.75	287.20	S10-020	119.16	117.16	268.11	139.96	168.94
43	☐	S10-020	166.77	147.94	S10-020	139.96	119.28	147.94	139.96	139.96

Peak Hour (Min HGL) HGL 144m - Pipe Report

		ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness	Flow (L/s)	Velocity (m/s)	Headloss (m)	HL/1000 (m/k-m)	Status	Flow Reversal Count	Water Age (hrs)
1	☐	2071	482	L-100	20.12	393.00	120.00	71.09	0.59	0.02	1.06	Open	0	0.00
2	☐	785	482	L-130	1,244.29	610.00	120.00	192.80	0.66	0.99	0.79	Open	0	0.00
3	☐	2069	7000	482	1.00	610.00	120.00	263.90	0.90	0.00	1.42	Open	0	0.00
4	☐	31	B-100	B-110	378.19	393.00	120.00	59.89	0.49	0.29	0.77	Open	0	0.00
5	☐	33	B-110	C-25	138.97	393.00	120.00	36.17	0.30	0.04	0.30	Open	0	0.00
6	☐	943	B-110	C-30	45.30	297.00	120.00	23.27	0.34	0.02	0.53	Open	0	0.00
7	☐	843	B-130	S8-360	86.06	204.00	110.00	-3.46	0.11	0.01	0.11	Open	0	0.00
8	☐	35	B-130	B-140	129.42	393.00	120.00	28.29	0.23	0.02	0.19	Open	0	0.00
9	☐	177	B-140	S1-270	26.56	204.00	110.00	-6.60	0.20	0.01	0.37	Open	0	0.00
10	☐	37	B-140	B-150	256.88	393.00	120.00	34.89	0.29	0.07	0.28	Open	0	0.00
11	☐	1581	B-160	B-150	160.20	393.00	120.00	-31.39	0.26	0.04	0.23	Open	0	0.00
12	☐	795	B-160	B-170	150.42	393.00	120.00	30.69	0.25	0.03	0.22	Open	0	0.00
13	☐	1547	B-170	B-175	52.05	393.00	120.00	41.05	0.34	0.02	0.38	Open	0	0.00
14	☐	1587	B-170	S3B-160	69.46	297.00	120.00	-16.03	0.23	0.02	0.26	Open	0	0.00
15	☐	1645	B-175	B-190	430.28	393.00	120.00	44.72	0.37	0.19	0.45	Open	0	0.00
16	☐	1391	B-190	S7-340	116.52	204.00	110.00	2.22	0.07	0.01	0.05	Open	0	0.00
17	☐	41	B-190	B-200	450.09	393.00	120.00	42.00	0.35	0.18	0.40	Open	0	0.00
18	☐	791	B-200	B-210	190.43	393.00	120.00	41.37	0.34	0.07	0.39	Open	0	0.00
19	☐	P61	C-1	S10-100	165.39	297.00	120.00	21.47	0.31	0.07	0.45	Open	0	0.00
20	☐	P71	C-10	C-8	16.96	250.00	110.00	-0.13	0.00	0.00	0.00	Open	0	0.00
21	☐	P79	C-11	C-10	18.80	250.00	110.00	0.35	0.01	0.00	0.00	Open	0	0.00
22	☐	P81	C-12	C-11	19.92	100.00	100.00	-0.72	0.09	0.00	0.24	Open	0	0.00
23	☐	P83	C-13	C-12	33.00	50.00	100.00	-0.36	0.18	0.06	1.92	Open	0	0.00
24	☐	P85	C-14	C-11	43.56	250.00	110.00	1.07	0.02	0.00	0.00	Open	0	0.00
25	☐	P89	C-15	C-14	43.44	250.00	110.00	2.03	0.04	0.00	0.02	Open	0	0.00
26	☐	P95	C-16	C-15	18.80	100.00	100.00	-0.96	0.12	0.01	0.40	Open	0	0.00
27	☐	P97	C-17	C-16	23.37	50.00	100.00	-0.48	0.24	0.08	3.27	Open	0	0.00
28	☐	P99	C-18	C-16	39.34	50.00	100.00	-0.48	0.24	0.13	3.27	Open	0	0.00
29	☐	P91	C-19	C-15	21.71	250.00	110.00	2.99	0.06	0.00	0.03	Open	0	0.00
30	☐	P63	C-2	C-1	16.97	250.00	110.00	-1.81	0.04	0.00	0.01	Open	0	0.00
31	☐	P93	C-20	C-19	31.80	50.00	100.00	-0.36	0.18	0.06	1.92	Open	0	0.00
32	☐	P105	C-21	C-19	20.70	100.00	100.00	-1.20	0.15	0.01	0.61	Open	0	0.00
33	☐	P107	C-22	C-21	29.83	50.00	100.00	-0.48	0.24	0.10	3.27	Open	0	0.00
34	☐	P109	C-23	C-21	21.66	100.00	100.00	-0.72	0.09	0.01	0.24	Open	0	0.00
35	☐	P111	C-24	C-23	29.54	50.00	100.00	-0.36	0.18	0.06	1.92	Open	0	0.00

Peak Hour (Min HGL) HGL 144m - Pipe Report

		ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness	Flow (L/s)	Velocity (m/s)	Headloss (m)	HL/1000 (m/k-m)	Status	Flow Reversal Count	Water Age (hrs)
36	☐	P103	C-25	C-19	30.13	250.00	110.00	4.91	0.10	0.00	0.08	Open	0	0.00
37	☐	P101	C-25	B-130	307.34	393.00	120.00	31.26	0.26	0.07	0.23	Open	0	0.00
38	☐	P77	C-3	C-2	35.73	50.00	100.00	-0.48	0.24	0.12	3.27	Open	0	0.00
39	☐	P113	C-30	C-1	41.79	297.00	120.00	23.27	0.34	0.02	0.53	Open	0	0.00
40	☐	P65	C-4	C-2	22.10	250.00	110.00	-1.33	0.03	0.00	0.01	Open	0	0.00
41	☐	P73	C-5	C-4	30.76	100.00	100.00	-0.72	0.09	0.01	0.24	Open	0	0.00
42	☐	P75	C-6	C-5	28.50	50.00	100.00	-0.36	0.18	0.05	1.92	Open	0	0.00
43	☐	P87	C-7	C-10	26.10	50.00	100.00	-0.48	0.24	0.09	3.27	Open	0	0.00
44	☐	P67	C-8	C-4	20.12	204.00	110.00	-0.61	0.02	0.00	0.00	Open	0	0.00
45	☐	P69	C-9	C-8	25.54	50.00	100.00	-0.48	0.24	0.08	3.27	Open	0	0.00
46	☐	P23	JJ1	S15-025	48.89	250.00	110.00	-2.79	0.06	0.00	0.03	Open	0	0.00
47	☐	P21	JJ2	S15-030	47.33	250.00	110.00	-2.79	0.06	0.00	0.03	Open	0	0.00
48	☐	13	L-100	L-110	276.53	393.00	120.00	71.09	0.59	0.29	1.06	Open	0	0.00
49	☐	15	L-110	L-120	605.10	393.00	120.00	58.28	0.48	0.45	0.74	Open	0	0.00
50	☐	17	L-120	L-130	320.65	393.00	120.00	56.88	0.47	0.23	0.70	Open	0	0.00
51	☐	19	L-130	S9-100	593.00	204.00	110.00	-8.37	0.26	0.34	0.58	Open	0	0.00
52	☐	21	L-130	L-135	410.94	610.00	120.00	160.94	0.55	0.23	0.57	Open	0	0.00
53	☐	23	L-135	S9-110	766.19	297.00	120.00	1.24	0.02	0.00	0.00	Open	0	0.00
54	☐	815	L-140	L-130	574.40	393.00	120.00	-96.32	0.79	1.07	1.87	Open	0	0.00
55	☐	27	L-150	L-140	770.28	393.00	120.00	-93.42	0.77	1.36	1.76	Open	0	0.00
56	☐	2107	L-155	L-150	126.25	393.00	120.00	-66.67	0.55	0.12	0.94	Open	0	0.00
57	☐	721	L-160	L-170	388.49	393.00	120.00	60.93	0.50	0.31	0.80	Open	0	0.00
58	☐	29	L-160	L-155	114.29	393.00	120.00	-62.09	0.51	0.09	0.83	Open	0	0.00
59	☐	633	L-170	B-100	548.72	393.00	120.00	60.67	0.50	0.44	0.79	Open	0	0.00
60	☐	789	S10-010	S10-340	61.71	204.00	110.00	-1.22	0.04	0.00	0.02	Open	0	0.00
61	☐	1029	S10-010	S10-260	78.41	204.00	110.00	2.98	0.09	0.01	0.09	Open	0	0.00
62	☐	919	S10-040	S10-020	190.37	204.00	110.00	-0.36	0.01	0.00	0.00	Open	0	0.00
63	☐	921	S10-040	S10-050	78.83	204.00	110.00	0.47	0.01	0.00	0.00	Open	0	0.00
64	☐	923	S10-050	S10-060	75.70	204.00	110.00	2.09	0.06	0.00	0.04	Open	0	0.00
65	☐	1019	S10-060	S10-250	164.60	204.00	110.00	3.39	0.10	0.02	0.11	Open	0	0.00
66	☐	925	S10-060	S10-080	189.73	204.00	110.00	-2.18	0.07	0.01	0.05	Open	0	0.00
67	☐	929	S10-080	S10-090	74.84	204.00	110.00	2.43	0.07	0.00	0.06	Open	0	0.00
68	☐	935	S10-080	S10-050	118.80	204.00	110.00	2.18	0.07	0.01	0.05	Open	0	0.00
69	☐	931	S10-090	S10-020	79.02	204.00	110.00	0.92	0.03	0.00	0.01	Open	0	0.00
70	☐	937	S10-090	S10-040	117.47	204.00	110.00	0.90	0.03	0.00	0.01	Open	0	0.00

APPENDIX B

Sundance Village Ph 1 Sanitary Sewer Design Sheet
125600-400 Sanitary Drainage Plan
Sanitary Sewer Design Sheet

IBI GROUP
400 - 333 Preston Street
Ottawa, Ontario
K1S 5N4

SANITARY SEWER DESIGN SHEET

PROJECT: Sundance Village Phase 1
LOCATION: City of Ottawa
CLIENT: Claridge Homes (Bank Street) Inc.

LOCATION			RESIDENTIAL LANDS									ICI LANDS							INFILTRATION ALLOWANCE			TOTAL FLOW	SEWER DATA						
STREET			UNITS					POPULATION		POPULATION FLOW		AREA (Ha)							AREA (Ha)				CAP	LENGTH	DIAMETER	SLOPE	VELOCITY	AVAILABLE CAP	
	FROM MH	TO MH	Singles	Semis	Towns	Stacked	Area (Ha)	IND	CUM	PEAK FACTOR	FLOW (L/s)	INSTITUTIONAL IND	INSTITUTIONAL CUM	COMMERCIAL IND	COMMERCIAL CUM	INDUSTRIAL IND	INDUSTRIAL CUM	FLOW (L/s)	INDIV	CUM	FLOW (L/s)	(L/s)	(L/s)	(m)	(mm)	(%)	(m/s)	(L/s)	(%)
Future Commercial (South)	Cap	101A												1.28	1.28			1.11	1.28	1.28	0.36	1.47	20.24	16.01	200	0.35	0.62	18.77	92.74
Summertime Drive	101A	102A					0.26	0	0	4.00	0.00				1.28			1.11	0.26	1.54	0.43	1.54	27.59	58.52	200	0.65	0.85	26.04	94.41
Ottawa Rotary Home Site	Cap	102A										1.89	1.89					1.64	1.89	1.89	0.53	2.17	50.52	12.66	200	2.18	1.56	48.35	95.71
Summertime Drive	102A	103A					0.17	0	0	4.00	0.00		1.89		1.28			2.75	0.17	3.60	1.01	3.76	29.63	71.98	200	0.75	0.91	25.87	87.31
Summertime Drive	103A	104A					0.14	0	0	4.00	0.00		1.89	1.49	2.77			4.05	1.63	5.23	1.46	5.51	29.63	61.99	200	0.75	0.91	24.12	81.41
Fairweather Street	104A	105A				36	0.49	68	68										0.49										
					9		0.25	24	93	4.00	1.50		1.89		2.77			4.05	0.25	5.97	1.67	7.22	22.95	76.24	200	0.45	0.71	15.74	68.56
Fairweather Street	105A	107A				36	0.62	68	68										0.62										
					10		0.27	27	188	4.00	3.05		1.89		2.77			4.05	0.27	6.86	1.92	9.02	24.19	76.79	200	0.50	0.75	15.18	62.74
Fiddlehead Drive	150A	151A	12				1.11	41	41	4.00	0.66							0.00	1.59	1.59	0.45	1.11	27.59	104.26	200	0.65	0.85	26.48	95.99
Fiddlehead Drive	151A	152A	1				0.06	3	44	4.00	0.72							0.00	0.06	1.65	0.46	1.18	27.59	10.97	200	0.65	0.85	26.40	95.72
Littlerock Drive	152A	153A	6				0.35	20	65	4.00	1.05							0.00	0.35	2.00	0.56	1.61	20.24	70.24	200	0.35	0.62	18.63	92.05
Shasta Street	153A	Blkhd	8				0.39	27	27	4.00	0.44							0.00	0.39	0.39	0.11	0.55	34.22	13.25	200	1.00	1.06	33.67	98.39
Littlerock Drive	153A	154A	6				0.34	20	85	4.00	1.38							0.00	0.34	2.34	0.66	2.04	20.24	78.37	200	0.35	0.62	18.21	89.95
Fairweather Street	154A	Blkhd (S)	8				0.39	27	27	4.00	0.44							0.00	0.39	0.39	0.11	0.55	44.61	13.26	200	1.70	1.38	44.06	98.77
Littlerock Drive	154A	Blkhd (E)	5				0.30	17	102	4.00	1.65							0.00	0.30	2.64	0.74	2.39	27.59	14.32	200	0.65	0.85	25.20	91.34
Fairweather Street	154A	107 A					0.12	0	85	4.00	1.38							0.00	0.12	2.46	0.69	2.07	24.19	76.55	200	0.50	0.75	22.13	91.45
Sunburst Street	107 A	110 A			10		0.33	27	300	4.00	4.86		1.89		2.77			4.05	0.33	9.65	2.70	11.61	32.46	78.00	200	0.90	1.00	20.85	64.24
Kingswell Street	108 A	109 A			18		0.69	49	49	4.00	0.79							0.00	0.69	0.69	0.19	0.98	26.50	60.84	200	0.60	0.82	25.52	96.29
Kingswell Street	109 A	110 A			20		0.54	54	103	4.00	1.66							0.00	0.54	1.23	0.34	2.00	26.50	76.81	200	0.60	0.82	24.50	92.44
Sunburst Street	110 A	114 A			10		0.37	27	430	4.00	6.96		1.89		2.77			4.05	0.37	11.25	3.15	14.16	34.22	78.00	200	1.00	1.06	20.06	58.63
Laguna Street	112 A	113 A			20		0.71	54	54	4.00	0.88							0.00	0.71	0.71	0.20	1.08	28.63	63.72	200	0.70	0.88	27.55	96.23
Laguna Street	113 A	114 A			18		0.52	49	103	4.00	1.66							0.00	0.52	1.23	0.34	2.00	28.63	73.43	200	0.70	0.88	26.62	93.00
Sunburst Street	114 A	117 A			6		0.26	16	549	3.95	8.78		1.89		2.77			4.05	0.26	12.74	3.57	16.39	46.54	78.00	200	1.85	1.44	30.15	64.78
Fernside Street	115A	116 A	6				0.52	20	20	4.00	0.33							0.00	0.52	0.52	0.15	0.48	30.60	63.83	200	0.80	0.94	30.13	98.45
Fernside Street	116 A	117 A	5				0.31	17	37	4.00	0.61							0.00	0.31	0.83	0.23	0.84	30.60	72.96	200	0.80	0.94	29.76	97.25
Fernside Street	117A	Bulkhead	5				0.29	17	17	4.00	0.28							0.00	0.29	0.29	0.08	0.36	48.39	36.72	200	2.00	1.49	48.03	99.25
Sunburst Street	117 A	121 A	11				0.51	37	640	3.92	10.16		1.89		2.77			4.05	0.51	14.37	4.02	18.23	46.54	78.20	200	1.85	1.44	28.31	60.83
Ivy Green	116 A	119 A	10				0.49	34	34	4.00	0.55							0.00	0.49	0.49	0.14	0.69	50.98	70.57	200	2.22	1.57	50.29	98.65
Ivy Green	119 A	120 A	2				0.14	7	41	4.00	0.66							0.00	0.14	0.63	0.18	0.84	50.98	11.93	200	2.22	1.57	50.15	98.36
Ivy Green	120 A	121 A	5				0.30	17	58	4.00	0.94							0.00	0.30	0.93	0.26	1.20	61.68	64.98	200	3.25	1.90	60.48	98.05
Sunburst Street	121 A	126 A	5				0.31	17	715	3.89	11.27		1.89		2.77			4.05	0.31	15.61	4.37	19.69	44.61	79.51	200	1.70	1.38	24.93	55.87
Summertime Drive	122 A	123 A	9				0.61	31	31	4.00	0.50							0.00	9.60	9.60	2.69	3.19	45.26	106.94	200	1.75	1.40	42.08	92.96
Summertime Drive	123 A	124 A	3				0.22	10	41	4.00	0.66							0.00	0.22	9.82	2.75	3.41	34.22	32.83	200	1.00	1.06	30.81	90.04
Summertime Drive	124 A	125 A	3				0.23	10	51	4.00	0.83							0.00	0.23	10.05	2.81	3.64	30.60	25.50	200	0.80	0.94	26.96	88.09
Summertime Drive	125 A	126 A	16				0.93	54	105	4.00	1.71							0.00	0.93	10.98	3.07	4.78	54.10	111.68	200	2.50	1.67	49.32	91.16
Summertime Drive	126 A	127 A	3				0.27	10	831	3.85	12.96		1.89		2.77			4.05	0.27	26.86	7.52	24.53	65.07	74.61	250	1.10	1.28	40.54	62.31
Future Street	Cap	127 A					1.10	66	66	4.00	1.07							0.00	1.10	1.10	0.31	1.38	48.39	22.00	200	2.00	1.49	47.01	97.15
Summertime Drive	127 A	128 A					0.15	0	897	3.83	13.91		1.89		2.77			4.05	0.15	28.11	7.87	25.83	65.07	78.00	250	1.10	1.28	39.24	60.31
Future Street (West)	Cap	128 A					1.10	66	66	4.00	1.07							0.00	1.10	1.10	0.31	1.38	48.39	22.00	200	2.00	1.49	47.01	97.15
Summertime Drive	128 A	129 A	12				0.73	41	1004	3.80	15.44		1.89		2.77			4.05	0.73	29.94	8.38	27.87	65.07	104.53	250	1.10	1.28	37.20	57.17
Summertime Drive	129 A	133 A					0.06	0	1004	3.80	15.44		1.89		2.77			4.05	0.06	30.00	8.40	27.89	65.07	27.54	250	1.10	1.28	37.18	57.14

Designed: P.K.
Checked: JIM
Dwg Reference: 3791-501A, 3791-501B

Revision	Date
7. Issued For MOE Approval	02/03/2011
6. Re-issued for City Comments	11/01/2011
5. Re-issued for City Comments	22/12/2010
4. Re-issued for City Comments	22/09/2010
3. Re-issued for City Comments	27/05/2010

File Reference: 3791.5.7.1 **Date:** 13/08/2010
Sheet No.: 1 of 2

Population per unit:

Singles	3.4
Semis & Towns	2.7
High Density	1.9
Other Lands	60 cap/Ha

Flow rate: 350 L/cap/day

Harmon formula = $1+(14/(4+P^{0.5}))$
P = population in thousands

ICI flow rates:

			Peak Factor
Institutional	50,000	L/Ha/day	1.5
Commercial	50,000	L/Ha/day	1.5
Industrial	35,000	L/Ha/day	MOE

Infiltration Allowance: 0.28 L/sec/Ha

Manning's coefficient (n): 0.013

IBI GROUP
400 - 333 Preston Street
Ottawa, Ontario
K1S 5N4

SANITARY SEWER DESIGN SHEET

PROJECT: Leitrim - Phase 1
LOCATION: City of Ottawa
CLIENT: Claridge Homes (Bank Street) Inc.

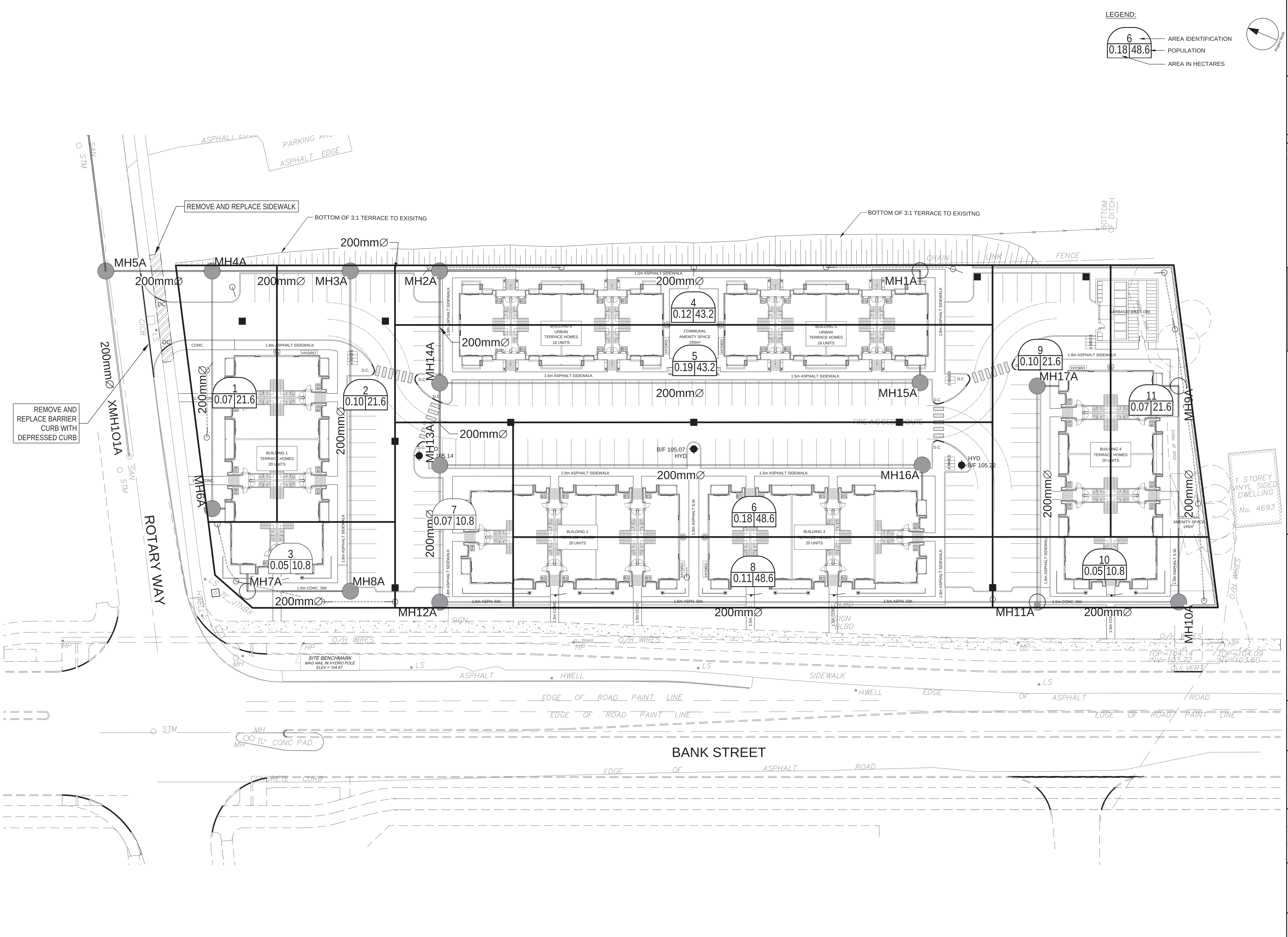
LOCATION			RESIDENTIAL LANDS									ICI LANDS							INFILTRATION ALLOWANCE			TOTAL FLOW	SEWER DATA						
STREET	FROM MH	TO MH	UNITS					POPULATION		POPULATION FLOW		AREA (Ha)							AREA (Ha)				CAP	LENGTH	DIAMETER	SLOPE	VELOCITY	AVAILABLE CAP	
			Singles	Semis	Towns	Stacked	Area (Ha)	IND	CUM	PEAK FACTOR	FLOW (L/s)	INSTITUITIONAL IND	INSTITUITIONAL CUM	COMMERCIAL IND	COMMERCIAL CUM	INDUSTRIAL IND	INDUSTRIAL CUM	FLOW (L/s)	IND	CUM	FLOW (L/s)	(L/s)	(L/s)	(m)	(mm)	(%)	(m/s)	(L/s)	(%)
	Blkhd	133A					4.47	268	268										4.47										
							7.08	425	693										7.08										
							1.78	0	693										1.78										
			21				1.08	71	764	3.87	11.99							0.00	1.08	14.41	4.03	16.02	36.70	15.00	250	0.35	0.72	20.68	56.34
Future Street	133 A	134A	3				0.38	10	1778	3.62	26.11		1.89		2.77			4.05	0.38	44.79	12.54	42.70	91.46	29.49	375	0.25	0.80	48.76	53.31
Future Street	134A	135A	13				0.82	44	1822	3.62	26.70		1.89		2.77			4.05	0.82	45.61	12.77	43.52	91.46	108.51	375	0.25	0.80	47.94	52.42
Future Street (North)	Blkhd	135A					3.46	208	208	4.00	3.36							0.00	3.46	3.46	0.97	4.33	20.24	10.00	200	0.35	0.62	15.91	78.62
Easement	135A	136A					0.19	11	2041	3.58	29.59		1.89		2.77			4.05	0.19	49.26	13.79	47.43	91.46	55.17	375	0.25	0.80	44.03	48.14
Easement	136 A	137 A					0.08	0	2041	3.58	29.59		1.89		2.77			4.05	0.08	49.34	13.82	47.45	91.46	40.85	375	0.25	0.80	44.01	48.12
Easement	137 A	138 A					0.15	0	2041	3.58	29.59		1.89		2.77			4.05	0.15	49.49	13.86	47.49	91.46	96.96	375	0.25	0.80	43.96	48.07
Easement	138 A	139 A					0.15	0	2041	3.58	29.59		1.89		2.77			4.05	0.15	49.64	13.90	47.53	91.46	102.35	375	0.25	0.80	43.92	48.02
Easement	139 A	140 A					0.13	0	2041	3.58	29.59		1.89		2.77			4.05	0.13	49.77	13.94	47.57	91.46	84.98	375	0.25	0.80	43.88	47.98
Easement	140 A	141A					0.11	0	2041	3.58	29.59		1.89		2.77			4.05	0.11	49.88	13.97	47.60	91.46	86.00	375	0.25	0.80	43.85	47.95
Easement	141A	207A					0.18	0	2041	3.58	29.59		1.89		2.77			4.05	0.18	50.06	14.02	47.65	91.46	60.58	375	0.25	0.80	43.80	47.90
Easement	207A	206 A					0.31	0	2041	3.58	29.59		1.89		2.77			4.05	0.31	50.37	14.10	47.74	91.46	120.00	375	0.25	0.80	43.72	47.80
Easement	206 A	205 A					0.31	0	2041	3.58	29.59		1.89		2.77			4.05	0.31	50.68	14.19	47.83	91.46	120.00	375	0.25	0.80	43.63	47.71
Easement	205 A	204 A					0.31	0	2041	3.58	29.59		1.89		2.77			4.05	0.31	50.99	14.28	47.91	91.46	120.00	375	0.25	0.80	43.54	47.61
Easement	204 A	203 A					0.31	0	2041	3.58	29.59		1.89		2.77			4.05	0.31	51.30	14.36	48.00	91.46	120.00	375	0.25	0.80	43.46	47.52
Easement	203 A	202 A					0.31	0	2041	3.58	29.59		1.89		2.77			4.05	0.31	51.61	14.45	48.09	91.46	120.00	375	0.25	0.80	43.37	47.42
Easement	202 A	201 A					0.26	0	2041	3.58	29.59		1.89		2.77			4.05	0.26	51.87	14.52	48.16	91.46	97.84	375	0.25	0.80	43.30	47.34
Easement	201 A	200A					0.14	0	2041	3.58	29.59		1.89		2.77			4.05	0.14	52.01	14.56	48.20	91.46	41.90	375	0.25	0.80	43.26	47.30
Easement/Findlay Creek Drive	200A	*Ex MH*					0.00	0	2041	3.58	29.59		1.89		2.77			4.05	0.00	52.01	14.56	48.20	153.03	61.90	375	0.70	1.34	104.84	68.51
																								1404.23					

Designed:	P.K.	7 Issued For MOE Approval	02/03/2011	**Population per unit:**	
		6. Re-issued for City Comments	11/01/2011	Singles	3.4
Checked:	JIM	5. Re-issued for City Comments	22/12/2010	Semis & Towns	2.7
		4. Re-issued for City Comments	22/09/2010	High Density	1.9
		3. Re-issued for City Comments	27/05/2010	Other Lands	60 cap/Ha
		Revision	Date	**Flow rate:**	350 L/cap/day
Dwg Reference:	3791-501A 3791-501B	**File Reference:** 3791.5.7.1	**Date:** 13/08/2010	**Sheet No.:** 2 of 2	Harmon formula = $1+(14/(4+P^{0.5}))$ P = population in thousands

ICI flow rates:			Peak Factor
Institutional	50,000	L/Ha/day	1.5
Commercial	50,000	L/Ha/day	1.5
Industrial	35,000	L/Ha/day	MOE

Infiltration Allowance: 0.28 L/sec/Ha

Manning's ceofficient (n): 0.013



CLIENT

GLENVIEW HOMES

190 O'Connor St., 11th floor, Ottawa, ON

COPYRIGHT

ISSUES

No.	DESCRIPTION	DATE
1	SUBMITTED FOR ZBA AND SPA	2020-08-28

NOT FOR CONSTRUCTION

KEY PLAN

SITE

CONSULTANTS

Project Coordinator
Terrain Development Consulting
Architect:
M. David Blakely Architects Inc.
Landscape:
James B. Lennox & Assoc. Inc.
Surveyor:
J.D.Barnes Ltd.
Geotech:
Golder Associates Ltd.

SEAL

LICENSED PROFESSIONAL ENGINEER
D. Yannoulopoulos
2020-08-28
PROVINCE OF ONTARIO

IBI GROUP
Suite 400 – 333 Preston Street
Ottawa ON K1S 5N4 Canada
tel 613 225 1311 / 613 241 3300 fax 613 225 9868
ibigroup.com

PROJECT

4639 BANK STREET

4639 Bank Street

PROJECT NO:
125600

DRAWN BY:	CHECKED BY:
D.D./E.H.	R.M.
PROJECT MGR:	APPROVED BY:
D.Y.	D.Y.

SHEET TITLE

SANITARY DRAINAGE AREA PLAN

SHEET NUMBER	ISSUE
C-400	1

IBI GROUP
400-333 Preston Street
Ottawa, Ontario K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

SANITARY SEWER DESIGN SHEET

4639 Bank St
CITY OF OTTAWA
Glenview Homes

LOCATION				RESIDENTIAL										ICI AREAS								INFILTRATION ALLOWANCE			FIXED FLOW (L/s)		TOTAL FLOW	PROPOSED SEWER DESIGN						
				AREA	UNIT TYPES				AREA	POPULATION		RES PEAK	PEAK FLOW	AREA (Ha)						ICI PEAK	PEAK FLOW	AREA (Ha)		FLOW				CAPACITY	LENGTH	DIA	SLOPE	VELOCITY	AVAILABLE CAPACITY	
STREET	AREA ID	FROM MH	TO MH	w/ Units (Ha)	SF	SD	TH	APT	w/o Units (Ha)	IND	CUM	FACTOR	(L/s)	INSTITUTIONAL IND	INSTITUTIONAL CUM	COMMERCIAL IND	COMMERCIAL CUM	INDUSTRIAL IND	INDUSTRIAL CUM	FACTOR	(L/s)	IND	CUM	(L/s)	IND	CUM	(L/s)	(L/s)	(m)	(mm)	(%)	(full) (m/s)	L/s	(%)
OUTLET TO ROTARY WAY																																		
	11	9A	10A	0.07			8			21.6	21.6	3.70	0.26	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.07	0.1	0.02	0.00	0.00	0.28	21.64	38.93	200	0.40	0.667	21.36	98.70%
	10	10A	11A	0.05			4			10.8	32.4	3.68	0.39	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.05	0.1	0.04	0.00	0.00	0.43	21.64	25.46	200	0.40	0.667	21.21	98.03%
	9	17A	11A	0.10			8			21.6	21.6	3.70	0.26	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.10	0.1	0.03	0.00	0.00	0.29	27.59	38.93	200	0.65	0.851	27.29	98.94%
	8	11A	12A	0.11			18			48.6	102.6	3.59	1.19	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.11	0.3	0.11	0.00	0.00	1.30	24.19	107.70	200	0.50	0.746	22.89	94.61%
	7	12A	13A	0.07			4			10.8	113.4	3.58	1.32	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.07	0.4	0.13	0.00	0.00	1.45	24.19	24.71	200	0.50	0.746	22.75	94.01%
	6	16A	13A	0.18			18			48.6	48.6	3.65	0.58	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.18	0.2	0.06	0.00	0.00	0.63	27.59	86.96	200	0.65	0.851	26.95	97.70%
		13A	14A							0.0	162.0	3.54	1.86	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.6	0.19	0.00	0.00	2.05	24.19	14.80	200	0.50	0.746	22.14	91.52%
	5	15A	14A	0.19			16			43.2	43.2	3.66	0.51	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.19	0.2	0.06	0.00	0.00	0.58	27.59	86.59	200	0.65	0.851	27.01	97.91%
		14A	2A							0.0	205.2	3.52	2.34	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.8	0.25	0.00	0.00	2.59	24.19	20.21	200	0.50	0.746	21.60	89.29%
	4	1A	2A	0.12			16			43.2	43.2	3.66	0.51	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.12	0.1	0.04	0.00	0.00	0.55	27.59	86.59	200	0.65	0.851	27.03	98.00%
		2A	3A							0.0	248.4	3.49	2.81	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.9	0.29	0.00	0.00	3.10	24.19	16.10	200	0.50	0.746	21.09	87.18%
	3	7A	8A	0.05			4			10.8	10.8	3.73	0.13	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.05	0.1	0.02	0.00	0.00	0.15	27.59	18.56	200	0.65	0.851	27.44	99.47%
	2	8A	3A	0.10			8			21.6	32.4	3.68	0.39	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.10	0.2	0.05	0.00	0.00	0.44	27.59	57.72	200	0.65	0.851	27.15	98.42%
		3A	4A							0.0	280.8	3.47	3.16	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	1.0	0.34	0.00	0.00	3.50	24.19	24.90	200	0.50	0.746	20.69	85.52%
	1	6A	4A	0.07			8			21.6	21.6	3.70	0.26	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.07	0.1	0.02	0.00	0.00	0.28	27.59	42.83	200	0.65	0.851	27.30	98.98%
		4A	5A(EX)							0.0	302.4	3.46	3.39	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	1.1	0.37	0.00	0.00	3.76	59.26	19.18	200	3.00	1.828	55.51	93.66%
				1.11	0		112			302.4																								

Design Parameters:

Residential			ICI Areas			
SF	3.4	p/p/u	INST	28,000	L/Ha/day	
TH/SD*	2.7	p/p/u	COM	28,000	L/Ha/day	
APT	1.8	p/p/u	IND	35,000	L/Ha/day	MOE Chart
Other	60	p/p/Ha		17000	L/Ha/day	

Notes:
1. Mannings coefficient (n) = 0.013
2. Demand (per capita): 280 L/day 200 L/day
3. Infiltration allowance: 0.33 L/s/Ha
4. Residential Peaking Factor:
Harmon Formula = 1+(14/(4+(P/1000)^0.5))0.8
where K = 0.8 Correction Factor
5. Commercial and Institutional Peak Factors based on total area, 1.5 if greater than 20%, otherwise 1.0

Designed: R.M.
Checked: D.G.Y.
Dwg. Reference: 125600-400

No.	Revision	Date
1.	Servicing Brief - Submission No. 1	2020-08-28

File Reference: 125600.6.4.4.
Date: 2020-08-28
Sheet No: 1 of 1

APPENDIX C

Sundance Village Phase 1 Storm Design Sheet
Sundance Village Phase 1 Storm Drainage Area Plan
Storm Sewer Design Sheet
125600-500 Storm Drainage Plan
StormTech Underground Storage System
Modified Rational Method Calculation Sheet

IBI GROUP
IBI Group
400 - 333 Preston Street
Ottawa, Ontario
K1S 5N4

STORM SEWER DESIGN SHEET

PROJECT: Sundance Village Phase 1
LOCATION: City of Ottawa
CLIENT: Claridge Homes (Bank Street) Inc.

LOCATION			AREA (Ha)						2.78AC		RATIONAL DESIGN FLOW						GENERIC CAPTURE RATE						SEWER DATA						
STREET	FROM MH	TO MH	C= 0.20	C= 0.45	C= 0.50	C= 0.55	C= 0.60	C= 0.90	IND	CUM	TIME (min)			I (mm/hr)		PEAK FLOW (L/s)		AREA (Ha)		FLOW (L/s)			CAP (L/s)	LENGTH (m)	DIAMETER (mm)	SLOPE (%)	VELOCITY (m/s)	AVAILABLE CAP	
											INLET	IN PIPE	TOTAL	5-year	10-year	IND	TOTAL	IND	CUM	IND	CUM	TOTAL						(L/s)	(%)
External Lands Tc = 10min + 506m / 1.0m/s = 18.43min																													
Summertime Drive	100	101					2.52		4.20	4.20	18.43			73.90		310.61	310.61	2.52	2.52	214.20	214.20	214.20							
Bank Street 10-Year Flow	100	101					0.00		1.50	1.50	18.43	0.52	18.95		86.49	129.65	440.46	0.00	0.00	216.00	216.00	430.20	452.94	48.45	600	0.50	1.552	12.48	2.76
		DI 1					0.74		1.23	1.23	34.65	0.15	34.80	48.86		60.30	60.30	0.74	0.74	62.90	62.90	62.90	142.67	17.08	300	2.00	1.955	79.77	55.91
Future Commercial	CAP	101					1.28		2.14	2.14	17.50	0.29	17.79	76.26		162.83	162.83	1.28	1.28	108.80	108.80	108.80	200.65	15.53	525	0.20	0.896	37.82	18.85
Existing Commercial	DI 2	101					1.40		2.34	2.34	17.00	0.07	17.07	77.61		181.23	181.23	1.40	1.40	119.00	119.00	119.00	258.68	10.00	375	2.00	2.269	77.45	29.94
Summertime Drive	101	102					0.26		0.43	9.11	18.95			72.64		661.56	661.58	0.26	5.46	22.10	464.10	464.10							
									0.00	1.50	18.95	0.66	19.61		85.02	127.63	789.21	0.00	0.90	0.00	216.00	680.10	820.21	58.53	825	0.30	1.486	31.01	3.78
Site restricted to 125 L/s: Refer to Trow Associates Design																													
Ottawa Rotary Home	CAP	102					1.89		3.15	3.15	23.50	0.24	23.74	63.40		125.00	125.00	1.89	1.89	160.65	160.65	160.65	162.91	14.16	450	0.30	0.992	2.26	1.39
Summertime Drive	102	103					0.25		0.42	12.68	23.74			62.99		798.49	798.49	0.25	7.60	21.25	646.00	646.00							
									0.00	1.50	23.74	0.70	24.44		73.98	110.61	909.10	0.00	0.90	0.00	216.00	862.00	947.10	72.08	825	0.40	1.716	38.01	4.01
Existing Commercial		DI 3					1.49		2.49	2.49	17.00	0.07	17.07	77.61		192.88	192.88	1.49	1.49	126.65	126.65	126.65	258.68	9.00	375	2.00	2.269	65.80	25.44
Summertime Drive	103	104					0.00		0.00	15.16	24.44			61.81		937.15	937.15	0.00	7.60	0.00	646.00	646.00							
									0.00	1.50	24.44	0.51	24.95		72.39	108.53	1,045.68	0.00	0.90	0.00	216.00	862.00	1,110.58	61.80	825	0.55	2.013	64.90	5.84
Fairweather Street	104	105					0.46		0.77	15.93	24.95			60.98		971.32	971.32	0.46	8.06	39.10	685.10	685.10							
									0.00	1.50	24.95	0.63	25.58		71.32	107.06	1,078.39	0.00	0.90	0.00	216.00	901.10	1,110.58	75.73	825	0.55	2.013	32.19	2.90
Fairweather Street	105	107					0.83		1.38	17.31	25.58			59.99		1038.67	1,038.67	0.83	8.89	70.55	755.65	755.65							
									0.00	1.50	25.58	0.61	26.19		70.16	105.35	1,144.00	0.00	0.90	0.00	216.00	971.65	1,159.96	77.29	825	0.60	2.102	15.96	1.38
External		DI 10		0.48					0.60	0.60	15.00	0.08	15.08	83.56		50.17	50.17	0.48	0.48	40.80	40.80	40.80	54.10	8.00	200	2.50	1.668	3.93	7.26
Fiddlehead Drive	150	151		0.51					0.64	1.24	15.08	1.75	16.83	83.30		103.17	103.17	0.51	0.99	43.35	84.15	84.15	115.68	106.82	375	0.40	1.015	12.52	10.82
Littlerock Drive	151	152		0.00					0.00	1.24	16.83	0.18	17.02	78.06		96.68	96.68	0.00	0.99	0.00	84.15	84.15	115.68	11.21	375	0.40	1.015	19.00	16.43
Littlerock Drive	152	153		0.28					0.35	1.59	17.02	1.03	18.05	77.56		123.22	123.22	0.28	1.27	23.80	107.95	107.95	129.34	70.07	375	0.50	1.134	6.12	4.73
Shasta Street	153	Stub (S)		0.37					0.46	0.46	10.00	0.18	10.18	104.19		48.23	48.23	0.37	0.37	31.45	31.45	31.45	100.88	14.75	300	1.00	1.383	52.65	52.19
Littlerock Drive	153	154		0.19					0.24	1.83	18.05	1.22	19.27	74.85		135.71	135.71	0.19	1.46	16.15	124.10	124.10	175.96	78.46	450	0.35	1.072	39.26	22.31
Fairweather Street	154	Stub (S)		0.39					0.49	0.49	10.00	0.16	10.16	104.19		50.83	50.83	0.39	0.39	33.15	33.15	33.15	80.89	15.00	250	1.70	1.596	30.05	37.15
Littlerock Drive	154	Stub (E)		0.43					0.54	0.54	10.00	0.26	10.26	104.19		56.05	56.05	0.43	0.43	36.55	36.55	36.55	71.33	15.00	300	0.50	0.978	15.29	21.43
Fairweather Street	154	107		0.35					0.44	2.26	19.27	1.07	20.34	71.90		162.80	162.80	0.35	1.81	29.75	153.85	153.85	265.43	76.52	525	0.35	1.188	102.63	38.66
Sunburst Street	107	110				0.35			0.54	20.11	26.19			59.06		1187.91	1,187.91	0.35	11.05	29.75	939.25	939.25							
									0.00	1.50	26.19	0.54	26.73		69.07	103.69	1,291.60	0.00	0.90	0.00	216.00	1155.25	1,339.41	78.23	825	0.60	2.427	47.81	3.57
Kingswell Street	108	109				0.24			0.37	0.37	15.00	1.22	16.22	83.56		30.66	30.66	0.24	0.24	20.40	20.40	20.40	59.68	60.10	300	0.35	0.818	29.02	48.62
Kingswell Street	109	110				0.68			1.04	1.41	16.22	0.67	16.90	79.80		112.25	112.25	0.68	0.92	57.80	78.20	78.20	216.42	76.72	375	1.40	1.898	104.17	48.13
Sunburst Street	110	114				0.47			0.72	22.24	26.73			58.27		1295.89	1,295.89	0.47	12.44	39.95	1057.40	1057.40							
									0.00	1.50	26.73	0.49	27.22		68.14	102.30	1,398.19	0.00	0.90	0.00	216.00	1273.40	1,459.58	78.00	825	0.95	2.645	61.40	4.21
Summertime Drive	111	112				0.08	0.39		0.77	0.77	15.00	1.40	16.40	83.56		64.58	64.58	0.47	0.47	39.95	39.95	39.95	67.67	78.00	300	0.45	0.927	3.10	4.58
External Lands Tc = 49.19min																													
External Lands (Leitrim Park)	DI 4	112	2.31						1.28	1.28	49.19	0.09	49.28	38.10		48.94	48.94	2.31	2.31	196.35	196.35	196.35	225.58	16.00	300	5.00	3.092	29.23	12.96
Laguna Street	112	113				0.18			0.28	2.33	49.28	0.72	50.00	38.05		88.76	88.76	0.18	2.96	15.30	211.65	211.65	297.43	78.43	450	1.00	1.812	85.78	28.84
	113	114				0.57			0.87	3.20	50.00	0.61	50.60	37.65		120.64	120.64	0.57	3.53	46.45	260.10	260.10	332.54	73.74	450	1.25	2.026	72.44	21.78
Sunburst Street	114	117				0.75			1.15	26.59	27.22			57.57		1530.76	1,530.76	0.75	16.72	63.75	1421.20	1421.20							
									0.00	1.50	27.22	0.40	27.62		67.32	101.05	1,631.82	0.00	0.90	0.00	216.00	1637.20	1,771.87	77.50	825	1.40	3.211	134.67	7.60
Fernside Street	115	116		0.18		0.19			0.52	0.52	15.00	1.09	16.09	83.56		43.09	43.09	0.37	0.37	31.45	31.45	31.45	50.02	64.43	250	0.65	0.987	6.93	13.85
	116	117		0.25					0.31	0.83	16.09	0.75	16.84	80.20		66.44	66.44	0.25	0.62	21.25	52.70	52.70	82.07	73.09	250	1.75	1.620	15.63	19.04
Fernside Street	117	Bulkhead		0.34					0.43	0.43	10.00	0.37	10.37	104.19		44.32	44.32	0.34	0.34	28.90	28.90	28.90	87.74	36.72	250	2.00	1.731	43.42	49.49
Sunburst Street	117	121		0.12					0.15	27.99	27.62			57.01		1595.89	1,595.89	0.12	17.46	10.20	1484.10	1484.10							
									0.00	1.50	27.62	0.41	28.03		66.66	100.07	1,695.97	0.00	0.90	0.00	216.00	1700.10	1,834.06	82.40	825	1.50	3.324	133.96	7.30
Ivy Green	116	119		0.00					0.00	0.00	15.00	0.69	15.69	83.56		0.00	0.00	0.00	0.00	0.00	0.00	0.00	89.90	73.73	250	2.10	1.774	89.90	100.00
	119	120		0.22					0.28	0.28	15.69	0.11	15.80	81.38		22.40	22.40	0.22	0.22	18.70	18.70	18.70	89.90	11.59	250	2.10	1.774	67.50	75.09
	120	121		0.50					0.63	0.90	15.80	0.60	16.41	81.05		73.01	73.01	0.50	0.72	42.50	61.20	61.20	89.90	64.37	250	2.10	1.774	16.90	18.79
Sunburst Street	121	126		0.48					0.60	29.49	28.03			56.45		1664.86	1,664.86	0.48	18.66	40.80	1586.10	1586.10							
									0.00	1.50	28.03	0.41	28.44		66.00	99.06	1,763.95	0.00	0.90	0.00	216.00	1802.10	2,153.32	80.73	900	1.30	3.279	351.22	16.31

Designed:	P.K.	7.Issued For MOE Approval	02/03/2011	
		6. Re-Issued for City Comments	11/01/2011	
		5. Re-Issued for City Comments	22/12/2010	
Checked:	JIM	4. Re-Issued for City Comments	22/09/2010	
		3. Re-Issued for City Comments	27/05/2010	
		Revision	Date	
Dwg. Reference:	3791-500A 3791-500B	File Reference: 3791.5.7.1	Date: 05/02/2010	Sheet No: 1 of 2

Rational flow:
Q = 2.78CiA, where:
Q = Peak flow in litres per second (L/s)
A = Area in hectares (Ha)
i = Rainfall intensity in millimeters per hour (mm/hr)
[i = 998.071/(T_C+6.053)$^{0.814}$]

Generic Capture Rates:		
	65.00	L/s/Ha
	240.00	L/s/Ha

Mannings Coefficient (n):		
	0.013	sewers
	0.024	culverts

IBI GROUP
IBI Group
400 - 333 Preston Street
Ottawa, Ontario
K1S 5N4

STORM SEWER DESIGN SHEET

PROJECT: Sundance Village Phase 1
LOCATION: City of Ottawa
CLIENT: Claridge Homes (Bank Street) Inc

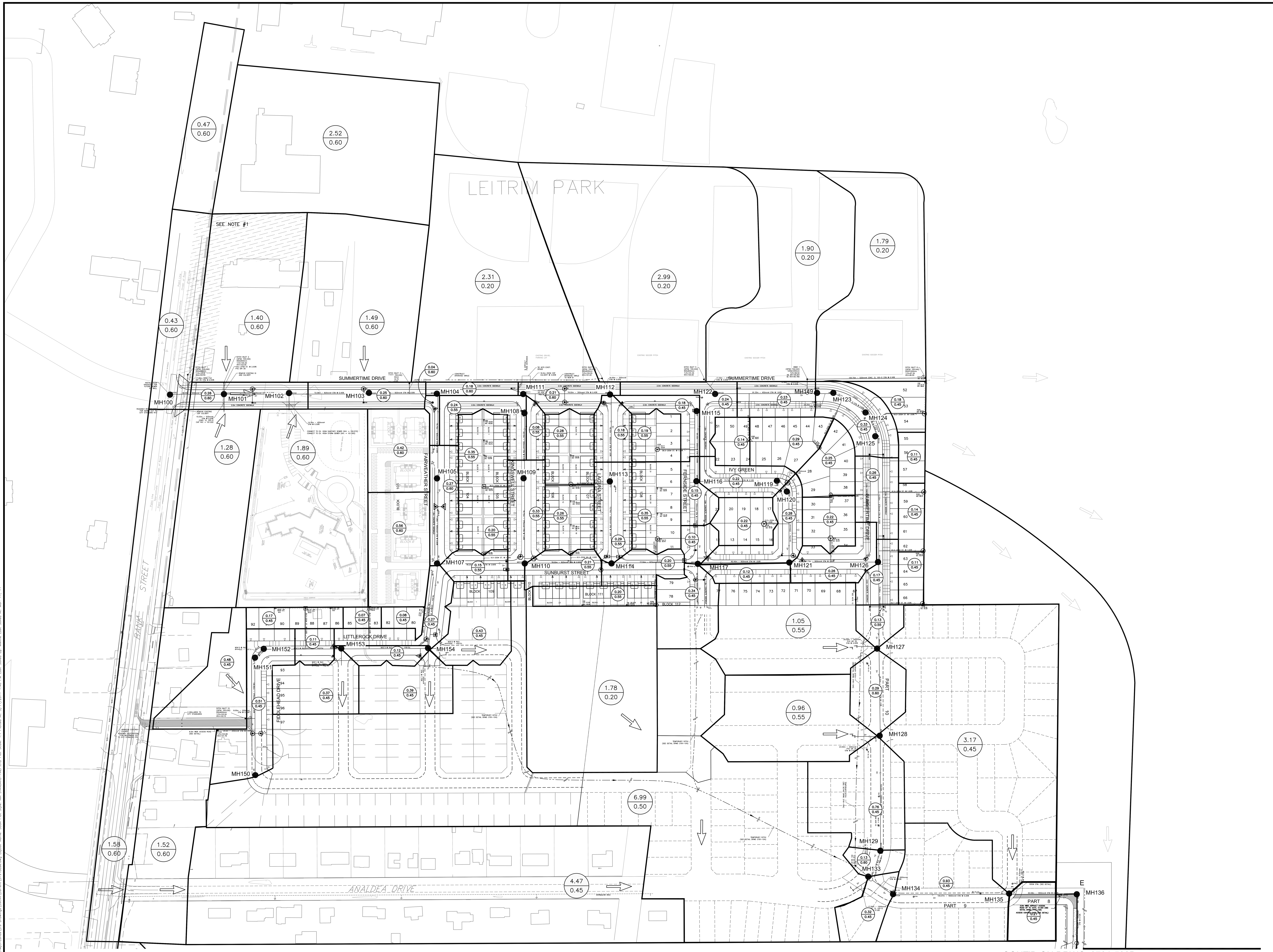
LOCATION			AREA (Ha)						2.78AC		RATIONAL DESIGN FLOW						LEVEL OF SERVICE					SEWER DATA						
STREET	FROM MH	TO MH	C= 0.20	C= 0.45	C= 0.50	C= 0.55	C= 0.60	C= 0.90	IND	CUM	TIME (min) INLET	TIME (min) IN PIPE	TIME (min) TOTAL	i (mm/hr) 5-year	i (mm/hr) 10-year	PEAK FLOW (L/s) IND	PEAK FLOW (L/s) TOTAL	AREA (Ha) IND	AREA (Ha) CUM	FLOW (L/s) IND	FLOW (L/s) CUM	FLOW (L/s) TOTAL	CAP (L/s)	LENGTH (m)	DIAMETER (mm)	SLOPE (%)	VELOCITY (m/s)	AVAILABLE CAP (L/s)	AVAILABLE CAP (%)
											External Lands Tc = 58.85min																		
External Lands (Leitrim Park)	DI 5	122	2.99						1.66	1.66	58.85	0.10	58.95	33.42		55.56	55.56	2.99	2.99	254.15	254.15	254.15	316.81	17.30	375	3.00	2.779	62.66	19.78
Summertime Drive	122	149		0.38					0.48	2.14	58.95	0.59	59.55	33.37		71.35	71.35	0.38	3.37	32.30	286.45	286.45	376.23	81.33	450	1.60	2.292	89.78	23.86
											External Lands Tc = 45.83min																		
External Lands (Leitrim Park)	DI 6	CBMH 1	1.79						1.00	1.00	45.83	2.19	48.02	40.10		39.91	39.91	1.79	1.79	152.15	152.15	152.15	179.46	105.70	525	0.16	0.803	27.31	15.22
External Lands (Leitrim Park)	CBMH 1	149	1.90						1.06	2.05	48.02	0.15	48.17	38.77		79.54	79.54	1.90	3.69	161.50	313.65	313.65	332.73	12.98	525	0.55	1.489	19.08	5.74
Summertime Drive	149	123		0.23					0.29	4.48	59.55	0.18	59.73	33.13		148.33	148.33	0.23	7.29	19.55	600.10	600.10	640.56	24.25	600	1.00	2.195	40.46	6.32
Summertime Drive	123	124		0.29					0.36	4.84	59.73	0.25	59.98	33.05		159.98	159.98	0.29	7.58	24.65	624.75	624.75	784.35	32.23	675	0.80	2.123	159.60	20.35
Summertime Drive	124	125		0.18					0.23	5.07	59.98	0.18	60.17	32.95		166.90	166.90	0.18	7.76	15.30	640.05	640.05	784.35	23.38	675	0.80	2.123	144.30	18.40
Summertime Drive	125	126		1.09					1.36	6.43	60.17	0.65	60.81	32.88		211.35	211.35	1.09	8.85	92.65	732.70	732.70	1,074.02	112.55	675	1.50	2.908	341.32	31.78
Summertime Drive	126	127		0.28		0.13			0.55	36.47	28.44			55.90		2,038.78	2,038.78	0.41	27.92	34.85	2373.20	2373.20							
									0.00	1.50	28.44	0.38	28.82		65.36	98.12	2,136.90	0.00	0.90	0.00	216.00	2589.20	2,987.84	75.85	1050	1.10	3.343	398.64	13.34
Future Street	Cap	127				1.05			1.61	1.61	16.09	0.17	16.26	80.19		128.75	128.75	1.05	1.05	89.25	89.25	89.25	142.67	20.00	300	2.00	1.955	13.92	9.76
Summertime Drive	127	128					0.29		0.48	38.56	28.82			55.41		2,136.52	2,136.52	0.29	29.26	24.65	2487.10	2487.10							
									0.00	1.50	28.82	0.40	29.23		64.76	97.25	2,233.77	0.00	0.90	0.00	216.00	2703.10	2,987.84	81.01	1050	1.10	3.343	284.74	9.53
Future Street	Cap	128				0.96			1.47	1.47	16.20	0.20	16.40	79.87		117.24	117.24	0.96	0.96	81.60	81.60	81.60	142.67	23.00	300	2.00	1.955	25.43	17.83
Summertime Drive	128	129		0.76					0.95	40.98	29.23			54.89		2,249.34	2,249.34	0.76	30.98	64.60	2633.30	2633.30							
									0.00	1.50	29.23	0.64	29.86		64.17	98.34	2,345.68	0.00	0.90	0.00	216.00	2849.30	3,150.52	103.03	1200	0.60	2.699	301.22	9.56
Summertime Drive	129	133					0.13		0.22	41.20	29.86			54.10		2,228.58	2,228.58	0.13	31.11	11.05	2644.35	2644.35							
									0.00	1.50	29.86	0.17	30.03		63.24	94.84	2,323.52	0.00	0.90	0.00	216.00	2860.35	3,150.52	26.84	1200	0.60	2.699	290.17	9.21
											External Lands Tc = 10min + 1123m / 1.0m/s = 28.72min																		
Future Street	Bulkhead	133	1.78	5.66	6.99		1.52		20.32	20.32	28.72			55.54		1,128.63	1,128.63	15.95	15.95	1355.75	1355.75	1355.75							
Bank Street 10-Year Flow	Bulkhead	133					1.58		2.64	2.64	28.72	0.23	28.95		64.94	171.13	1,299.77	1.58	1.58	379.20	379.20	1734.95	2,332.02	17.50	1500	0.10	1.278	597.07	25.60
	DI 7	133	Refer To Section 4.5 Of Design Brief								Total of three overflow amounts (OVF-2, 3 & 4)						586.00	(Not included in Downstream Sewers)					634.50	17.93	525	2.00	2.839	48.50	7.64
Future Street	133	134		0.32					0.40	61.70	30.03			53.89		3,325.34	3,325.34	0.32	47.25	27.20	4016.25	4016.25							
									0.00	4.14	30.03	0.18	30.20		63.01	260.63	3,585.98	0.00	2.48	0.00	595.20	4611.45	5,995.88	24.01	1800	0.25	2.283	1,384.43	23.09
	134	135		0.93					1.16	62.87	30.20			53.68		3,374.70	3,374.70	0.93	48.18	79.05	4095.30	4095.30							
									0.00	4.14	30.20	0.77	30.97		62.76	259.60	3,634.31	0.00	2.48	0.00	595.20	4690.50	5,995.88	105.07	1800	0.25	2.283	1,305.38	21.77
									0.00																				
Future Street		135		3.17					3.97	3.97	20.50	0.09	20.59	69.17		274.31	274.31	3.17	3.17	269.45	269.45	269.45	339.63	5.00	675	0.15	0.919	65.32	19.23
Future Street	135	136		0.21					0.26	65.93	30.20			53.68		3,539.23	3,539.23	0.21	50.63	17.85	4303.55	4303.55							
									0.00	4.14	30.97	0.61	31.58		61.69	255.20	3,794.43	0.00	2.48	0.00	595.20	4898.75	5,142.48	60.58	1950	0.12	1.668	243.73	4.74
Easement	136	137							0.00	65.93	31.58			52.08		3,433.79	3,433.79	0.00	50.63	0.00	4303.55	4303.55							
									0.00	4.14	31.58	0.42	32.00		60.88	251.84	3,685.64	0.00	2.48	0.00	595.20	4898.75	5,142.48	42.50	1950	0.12	1.668	243.73	4.74
Easement	137	138							0.00	65.93	32.00			51.61		3,402.57	3,402.57	0.00	50.63	0.00	4303.55	4303.55							
									0.00	4.14	32.00	0.98	32.98		60.33	249.54	3,652.12	0.00	2.48	0.00	595.20	4898.75	5,142.48	97.80	1950	0.12	1.668	243.73	4.74
Easement	138	139							0.00	65.93	32.98			50.55		3,333.07	3,333.07	0.00	50.63	0.00	4303.55	4303.55							
									0.00	4.14	32.98	1.02	34.00		59.08	244.43	3,577.50	0.00	2.48	0.00	595.20	4898.75	5,142.48	102.36	1950	0.12	1.668	243.73	4.74
Easement	139	140							0.00	65.93	34.00			49.50		3,263.63	3,263.63	0.00	50.63	0.00	4303.55	4303.55							
									0.00	4.14	34.00	0.85	34.85		57.85	239.32	3,502.94	0.00	2.48	0.00	595.20	4898.75	5,142.48	85.00	1950	0.12	1.668	243.73	4.74
Easement	140	141							0.00	65.93	34.85			48.66		3,208.36	3,208.36	0.00	50.63	0.00	4303.55	4303.55							
									0.00	4.14	34.85	0.83	35.67		56.87	235.25	3,443.61	0.00	2.48	0.00	595.20	4898.75	5,142.48	82.61	1950	0.12	1.668	243.73	4.74
Easement	141	142							0.00	65.93	35.67			47.88		3,156.61	3,156.61	0.00	50.63	0.00	4303.55	4303.55							
									0.00	4.14	35.67	1.15	36.82		55.95	231.44	3,388.05	0.00	2.48	0.00	595.20	4898.75	5,142.48	115.00	1950	0.12	1.668	243.73	4.74
Easement	142	143							0.00	65.93	36.82			46.83		3,087.58	3,087.58	0.00	50.63	0.00	4303.55	4303.55							
									0.00	4.14	36.82	1.10	37.92		54.72	226.37	3,313.94	0.00	2.48	0.00	595.20	4898.75	5,142.48	110.00	1950	0.12	1.668	243.73	4.74
Easement	143	144							0.00	65.93	37.92			45.88		3,024.62	3,024.62	0.00	50.63	0.00	4303.55	4303.55							
									0.00	4.14	37.92	1.10	39.02		53.60	221.74	3,246.35	0.00	2.48	0.00	595.20	4898.75	5,142.48	110.00	1950	0.12	1.668	243.73	4.74
											Tc = 267.02 minutes (Airport Formula)																		
West Outlet Ditch Inlet Pipe	DI 8	144	57.48						31.96	31.96	267.02			17.45		557.65	557.65												
(1:100 yr rate)											Major Flow						585.00						1142.65	1,176.53	7.00	675	1.80	3.185	33.87	2.88
											Tc = 110.91 minutes (Airport Formula)																		
East Outlet Ditch Inlet Pipe	DI 9	144	11.41						6.34	6.34	110.91			34.98		221.90	221.90												
(1:100 yr rate)											Major Flow						585.00						606.90	859.40	4.91	600	1.80	2.945	52.50	8.11
Easement	144	145							0.00	104.23	39.02			44.96		4,686.67	4,686.67	0.00	50.63	0.00	4303.55	4303.55							
									0.00	4.14	39.02	0.31	39.33		52.53	217.31	4,903.98	0.00	2.48	0.00	595.20	4898.75	5,720.16	30.00	2100	0.10	1.600	816.18	14.27

Designed:	P K.	7.Issued For MOE Approval	02/03/2011
		6. Re-issued for City Comments	11/01/2011
		5. Re-issued for City Comments	22/12/2010
Checked:	JIM	4. Re-issued for City Comments	22/09/2010
		3. Re-issued for City Comments	27/05/2010
		Revision	Date
Dwg. Reference:	3791-500A 3791-500B	File Reference: 3791.5.7.1	Date: 05/02/2010
			Sheet No: 2 of 2

Rational flow:
Q = 2.78CiA, where:
Q = Peak flow in litres per second (L/s)
A = Area in hectares (Ha)
i = Rainfall intensity in millimeters per hour (mm/hr)
$[i = 998.071/(T_C+6.053)^{0.814}]$

Level of Service: 85.00 L/s/Ha
240.00 L/s/Ha

Mannings Coefficient (n): 0.013 sewers
0.024 culverts



CONT'D ON DRWG. 3791-500B

LEGEND :

- AREA IN HECTARES
- RUN OFF COEFFICIENT
- PROPSED FLOW DIRECTION
- EXISITNG FLOW DIRECTION

NOTES:

1) 0.74 Ha IS EXISTING AREA TRIBUTARY TO DITCH INLET #1

No.	REVISIONS	By	Date
14			
13			
12			
11			
10			
9			
8			
7	ISSUED FOR MOE APPROVAL		11:03:11
6	REVISED AS PER CITY COMMENTS		11:01:07
5	REVISED AS PER CITY COMMENTS		10:12:21
4	REVISED AS PER CITY COMMENTS		10:09:21
3	REVISED AS PER CITY COMMENTS		10:05:27
2	RE-ISSUED FOR CITY COMMENTS		10:04:09
1	ISSUED FOR CITY COMMENTS		10:02:05

CLARIDGE HOMES

IBI GROUP
333 Preston Street
Tower 1, Suite 400
Ottawa, Ontario
Canada K1S 5N4
Tel (613)225-1311
FAX (613)225-9868

Project Title

SUNDANCE VILLAGE PHASE 1

LICENSED PROFESSIONAL ENGINEER
J. I. MOFFATT
PROVINCE OF ONTARIO

N

Drawing Title

STORM DRAINAGE AREA PLAN

Scale

1:1500

Design	Date
R.K	FEBRUARY '10
Drawn	Checked
M.M.	J.I.M.
Project No.	Drawing No.
3791	500A

IBI GROUP
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Ottawa, Ontario K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

STORM SEWER DESIGN SHEET

4639 Bank St
City of Ottawa
Glenview Homes

LOCATION				AREA (Ha)							RATIONAL DESIGN FLOW														SEWER DATA									
STREET	AREA ID	FROM	TO	C= 0.75	C= 0.77	C= 0.80	C= 0.83	C= 0.85	C= 0.87	C= 0.90	IND 2.78AC	CUM 2.78AC	INLET (min)	TIME IN PIPE	TOTAL (min)	i (2) (mm/hr)	i (5) (mm/hr)	i (10) (mm/hr)	i (100) (mm/hr)	2yr PEAK FLOW (L/s	5yr PEAK FLOW (L/s)	10yr PEAK FLOW (L/s)	100yr PEAK FLOW (L/s)	FIXED FLOW (L/s	DESIGN FLOW (L/s)	CAPACITY (L/s)	LENGTH (m)	PIPE SIZE (mm) DIA	PIPE SIZE (mm) W	PIPE SIZE (mm) H	SLOPE (%)	VELOCITY (m/s)	AVAIL CAP (2yr) (L/s)	AVAIL CAP (2yr) (%)
OUTLET TO ROTARY WAY																																	
Finsbury Avenue	9	1	2							0.08	0.20	0.20	10.00	0.63	10.63	76.81	104.19	122.14	178.56	15.37	20.86	24.45	35.74	9.64	15.37	63.80	33.08	300			0.40	0.874	48.43	75.91%
Finsbury Avenue	5,6,7,8	2	3			0.34		0.14		0.10	1.34	1.54	10.63	2.11	12.74	74.47	100.98	118.35	172.99	114.48	155.23	181.95	265.95	74.49	114.48	139.51	107.70	450			0.22	0.850	25.03	17.94%
Finsbury Avenue	4	4	3			0.11					0.24	0.24	10.00	0.18	10.18	76.81	104.19	122.14	178.56	18.79	25.49	29.88	43.68	11.78	18.79	63.80	9.23	300			0.40	0.874	45.01	70.55%
Beckton Heights	2,3	3	5					0.07		0.05	0.29	2.07	12.74	0.30	13.04	67.66	91.64	107.36	156.85	140.23	189.92	222.50	325.07	100.24	140.23	162.91	17.71	450			0.30	0.992	22.68	13.92%
Beckton Heights	1	5	6			0.08					0.18	2.25	13.04	0.71	13.75	66.82	90.47	105.99	154.84	150.36	203.60	238.52	348.45	108.81	150.36	175.96	45.43	450			0.35	1.072	25.60	14.55%
Beckton Heights		6	7								0.00	2.25	13.75	0.23	13.97	64.89	87.84	102.89	150.28	146.04	197.67	231.54	338.20	108.81	146.04	175.96	14.63	450			0.35	1.072	29.93	17.01%
				0.00	0.00	0.53	0.00	0.21	0.00	0.23	2.25																							
											0.97	Total A																						
											0.83	Avg. C																						

Definitions:
Q = 2.78CiA, where:
Q = Peak Flow in Litres per Second (L/s)
A = Area in Hectares (Ha)
i = Rainfall intensity in millimeters per hour (mm/hr)
[i = 732.951 / (TC+6.199)^0.810] 2 YEAR
[i = 998.071 / (TC+6.053)^0.814] 5 YEAR
[i = 1174.184 / (TC+6.014)^0.816] 10 YEAR
[i = 1735.688 / (TC+6.014)^0.820] 100 YEAR

Notes:
1. Mannings coefficient (n) =

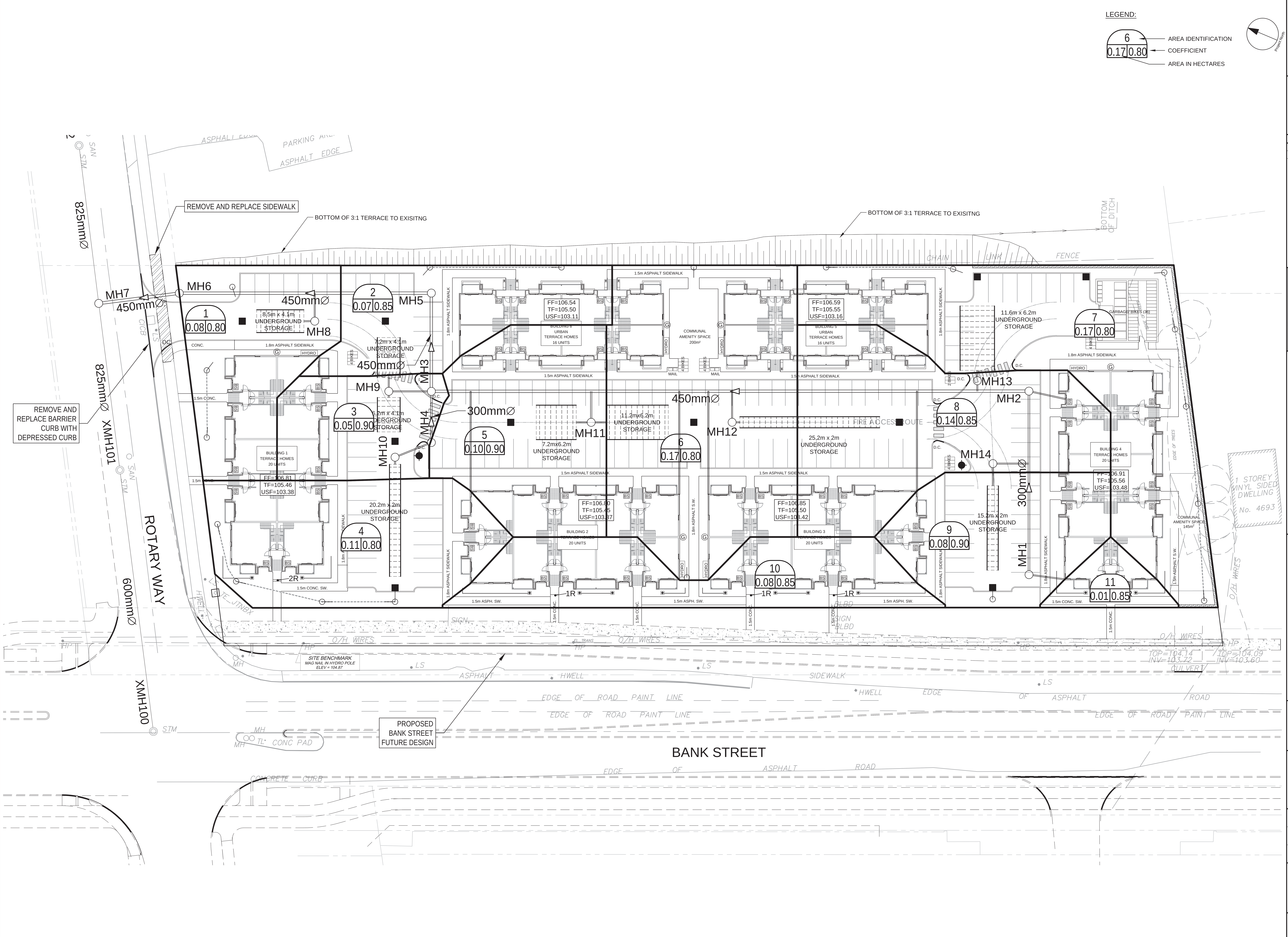
Designed: RM

Checked: DY

Dwg. Reference: 125600-500

No.	Revision	Date
1.	Servicing Brief - Submission No. 1	2020-08-28

File Reference: 125600.6.4.4
Date: 2020-08-28
Sheet No: 1 of 1



CLIENT

GLENVIEW HOMES

190 O'Connor St., 11th floor, Ottawa, ON

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ISSUES

No.	DESCRIPTION	DATE
1	SUBMITTED FOR ZBA AND SPA	2020-08-28

NOT FOR CONSTRUCTION

KEY PLAN

SITE

CONSULTANTS

Project Coordinator
Terrain Development Consulting
Architect:
M. David Blakely Architects Inc.
Landscape:
James B. Lennox & Assoc. Inc.
Surveyor:
J.D.Barnes Ltd.
Geotech:
Golder Associates Ltd.

SEAL

LICENSED PROFESSIONAL ENGINEER
D. G. Yannoulopoulos
2020-08-28
PROVINCE OF ONTARIO

IBI GROUP
Suite 400 – 333 Preston Street
Ottawa ON K1S 5N4 Canada
tel 613 225 1311 / 613 241 3300 fax 613 225 9868
ibigroup.com

PROJECT

4639 BANK STREET

4639 Bank Street

PROJECT NO:
125600

DRAWN BY: D.D./E.H.	CHECKED BY: R.Y.
PROJECT MGR: D.Y.	APPROVED BY: D.Y.

SHEET TITLE

STORM DRAINAGEAREA PLAN

SHEET NUMBER C-500

ISSUE 1

STORMTECH MC-3500 CHAMBER

Designed to meet the most stringent industry performance standards for superior structural integrity while providing designers with a cost-effective method to save valuable land and protect water resources. The StormTech system is designed primarily to be used under parking lots, thus maximizing land usage for private (commercial) and public applications. StormTech chambers can also be used in conjunction with Green Infrastructure, thus enhancing the performance and extending the service life of these practices.

STORMTECH MC-3500 CHAMBER
(not to scale)

Nominal Chamber Specifications

Size (L x W x H)
90" x 77" x 45"
2,286 mm x 1,956 mm x 1,143 mm

Chamber Storage
109.9 ft³ (3.11 m³)

Min. Installed Storage*
175.0 ft³ (4.96 m³)

Weight
134 lbs (60.8 kg)

Shipping
15 chambers/pallet
7 end caps/pallet
7 pallets/truck

*Assumes a minimum of 12" (300 mm) of stone above, 9" (230 mm) of stone below chambers, 6" (150 mm) of stone between chambers/end caps and 40% stone porosity.

STORMTECH MC-3500 END CAP
(not to scale)

Nominal End Cap Specifications

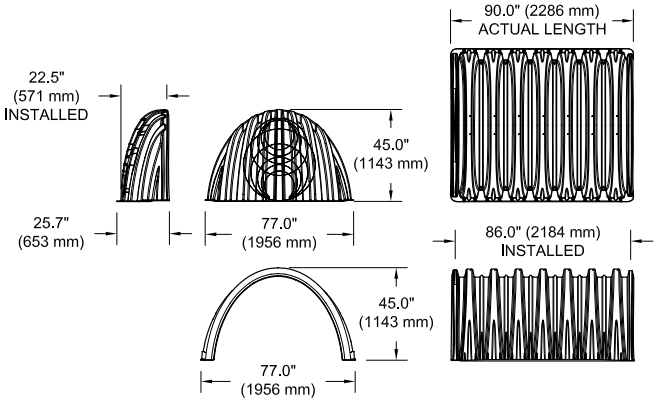
Size (L x W x H)
26.5" x 71" x 45.1"
673 mm x 1,803 mm x 1,145 mm

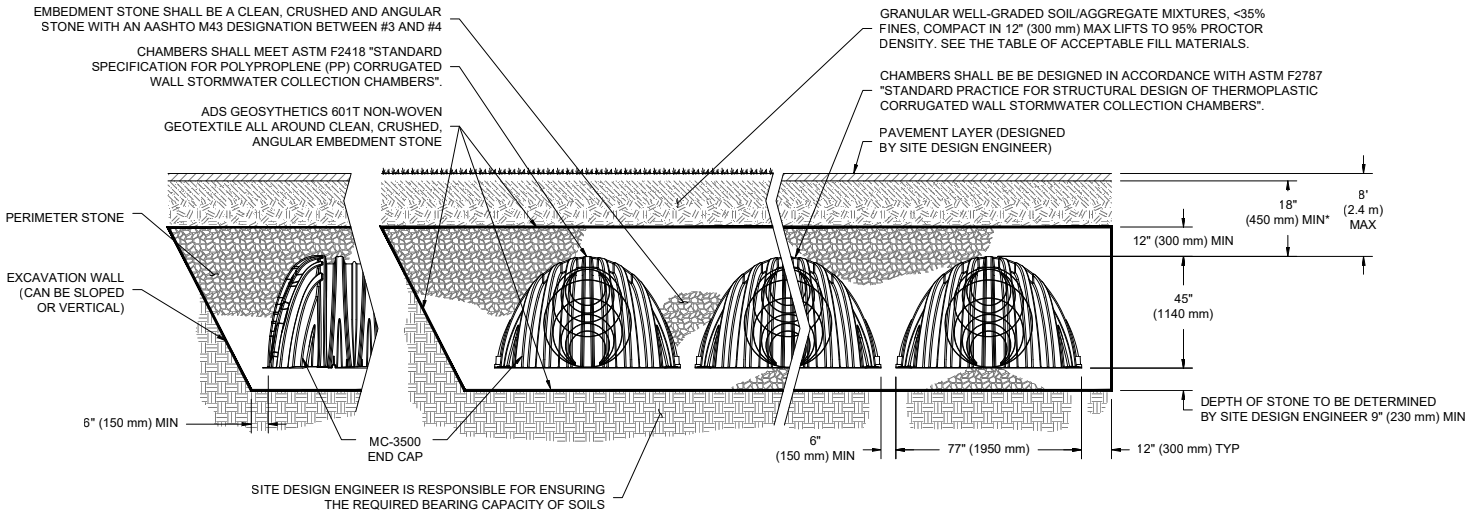
End Cap Storage
14.9 ft³ (0.42 m³)

Min. Installed Storage*
45.1ft ³ (1.28 m³)

Weight
49 lbs (22.2 kg)

*Assumes a minimum of 12" (300 mm) of stone above, 9" (230 mm) of stone below, 6" (150 mm) of stone perimeter, 6" (150 mm) of stone between chambers/ end caps and 40% stone porosity.





*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 24" (600 mm).

MC-3500 CHAMBER SPECIFICATION

STORAGE VOLUME PER CHAMBER FT³ (M³)

	Bare Chamber Storage ft³ (m³)	Chamber and Stone Foundation Depth in. (mm)			
		9" (230 mm)	12" (300 mm)	15" (375 mm)	18" (450 mm)
MC-3500 Chamber	109.9 (3.11)	175.0 (4.96)	179.9 (5.09)	184.9 (5.24)	189.9 (5.38)
MC-3500 End Cap	14.9 (.42)	45.1 (1.28)	46.6 (1.32)	48.3 (1.37)	49.9 (1.41)

Note: Assumes 6" (150 mm) row spacing, 40% stone porosity, 12" (300 mm) stone above and includes the bare chamber/end cap volume.

AMOUNT OF STONE PER CHAMBER

ENGLISH TONS (yds³)	Stone Foundation Depth			
	9"	12"	15"	18"
MC-3500 Chamber	8.5 (6.0)	9.1 (6.5)	9.7 (6.9)	10.4 (7.4)
MC-3500 End Cap	3.9 (2.8)	4.1 (2.9)	4.3 (3.1)	4.5 (3.2)
METRIC KILOGRAMS (m³)	**230 mm**	**300 mm**	**375 mm**	**450 mm**
MC-3500 Chamber	7711 (4.6)	8255 (5.0)	8800 (5.3)	9435 (5.7)
MC-3500 End Cap	3538 (2.1)	3719 (2.2)	3901 (2.4)	4082 (2.5)

Note: Assumes 12" (300 mm) of stone above and 6" (150 mm) row spacing and 6" (150 mm) of perimeter stone in front of end caps.

VOLUME EXCAVATION PER CHAMBER YD³ (M³)

	Stone Foundation Depth			
	9" (230 mm)	12" (300 mm)	15" (375mm)	18" (450 mm)
MC-3500 Chamber	11.9 (9.1)	12.4 (9.5)	12.8(9.8)	13.3 (10.2)
MC-3500 End Cap	4.0 (3.1)	4.1 (3.2)	4.3 (3.3)	4.4 (3.4)

Note: Assumes 6" (150 mm) of separation between chamber rows and 24" (600 mm) of cover. The volume of excavation will vary as depth of cover increases.

Working on a project?
Visit us at www.stormtech.com
and utilize the StormTech Design Tool

For more information on the StormTech MC-3500 Chamber and other ADS products, please contact our Customer Service Representatives at 1-800-821-6710

*THE MOST **ADVANCED** NAME IN WATER MANAGEMENT SOLUTIONS®*

Advanced Drainage Systems, Inc.
4640 Trueman Blvd., Hilliard, OH 43026
1-800-821-6710 www.ads-pipe.com

IBI GROUP
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ibigroup.com

PROJECT: 4639 Bank St
DATE: 28/08/2020
FILE: 125600-6.4.4
REV #: 1
DESIGNED BY: RM
CHECKED BY: D.Y.

STORMWATER MANAGEMENT

Formulas and Descriptions

i_{2yr} = 1:2 year Intensity = $732.951 / (T_c+6.199)^{0.810}$
i_{5yr} = 1:5 year Intensity = $998.071 / (T_c+6.053)^{0.814}$
i_{100yr} = 1:100 year Intensity = $1735.688 / (T_c+6.014)^{0.820}$
T_c = Time of Concentration (min)
C = Average Runoff Coefficient
A = Area (Ha)
Q = Flow = 2.78CiA (L/s)

Maximum Allowable Release Rate

Existing storm sewer designed based on restricted flowrate of 85 L/s/Ha fpr 1.28Ha site

A_{site} = 1.28 Ha

$Q_{restricted}$ = 108.80 L/s

MODIFIED RATIONAL METHOD (100-Year, 5-Year & 2-Year Ponding)

Drainage Area	*1*	8.56576			
Area (Ha)	0.080	Restricted Flow Q_r (L/s)=	8.57		
C =	1.00	Restricted Flow @ 50% for MRM	4.28		

100-Year

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p=2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 100yr (m^3)
40	75.15	16.71	4.28	12.43	29.831
42	72.57	16.14	4.28	11.86	29.878
44	70.18	15.61	4.28	11.33	**29.899**
46	67.96	15.11	4.28	10.83	29.895
48	65.89	14.65	4.28	10.37	29.868

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	29.90		31.66	0.00

Drainage Area	*1*		
Area (Ha)	0.080	Restricted Flow Q_r (L/s)=	8.57
C =	0.80	Restricted Flow Q_r (L/s)=	4.28

5-Year

T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow $Q_p=2.78xCi_{5yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 5yr (m^3)
20	70.25	12.50	4.28	8.22	9.86
22	66.15	11.77	4.28	7.49	9.88
23	64.29	11.44	4.28	7.16	**9.87**
24	62.54	11.13	4.28	6.84	9.86
26	59.35	10.56	4.28	6.28	9.79

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	9.87	0.00	31.66	0.00

Drainage Area	*1*		
Area (Ha)	0.080	Restricted Flow Q_r (L/s)=	8.57
C =	0.80	Restricted Flow Q_r (L/s)=	4.28

2-Year

T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p=2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 2yr (m^3)
14	64.23	11.43	4.28	7.15	6.00
16	59.50	10.59	4.28	6.30	6.05
17	57.42	10.22	4.28	5.93	**6.05**
18	55.49	9.87	4.28	5.59	6.04
20	52.03	9.26	4.28	4.97	5.97

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	6.05	0.00	31.66	0.00

MODIFIED RATIONAL METHOD (100-Year, 5-Year & 2-Year Ponding)

Drainage Area	*2&3*	13.972896			
Area (Ha)	0.120	Restricted Flow Q_r (L/s)=	13.97		
C =	1.00	Restricted Flow @ 50% for MRM	6.99		

100-Year

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p=2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 100yr (m^3)
38	77.93	26.00	6.99	19.01	43.348
40	75.15	25.07	6.99	18.08	43.397
42	72.57	24.21	6.99	17.22	**43.401**
44	70.18	23.41	6.99	16.43	43.364
46	67.96	22.67	6.99	15.68	43.291

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	43.40		47.60	0.00

Drainage Area	*2&3*		
Area (Ha)	0.120	Restricted Flow Q_r (L/s)=	13.97
C =	0.87	Restricted Flow Q_r (L/s)=	6.99

5-Year

T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow $Q_p=2.78xCi_{5yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 5yr (m^3)
19	72.53	21.05	6.99	14.06	16.03
21	68.13	19.77	6.99	12.79	16.11
22	66.15	19.20	6.99	12.21	**16.12**
23	64.29	18.66	6.99	11.67	16.11
25	60.90	17.67	6.99	10.69	16.03

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	16.12	0.00	47.60	0.00

Drainage Area	*2&3*		
Area (Ha)	0.120	Restricted Flow Q_r (L/s)=	13.97
C =	0.87	Restricted Flow Q_r (L/s)=	6.99

2-Year

T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p=2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 2yr (m^3)
14	64.23	18.64	6.99	11.66	9.79
16	59.50	17.27	6.99	10.28	9.87
17	57.42	16.66	6.99	9.68	**9.87**
18	55.49	16.10	6.99	9.12	9.85
20	52.03	15.10	6.99	8.11	9.74

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	9.87	0.00	47.60	0.00

MODIFIED RATIONAL METHOD (100-Year, 5-Year & 2-Year Ponding)

Drainage Area	4	11.77792		
Area (Ha)	0.110	Restricted Flow Q_r (L/s)=	11.78	
C =	1.00	Restricted Flow @ 50% for MRM	5.89	

100-Year

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p=2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 100yr (m^3)
40	75.15	22.98	5.89	17.09	41.017
42	72.57	22.19	5.89	16.30	41.083
44	70.18	21.46	5.89	15.57	**41.111**
46	67.96	20.78	5.89	14.89	41.105
48	65.89	20.15	5.89	14.26	41.069

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	41.11		41.20	0.00

Drainage Area	4			
Area (Ha)	0.110	Restricted Flow Q_r (L/s)=	11.78	
C =	0.80	Restricted Flow Q_r (L/s)=	5.89	

5-Year

T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow $Q_p=2.78xCi_{5yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 5yr (m^3)
19	72.53	17.74	5.89	11.85	13.51
21	68.13	16.67	5.89	10.78	13.58
22	66.15	16.18	5.89	10.29	**13.59**
23	64.29	15.73	5.89	9.84	13.58
25	60.90	14.90	5.89	9.01	13.51

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	13.59	0.00	41.20	0.00

Drainage Area	4			
Area (Ha)	0.110	Restricted Flow Q_r (L/s)=	11.78	
C =	0.80	Restricted Flow Q_r (L/s)=	5.89	

2-Year

T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p=2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 2yr (m^3)
14	64.23	15.71	5.89	9.82	8.25
16	59.50	14.56	5.89	8.67	8.32
17	57.42	14.05	5.89	8.16	**8.32**
18	55.49	13.57	5.89	7.69	8.30
20	52.03	12.73	5.89	6.84	8.21

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	8.32	0.00	41.20	0.00

MODIFIED RATIONAL METHOD (100-Year, 5-Year & 2-Year Ponding)

Drainage Area	5&6	30.71628		
Area (Ha)	0.270	Restricted Flow Q_r (L/s)=	30.72	
C =	1.00	Restricted Flow @ 50% for MRM	15.36	

100-Year

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p=2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 100yr (m^3)
38	77.93	58.50	15.36	43.14	98.357
40	75.15	56.40	15.36	41.05	98.510
42	72.57	54.47	15.36	39.11	**98.562**
44	70.18	52.68	15.36	37.32	98.523
46	67.96	51.01	15.36	35.65	98.401

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	98.56		104.10	0.00

Drainage Area	5&6			
Area (Ha)	0.270	Restricted Flow Q_r (L/s)=	30.72	
C =	0.85	Restricted Flow Q_r (L/s)=	15.36	

5-Year

T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow $Q_p=2.78xCi_{5yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 5yr (m^3)
19	72.53	46.27	15.36	30.91	35.24
21	68.13	43.47	15.36	28.11	35.42
22	66.15	42.20	15.36	26.84	**35.43**
23	64.29	41.02	15.36	25.66	35.41
25	60.90	38.85	15.36	23.49	35.24

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	35.43	0.00	104.10	0.00

Drainage Area	5&6			
Area (Ha)	0.270	Restricted Flow Q_r (L/s)=	30.72	
C =	0.85	Restricted Flow Q_r (L/s)=	15.36	

2-Year

T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p=2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 2yr (m^3)
14	64.23	40.98	15.36	25.62	21.52
16	59.50	37.96	15.36	22.61	21.70
17	57.42	36.63	15.36	21.27	**21.70**
18	55.49	35.40	15.36	20.04	21.65
20	52.03	33.20	15.36	17.84	21.41

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	21.70	0.00	104.10	0.00

MODIFIED RATIONAL METHOD (100-Year, 5-Year & 2-Year Ponding)

Drainage Area	7	18.20224		
Area (Ha)	0.170	Restricted Flow Q_r (L/s)=	18.20	
C =	1.00	Restricted Flow @ 50% for MRM	9.10	

100-Year

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p=2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 100yr (m^3)
40	75.15	35.51	9.10	26.41	63.390
42	72.57	34.30	9.10	25.19	63.491
44	70.18	33.17	9.10	24.07	**63.535**
46	67.96	32.12	9.10	23.02	63.526
48	65.89	31.14	9.10	22.04	63.470

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	63.53		65.10	0.00

Drainage Area	7			
Area (Ha)	0.170	Restricted Flow Q_r (L/s)=	18.20	
C =	0.80	Restricted Flow Q_r (L/s)=	9.10	

5-Year

T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow $Q_p=2.78xCi_{5yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 5yr (m^3)
19	72.53	27.42	9.10	18.32	20.88
21	68.13	25.76	9.10	16.66	20.99
22	66.15	25.01	9.10	15.91	**21.00**
23	64.29	24.31	9.10	15.20	20.98
25	60.90	23.02	9.10	13.92	20.88

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	21.00	0.00	65.10	0.00

Drainage Area	7			
Area (Ha)	0.170	Restricted Flow Q_r (L/s)=	18.20	
C =	0.80	Restricted Flow Q_r (L/s)=	9.10	

2-Year

T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p=2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 2yr (m^3)
14	64.23	24.29	9.10	15.18	12.75
16	59.50	22.50	9.10	13.40	12.86
17	57.42	21.71	9.10	12.61	**12.86**
18	55.49	20.98	9.10	11.88	12.83
20	52.03	19.67	9.10	10.57	12.69

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	12.86	0.00	65.10	0.00

MODIFIED RATIONAL METHOD (100-Year, 5-Year & 2-Year Ponding)

Drainage Area	8	15.92696	
Area (Ha)	0.140	Restricted Flow Q_r (L/s)=	15.93
C =	1.00	Restricted Flow @ 50% for MRI	7.96

100-Year

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p=2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 100yr (m^3)
38	77.93	30.33	7.96	22.37	51.000
40	75.15	29.25	7.96	21.28	51.079
42	72.57	28.24	7.96	20.28	**51.106**
44	70.18	27.31	7.96	19.35	51.086
46	67.96	26.45	7.96	18.49	51.023

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	51.11		52.00	0.00

Drainage Area	8		
Area (Ha)	0.140	Restricted Flow Q_r (L/s)=	15.93
C =	0.85	Restricted Flow Q_r (L/s)=	7.96

5-Year

T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow $Q_p=2.78xCi_{5yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 5yr (m^3)
19	72.53	23.99	7.96	16.03	18.27
21	68.13	22.54	7.96	14.58	18.36
22	66.15	21.88	7.96	13.92	**18.37**
23	64.29	21.27	7.96	13.30	18.36
25	60.90	20.15	7.96	12.18	18.27

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	18.37	0.00	52.00	0.00

Drainage Area	8		
Area (Ha)	0.140	Restricted Flow Q_r (L/s)=	15.93
C =	0.85	Restricted Flow Q_r (L/s)=	7.96

2-Year

T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p=2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 2yr (m^3)
14	64.23	21.25	7.96	13.29	11.16
16	59.50	19.69	7.96	11.72	11.25
17	57.42	18.99	7.96	11.03	**11.25**
18	55.49	18.36	7.96	10.39	11.22
20	52.03	17.21	7.96	9.25	11.10

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	11.25	0.00	52.00	0.00

MODIFIED RATIONAL METHOD (100-Year, 5-Year & 2-Year Ponding)

Drainage Area	9	9.63648	
Area (Ha)	0.080	Restricted Flow Q_r (L/s)=	9.64
C =	1.00	Restricted Flow @ 50% for MRI	4.82

100-Year

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p=2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 100yr (m^3)
36	80.96	18.01	4.82	13.19	28.486
38	77.93	17.33	4.82	12.51	28.533
40	75.15	16.71	4.82	11.89	**28.546**
42	72.57	16.14	4.82	11.32	28.529
44	70.18	15.61	4.82	10.79	28.485

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	28.55		30.30	0.00

Drainage Area	9		
Area (Ha)	0.080	Restricted Flow Q_r (L/s)=	9.64
C =	0.90	Restricted Flow Q_r (L/s)=	4.82

5-Year

T_c Variable (min)	i_{5yr} (mm/hour)	Peak Flow $Q_p=2.78xCi_{5yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 5yr (m^3)
19	72.53	14.52	4.82	9.70	11.06
21	68.13	13.64	4.82	8.82	11.11
22	66.15	13.24	4.82	8.42	**11.12**
23	64.29	12.87	4.82	8.05	11.11
25	60.90	12.19	4.82	7.37	11.06

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	11.12	0.00	30.30	0.00

Drainage Area	9		
Area (Ha)	0.080	Restricted Flow Q_r (L/s)=	9.64
C =	0.90	Restricted Flow Q_r (L/s)=	4.82

2-Year

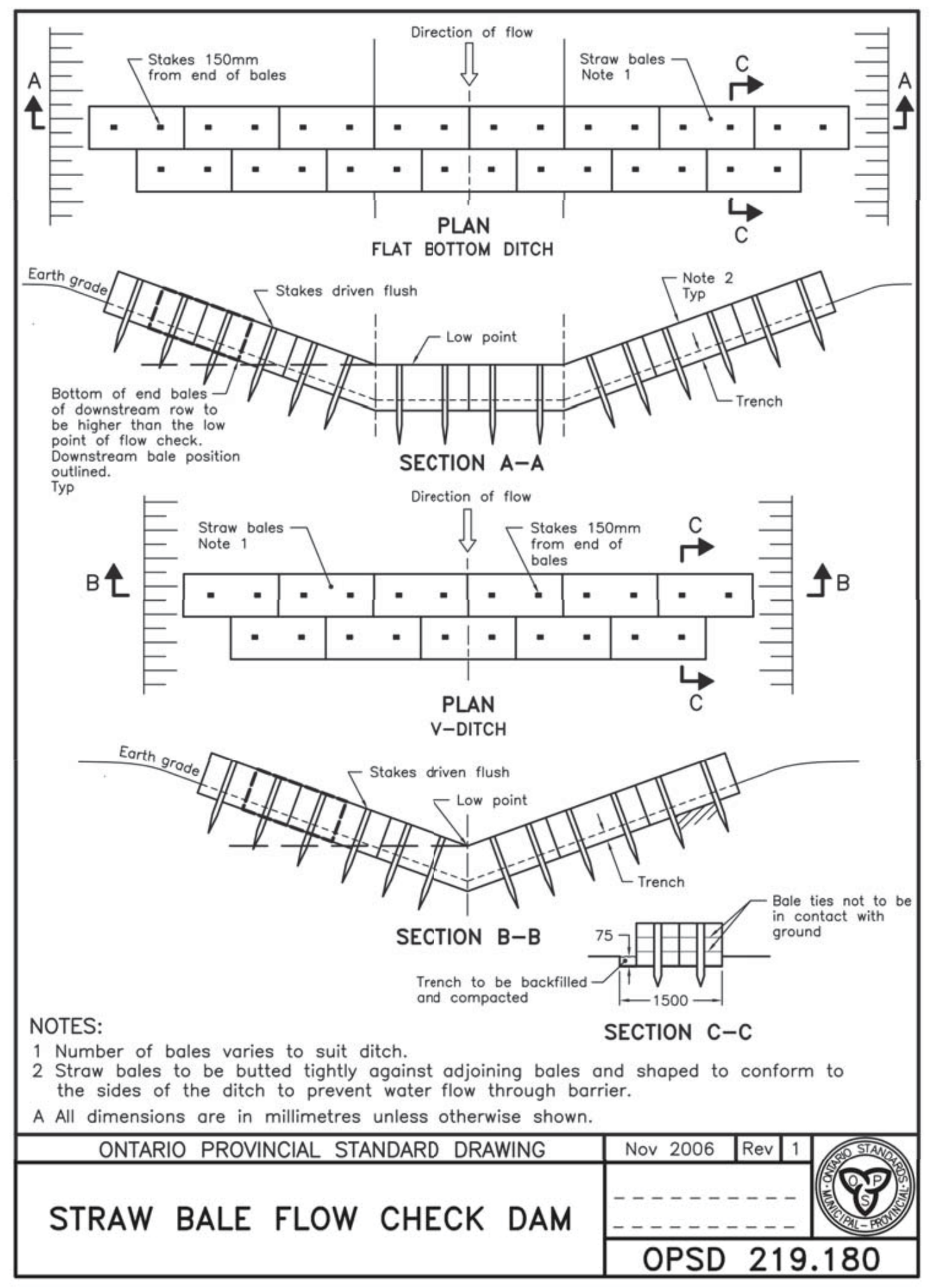
T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p=2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 2yr (m^3)
17	57.42	11.49	4.82	6.67	6.81
19	53.70	10.75	4.82	5.93	6.76
20	52.03	10.41	4.82	5.60	**6.72**
21	50.48	10.10	4.82	5.29	6.66
23	47.66	9.54	4.82	4.72	6.51

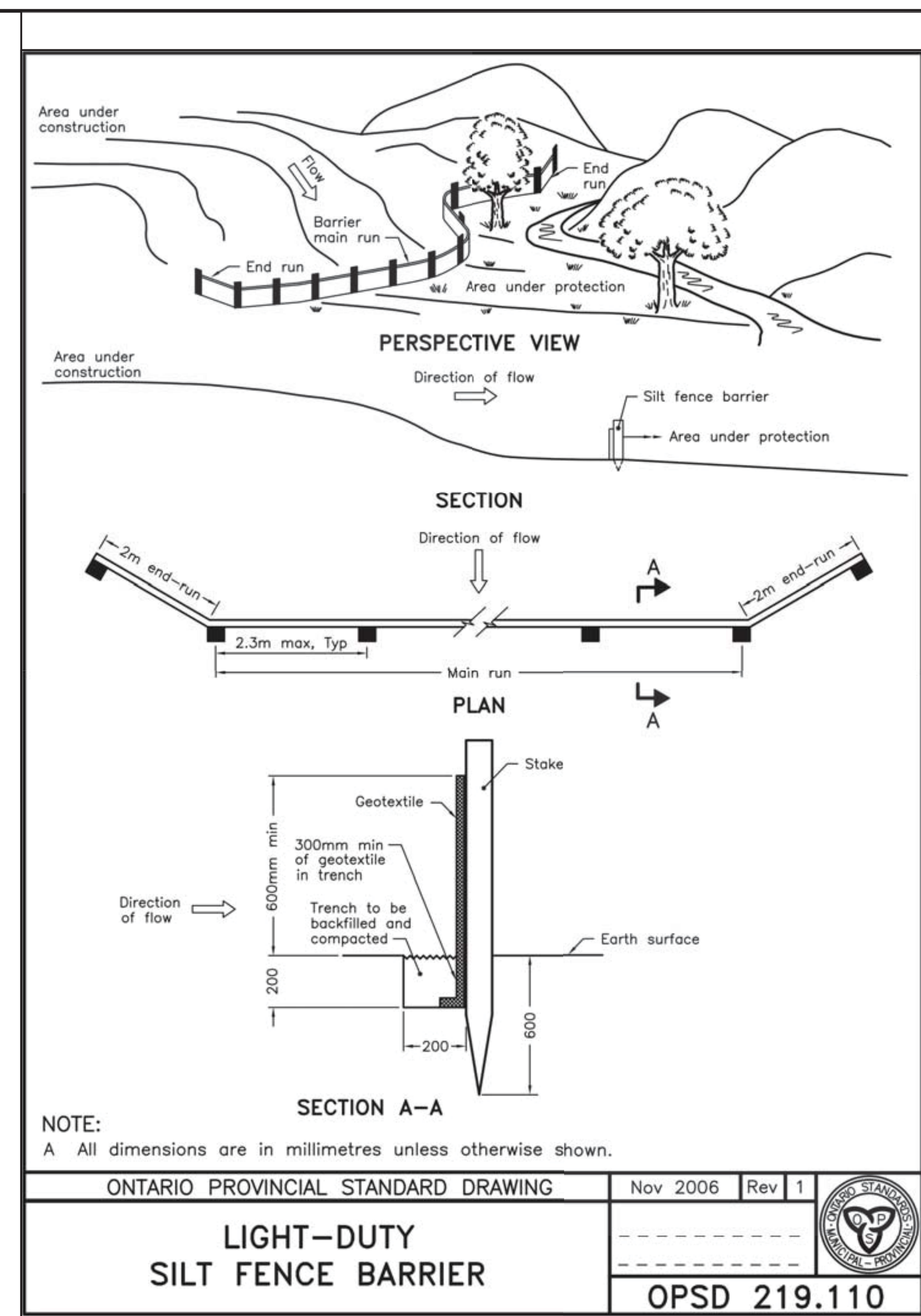
Storage (m^3)

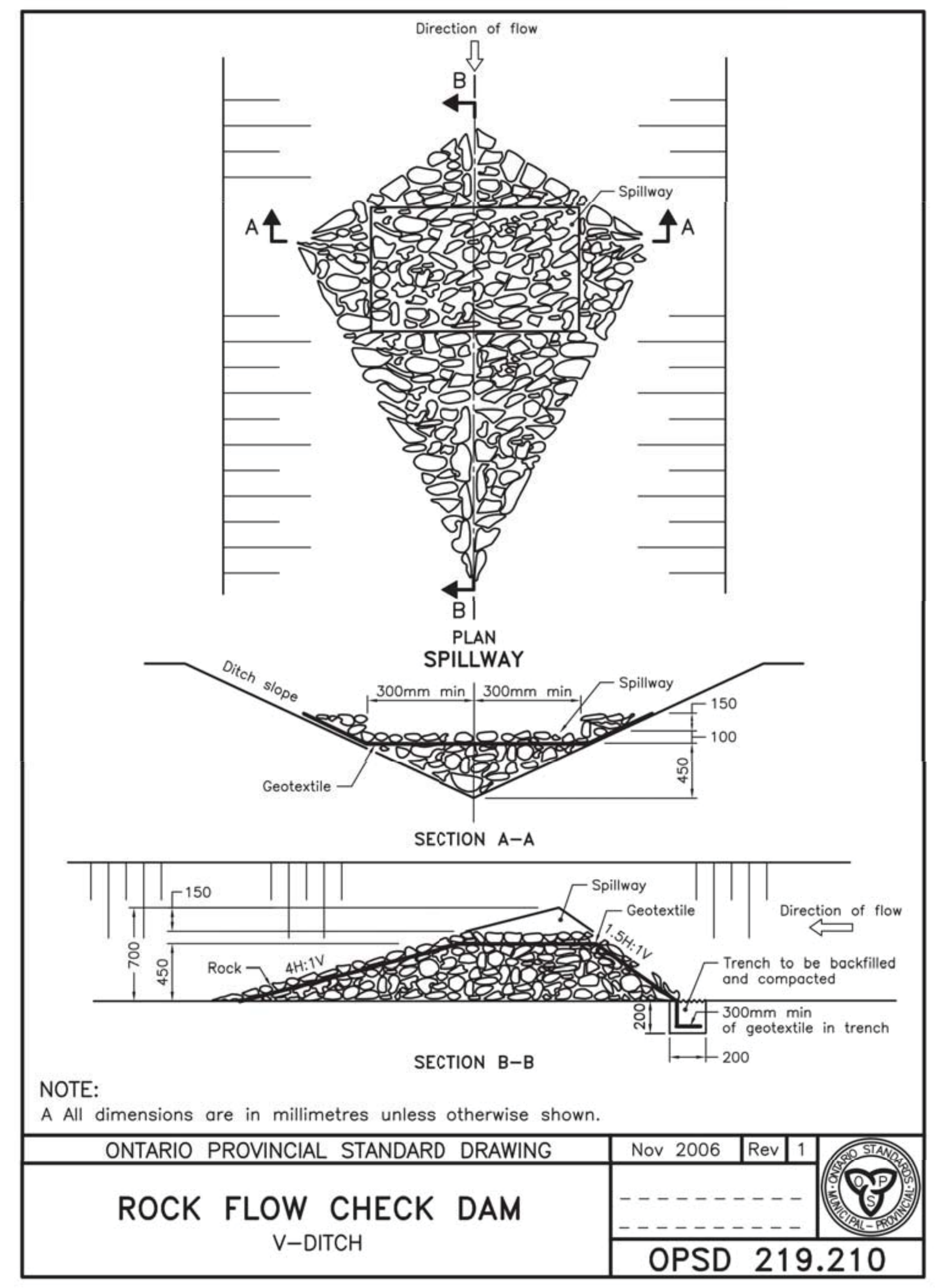
Overflow	Required	Surface	Sub-surface	Balance
0.00	6.72	0.00	30.30	0.00

APPENDIX D

125600-900 Erosion and Sediment Control Plan
Golder & Associates Geotechnical report
125600-200 Grading Plan
Geotechnical Report







NOTES:

THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES, TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE RECEIVING WATERCOURSE, DURING CONSTRUCTION ACTIVITIES. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT APPROPRIATE EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY,

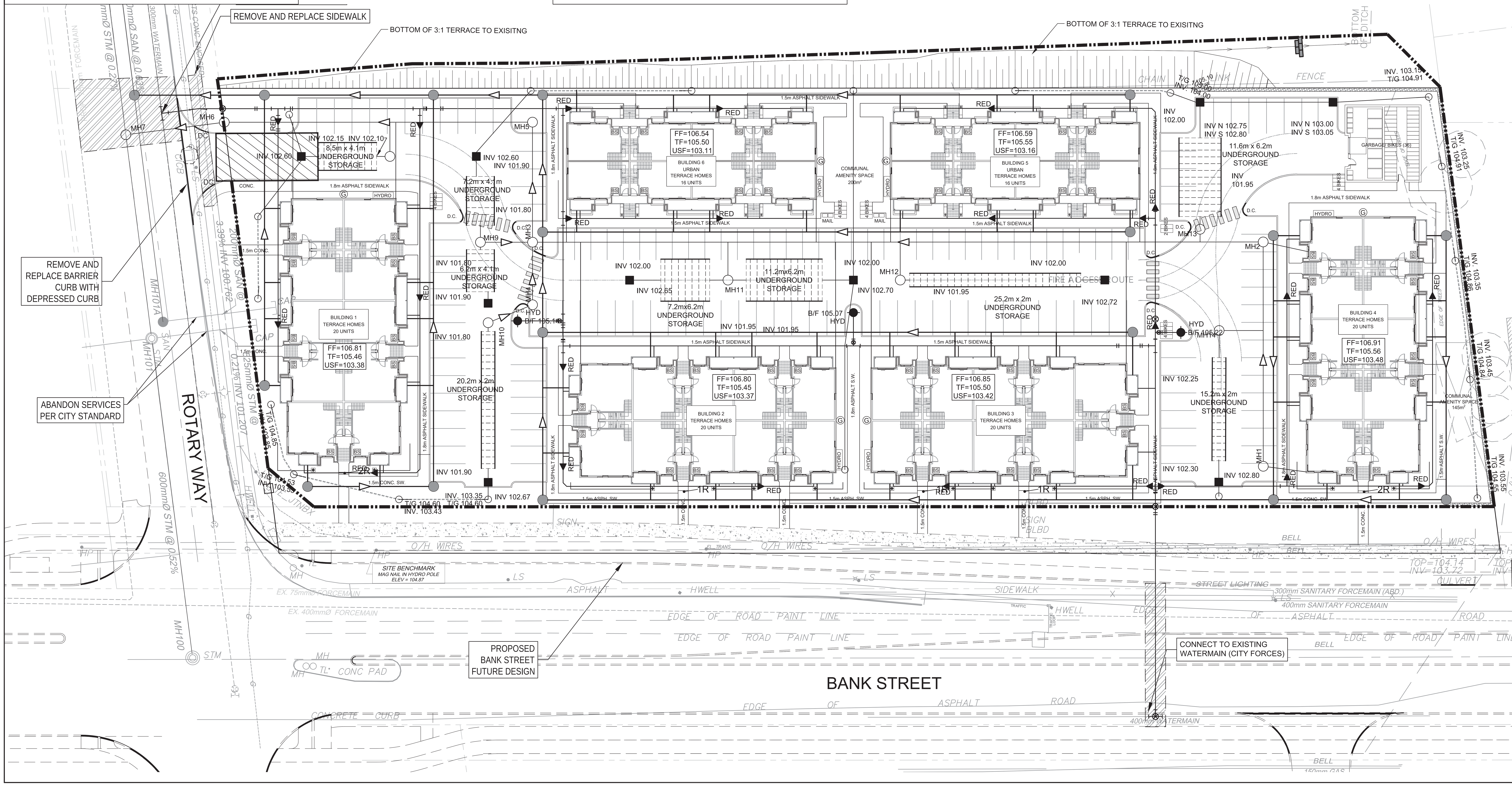
1. SILT FENCE TO BE ERECTED PRIOR TO EARTH WORKS BEING COMMENCED. SILT FENCE TO BE MAINTAINED UNTIL VEGETATION IS ESTABLISHED OR UNTIL START OF SUBSEQUENT PHASE.
2. STRAW BALE SEDIMENT TRAPS TO BE CONSTRUCTED IN EXISTING ROAD SIDE DITCHES. TRAPS TO REMAIN AND BE MAINTAINED UNTIL VEGETATION IS ESTABLISHED.
3. SILT SACK TO BE PLACED AND MAINTAINED UNDER COVER OF ALL CATCHBASINS. GEOTEXTILE SILT SACK IN STREET CBs TO REMAIN UNTIL ALL CURBS ARE CONSTRUCTED. GEOTEXTILE FABRIC IN RYCBs TO REMAIN UNTIL VEGETATION IS ESTABLISHED. ALL CATCHBASINS TO BE REGULARLY INSPECTED AND CLEANED, AS NECESSARY, UNTIL SOD AND CURBS ARE CONSTRUCTED.
4. WORKS NOTED ABOVE ARE TO BE INSTALLED, INSPECTED, MAINTAINED AND ULTIMATELY REMOVED BY SERVICING CONTRACTOR.
5. THIS IS A "LIVING DOCUMENT" AND MAY BE MODIFIED IN THE EVENT THE PROPOSED CONTROL MEASURES ARE INSUFFICIENT

LEGEND :

- LIGHT DUTY SILT FENCE AS PER OPSD-219.110
- SNOW FENCE
- STRAW BALE CHECK DAM AS PER OPSD-219.180
- ROCK CHECK DAM AS PER OPSD-219.210
- SILT SACK PLACED UNDER EXISTING CB COVER
- TEMPORARY MUD MAT 0.15m THICK 50mm CLEAR STONE ON NON WOVEN FILTER CLOTH (7.0 × 15.0)

NOTES:

1. SEE DRAWING C-010 FOR ADDITIONAL DETAILS AND NOTES.
2. SITE BENCHMARK TO BE OBTAINED FROM LEGAL SURVEYOR J. D. BARNES LIMITED.



NOT FOR CONSTRUCTION

Project North

CLIENT

GLENVIEW HOMES

190 O'Connor St., 11th floor, Ottawa, ON

ISSUES

No.	DESCRIPTION	DATE
1	SUBMITTED FOR ZBA AND SPA	2020-08-28

KEY PLAN

CONSULTANTS

Project Coordinator
Terrain Development Consulting
Architect:
M. David Blakely Architects Inc.
Landscape:
James B. Lennox & Assoc. Inc.
Surveyor:
J.D.Barnes Ltd.
Geotech:
Golder Associates Ltd.

1:300

SEAL

IBI GROUP
Suite 400 – 333 Preston Street
Ottawa ON K1S 5N4 Canada
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ibigroup.com

PROJECT

4639 BANK STREET

4639 Bank Street

PROJECT NO:	
125600	
DRAWN BY: D.D./E.H.	CHECKED BY: R.M.
PROJECT MGR: D.Y.	APPROVED BY: D.Y.

SHEET TITLE

EROSION AND SEDIMENTATION CONTROL PLAN

SHEET NUMBER: C-900

ISSUE: 1

REPORT

Geotechnical Investigation

Proposed Residential/Commercial Development 4639 Bank Street, Ottawa, Ontario

Submitted to:

Glenview Properties Inc.
190 O'Connor Street, 11th Floor
Ottawa, Ontario

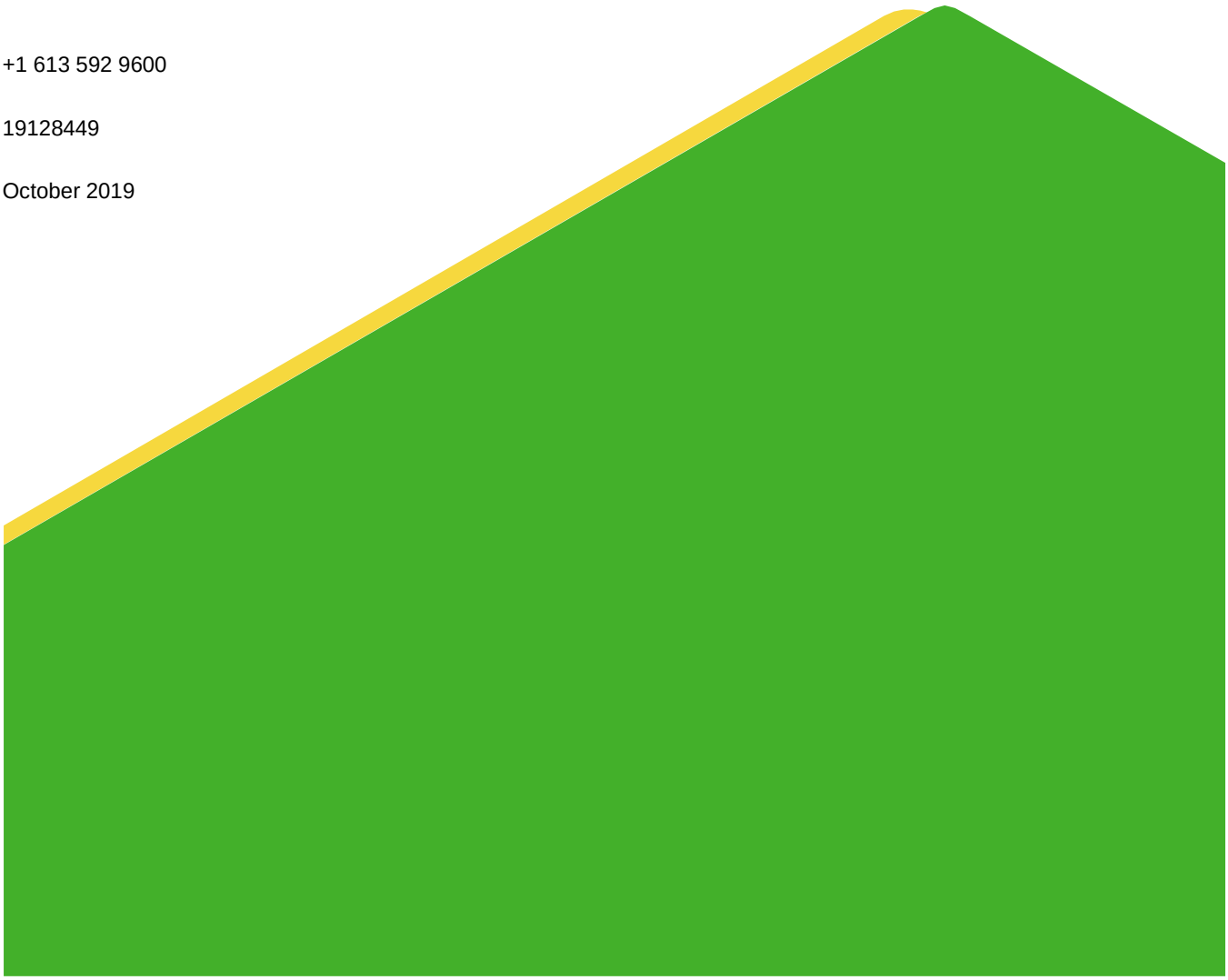
Submitted by:

Golder Associates Ltd.
1931 Robertson Road Ottawa, Ontario, K2H 5B7 Canada

+1 613 592 9600

19128449

October 2019



The fieldwork was supervised by personnel from our geotechnical staff who located the test pits, directed the test pitting operation, logged the test pits and samples, and took custody of the samples retrieved. On completion of the test pitting operations, soil samples from the test pits were transported to our laboratory for further examination by the project engineer and for laboratory testing.

Two samples of soil from test pits 19-03 and 19-04 were submitted to Eurofins Environmental for basic chemical analyses related to potential sulphate attack on buried concrete elements and potential corrosion of buried ferrous elements. The results of the basic chemical lab testing will be provided in the final copy of this report.

The test pit locations were selected, marked in the field, and subsequently surveyed by Golder Associates personnel. The coordinates and ground surface elevations were determined using a GPS survey unit. The geodetic reference system used for the survey was the North American datum of 1983 (NAD83). The test pit coordinates were based on the Modified Transverse Mercator (MTM Zone 9) coordinate system. The elevations were referenced to Geodetic datum (CGVD28).

4.0 SUBSURFACE CONDITIONS

4.1 General

Information on the subsurface conditions is provided as follows:

- Record of Test Pits for the current investigation are provided in Appendix A.
- Results of the grain size distribution testing from the current investigation are provided on Figures B1 to B5 in Appendix B.
- Results of the basic chemical analyses from the current investigation are provided in Appendix C.
- The results of the water content testing on selected soil samples are provided on the respective Record of Test Pits.

In general, the subsurface conditions at this site consist of topsoil, over variable thickness of fill and sandy silt deposits underlain by glacial till, over shale or limestone with shale interbeds bedrock.

The following sections present a more detailed overview of the subsurface conditions encountered in the test pits advanced during the investigation.

4.2 Topsoil Fill

Topsoil fill exists at the ground surface at all the test pit locations. The thickness of the topsoil fill ranges from about 0.15 to 0.3 metres.

4.3 Fill

A layer of fill exists below the topsoil at all test pit locations. The fill extends to depths ranging from about 0.8 to 1.9 metres below the existing ground surface. The fill consists of silty clay to clayey silt and sandy silt to silty sand with varying amounts of organic matter, rootlets, gravel, cobbles, and shale fragments. The fill at test pit 19-06 also contains concrete.

4.4 Sandy Silt to Silt

A layer of sandy silt to silt exists below the fill, which extends to depths ranging from about 1.7 to 3.8 metres below the existing ground surface. This deposit contains varying amounts of gravel, cobbles and boulders.

The measured water content of a sample from the sandy silt to silt ranged from about 16 to 22 percent.

The result of grain size distribution on one sample of the sandy silt to silt retrieved from the current investigation is provided on Figure B1 in Appendix B.

4.5 Glacial Till

Glacial till exists beneath the sandy silt to silt at all the test pit locations. The glacial till generally consists of a heterogeneous mixture of gravel, cobbles, and boulders in a matrix of silty sand to sandy silt. The glacial till extends to depths ranging between about 2.4 and greater than 5.2 metres beneath the existing ground surface.

The measured water content of samples from the glacial till ranged from about 7 to 14 percent.

The results of grain size distribution on four samples of the glacial till retrieved from the current investigation are provided on Figure B2 to B5 in Appendix B.

4.6 Refusal

Refusal to excavating was encountered at four test pit locations (19-02, 19-04, 19-05 and 19-06) at depths ranging between about 2.4 and 4.8 metres.

The following table summarizes the refusal elevations as encountered at the test pit locations.

Test pit Number	Existing Ground Surface Elevation (metre)	Depth of Test Pit (metre)	Refusal Elevation (metre)
19-01	103.8	5.0	–
19-02	103.1	4.8	98.3
19-03	103.5	5.2	–
19-04	103.4	4.8	98.6
19-05	103.2	2.4	100.8
19-06	103.7	4.3	99.4

Refusal may indicate the surface of the bedrock or boulders within the glacial till.

Distribution List

1 e-copy - Glenview Properties Inc.

1 e-copy - Golder

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FIGURES

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APPENDIX B

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1.0 INTRODUCTION

This report presents the results of a geotechnical investigation carried out for a proposed residential/commercial development to be located at 4639 Bank Street in Ottawa, Ontario. The geotechnical investigation included an assessment of the general subsurface conditions on the site by means of 6 test pits and laboratory testing. Based on an interpretation of the factual information obtained, a general description of the subsurface and groundwater conditions is presented. These interpreted subsurface conditions and available project details were used to prepare engineering guidelines on the geotechnical design aspects of the project, including construction considerations which could influence design decisions.

The reader is referred to the “Important Information and Limitations of This Report” which follows the text but forms an integral part of this document.

2.0 DESCRIPTION OF PROJECT AND SITE

Plans are being prepared for a residential/commercial development to be located at 4639 Bank Street in Ottawa, Ontario. The approximate location of the site is shown on the Key Map inset on the attached Site Plan (Figure 1).

The following is understood about the project and site:

- The site is located along the east side of Bank Street and is bounded to the north by Rotary Way, to the east by the Ottawa Rotary Home, and to the south by a single-family residential properties.
- The site is approximately rectangular in shape, has a relatively flat topography and is currently vacant land. The site is about 1.2 hectares in plan area.
- The proposed development will consist of a mix of residential townhome style units and/or commercial buildings, based on the conceptual plans provided to us at the time of this report. The maximum height of the proposed buildings will be up to 4 storeys above grade. The buildings may include partial basement levels.
- At-grade parking areas and drive lanes will be provided around the site.

Based on a review of the published geological mapping, and previous investigations carried out at the adjacent developments, the subsurface conditions at this site are indicated to consist of about 2 to 4 metres of silt, sand, and glacial till overlying bedrock. The bedrock is mapped to be shale of the Carlsbad Formation and likely changes to limestone with shale interbeds of Verulam Formation at the far south end of the subject property.

3.0 PROCEDURE

The fieldwork for this investigation was carried out on September 5, 2019. At that time, six test pits (numbered 19-01 to 19-06) were put down at the approximate locations shown on Figure 1. The test pits were advanced using a hydraulic excavator supplied and operated by Glenn Wright Excavating of Ottawa, Ontario.

The test pits were advanced to a maximum depth of about 5.2 metres or to practical refusal, which was encountered in four test pits at depths ranging from about 2.4 metres to 4.8 metres below the existing ground surface. The test pits were backfilled, without compaction, with soil excavated from the test pits. The site conditions were not restored following completion of work. Grab samples were recovered during the test pitting program.

4.7 Groundwater

Groundwater seepage was observed in all the test pits advanced during the current investigation as summarized in table below.

Test Pit Number	Ground Surface Elevation (metre)	Water Seepage Depth (metre)	Water Seepage Elevation (metre)
19-01	103.8	3.8	100.0
19-02	103.1	2.4	100.7
19-03	103.5	3.2	100.3
19-04	103.4	3.2	100.2
19-05	103.2	2.4	100.8
19-06	103.7	3.5	100.2

Groundwater levels are expected to fluctuate seasonally. Higher groundwater levels are expected during wet periods of the year, such as spring.

5.0 DISCUSSION

5.1 General

This section of the report provides engineering guidelines on the geotechnical design aspects of the project based on our interpretation of the available information described herein and project requirements. Contractors bidding on or undertaking the works should examine the factual results of the investigation, satisfy themselves as to the adequacy of the factual information for construction, and make their own interpretation of the factual data as it affects their proposed construction techniques, schedule, safety, and equipment capabilities.

5.2 Site Grading

The subsurface conditions on this site generally consist of fill over deposits of silty sand and glacial till underlain by bedrock. Refusal to excavating was encountered at depths ranging from about 2.4 to 4.8 metres below the existing ground surface.

No practical restrictions apply to the thickness of grade raise fill which may be placed on the site from a foundation design perspective. As a general guideline regarding the site grading, preparation for filling of the site should include stripping any topsoil, fill, and organic matter from within the building footprints to improve the settlement performance of structures. Topsoil, fill, and organic matter are not suitable as general fill and should be stockpiled separately for re-use in landscaping applications only. In areas with no proposed structures, these materials may be left in-place provided some settlement of the ground surface following filling can be tolerated.

Groundwater seepage was generally encountered at depths ranging from about 2.4 to 3.8 metres below the existing ground surface (at about Elevations 100 to 101 metres), typically within the glacial till deposit.

Groundwater inflows should be expected for excavations that extend below about Elevation 101 metres. It may be preferable from a geotechnical perspective to limit the depths of excavations to no more than about 2.0 metres below the existing ground surface to reduce the possibility of continuous groundwater inflow to the basement drainage system.

The grading should also ideally be selected to avoid or limit bedrock excavation.

5.3 Material Reuse

The native soils are not considered to be generally suitable for reuse as structural/engineered fill. Within foundation areas, imported engineered fill should be used.

The native sandy silt and glacial till may be suitable for use as controlled fill beneath pavement areas, provided they are not too wet to place and compact. Glacial till encountered below the groundwater may be too wet to feasibly be used as controlled fill. These materials could however be reused in non-structural areas (i.e., landscaping).

5.4 Foundations

The native undisturbed, inorganic overburden soils encountered at the site are considered suitable for supporting the proposed residential buildings. Topsoil and fill would not be considered suitable to support the building foundations and therefore must be removed from underneath the building footings and slabs.

For frost protection purposes, exterior footings for buildings should be founded at least 1.5 metres below finished exterior grade. Isolated footings in unheated areas should be provided with at least 1.8 metres of soil for frost protection (see Section 5.6 below). In some areas of the site (i.e., at test pits 19-01, 19-04 and 19-06), the existing fill materials extend to depths greater than 1.5 metres and should be removed and replaced with engineered fill. The engineered fill should consist of OPSS Granular B Type II compacted to at least 95% of the materials standard Proctor maximum dry density.

Strip or pad footings, up to 3 metres in width, placed on the surface of the native soils or on engineered fill may be designed using a maximum allowable net bearing pressure of 150 kPa at serviceability limit states (SLS) and a factored bearing resistance at ultimate limit states (ULS) of 250 kPa.

The post-construction total and differential settlements of footings sized using the above maximum allowable net bearing pressure should be less than about 25 and 15 millimetres, respectively, provided that the subgrade at or below founding level is not disturbed by groundwater inflow or construction traffic.

The overburden materials on this site, in particular the glacial till deposit, contain cobbles and boulders. Any cobbles or boulders in footing areas which are loosened by the excavation process should be removed (and not pushed back into place) and the cavity filled with lean concrete or engineered fill. Otherwise, recompression of the disturbed soils could lead to larger than expected post-construction settlements.

5.5 Seismic Design Considerations

The seismic design provisions of the 2012 Ontario Building Code (OBC) depend, in part, on the shear wave velocity of the upper 30 metres of soil and/or bedrock below founding level. Based on the 2012 Ontario Building Code methodology, this site can be assigned a Site Class of D.

A more favourable Site Class value could potentially be assigned for the site if shear wave velocity testing were carried out.

The soils at this site are not considered liquefiable under earthquake loadings.

5.6 Frost Protection

The native subgrade soils on this site are considered to be highly frost susceptible. Therefore, all exterior perimeter foundation elements or foundation elements in unheated areas should be provided with a minimum of 1.5 metres of earth cover for frost protection purposes. Isolated, unheated exterior footings adjacent to surfaces which are cleared of snow cover during winter months should be provided with a minimum of 1.8 metres of earth cover.

5.7 Basement Slab

In preparation for the construction of the basement floor slabs, all loose, wet, and disturbed material should be removed from beneath the floor slabs. Provision should be made for at least 200 millimetres of 19 millimetre crushed clear stone to form the base of the basement floor slabs. Any fill required to raise the subgrade to the underside of the clear stone should consist of OPSS Granular A or Granular B Type II. The engineered fill should be compacted to at least 95 percent of the materials standard Proctor maximum dry density.

The recommended type of drainage system required (perimeter drains and/or underfloor drains; damp-proofing or water-proofing) depends upon the proposed basement founding elevations, soil types in the area and actual stabilized groundwater levels. As a general guideline, to prevent hydrostatic pressure build up beneath the basement floor slabs, it is suggested that the granular base for the floor slabs be positively drained. This can be achieved by providing a hydraulic link between the underfloor fill and exterior drainage system.

Permanent excavation should ideally not extend below the groundwater level at this site (see Section 5.2). If the groundwater level is encountered above subgrade level, a geotextile could be required between the clear stone underslab fill and the sandy subgrade soils, to avoid loss of fine soil particles from the subgrade soil into the voids in the clear stone and ultimately into the drainage system. In the extreme case, loss of fines into the clear stone could cause ground loss beneath the slab and plugging of the drainage system. Where a geotextile is required, it should consist of a Class II non-woven geotextile with a Filtration Opening Size (FOS) not exceeding 100 microns, in accordance with Ontario Provincial Standard Specification (OPSS) 1860.

Based on the provided conceptual plan, it is understood that garages are not being considered for the proposed development. Recommendations on garage floor slab preparation can be provided upon request, if that changes.

5.8 Basement Walls and Foundation Wall Backfill

The soils at this site are highly frost susceptible and should not be used as backfill directly against exterior, unheated, or well insulated foundation elements. To avoid problems with frost adhesion and heaving, these foundation elements should either be backfilled with non-frost susceptible sand or sand and gravel conforming to the requirements for Ontario Provincial Standard Specification (OPSS) Granular B Type I or, alternatively, a bond break such as the Platon system sheeting could be placed against the foundation walls.

Drainage of the wall backfill should be provided by means of a perforated pipe subdrain in a surround of 19 millimetre clear stone, wrapped in geotextile. It is anticipated that the subdrains will discharge by gravity drainage into an adjacent storm sewer. Alternatively, if gravity discharge to the storm sewer system is not feasible, the subdrains may discharge to a sump pit. Conventional damp proofing of the basement walls is appropriate with the above design approach.

Basement walls made within open cut excavations, backfilled with granular material, and effectively drained as described above should be designed to resist lateral earth pressures calculated using a triangular distribution of the stress with a magnitude of:

$$\sigma_h(z) = K_o (\gamma z + q)$$

Where: $\sigma_h(z)$ = Lateral earth pressure on the wall at depth z, kilopascals;

K_o = At-rest earth pressure coefficient, use 0.5;

γ = Unit weight of retained soil, 21.5 kilonewtons per cubic metre;

z = Depth below top of wall, metres; and,

q = Uniform surcharge at ground surface behind the wall to account for traffic, equipment, or stockpiled soil (use 12 kilopascals as a minimum).

The lateral earth pressure equation given above is in an unfactored format and will need to be factored for Limit States Design purposes. If Platon System sheeting or a similar water barrier product is used against the foundation walls, then hydrostatic groundwater pressures should also be considered in the calculation of the lateral earth pressures.

These lateral earth pressures would increase under seismic loading conditions. The earthquake-induced dynamic pressure distribution, which is to be added to the static earth pressure distribution, is a linear distribution with maximum pressure at the top of the wall and minimum pressure at its toe (i.e., an inverted triangular pressure distribution). The combined pressure distribution (static plus seismic) may be determined as follows:

$$\sigma_h(z) = K_o \gamma z + (K_{AE} - K_a) \gamma (H-z)$$

Where:

K_{AE} = The seismic earth pressure coefficient, use 0.8 for a non-yielding wall,

Ka = Active earth pressure coefficient, use 0.34; and,

H = The total depth to the bottom of the foundation wall, metres.

5.9 Excavations

Excavations for basements, watermain, sewers, and service connections will be primarily through the fill, sandy silt and glacial till. No unusual problems are anticipated in excavating the overburden materials using conventional hydraulic excavating equipment, recognizing that significant cobble and boulder removal should be expected in the glacial till.

If encountered, removal of shallow depths or limited areas of bedrock could be accomplished using mechanical methods (such as hoe ramming in conjunction with line drilling). Rock removal to significant depths or over large areas could require blasting and further guidance can be provided if blasting is required.

In accordance with the Occupational Health and Safety Act (OHSA) of Ontario, the overburden materials above the groundwater table would generally be classified as a Type 3 soil and therefore, the side slopes should be stable in the short term at 1 horizontal to 1 vertical. Below the water table, side slopes of 3 horizontal to 1 vertical (Type 4 soil in accordance with the OHSA) will be required to prevent sloughing of the sandier soils.
Boulders larger than 0.3 metres in diameter should be removed from the excavation side slopes for worker safety.

Near-vertical temporary excavation side slopes in the bedrock, if encountered, should be feasible.

Trench excavations could also be carried out using steeper side slopes with all manual labour carried out within a fully braced, steel trench box for worker safety. It is expected that open-cut methods and/or braced trench box support will generally be feasible.

Stockpiling of soil beside the excavations should be avoided; the weight of the stockpiled soil could lead to slope instability of unsupported excavations. Stockpiles should be setback from the top of the slope a minimum distance equal to twice the depth of the excavation.

Where the subgrade for building is found to be wet and sensitive to disturbance, consideration should be given to placing a mud slab of lean concrete over the subgrade (following inspection and approval by geotechnical personnel) or a 150 millimetre thick layer of OPSS Granular A underlain by a non-woven geotextile to protect the subgrade from construction traffic.

The groundwater seepage at the test pit locations were measured to be between about 2.4 and 3.8 metres below the existing ground surface. Excavations deeper than about 2 metres below the existing ground surface may extend below the groundwater level. Groundwater inflow into the excavations should however be feasibly handled by pumping from sumps within the excavations. The actual rate of groundwater inflow will depend on many factors including the contractor's schedule and rate of excavation, the size of the excavation, the number of working areas being excavated at one time, and the time of year at which the excavation is made. Also, there may be instances where significant volumes of precipitation, surface runoff and/or groundwater collects in an open excavation and must be pumped out.

Under the new regulations, a Permit-To-Take-Water (PTTW) is required from the Ministry of the Environment and Climate Change (MOECC) if a volume of water greater than 400,000 litres per day is pumped from the excavations. If the volume of water to be pumped will be less than 400,000 litres per day, but more than 50,000 litres per day, the water taking will not require a PTTW, but will need to be registered in the Environmental Activity and Sector Registry (EASR) as a prescribed activity. Based on the groundwater information collected during the current investigation as well as the type of the basement (partial basement), it is considered unlikely that a PTTW would be required during construction for this project. However, registration in the EASR may be required. The requirement for registration (i.e., if more than 50,000 litres per day is being pumped) can be assessed at the time of construction. Registration is a quick process that will not significantly disrupt the construction schedule.

5.10 Site Servicing

At least 150 millimetres of OPSS Granular A should be used as pipe bedding for sewer and water pipes. Where unavoidable disturbance to the subgrade surface does occur, it may be necessary to place a sub-bedding layer consisting of 300 millimetres of compacted OPSS Granular B Type II beneath the Granular A or to thicken the Granular A bedding. The bedding should in all cases extend to the spring line of the pipe and should be compacted to at least 95 percent of the material's standard Proctor maximum dry density (SPMDD). The use of clear crushed stone as a bedding layer should not be permitted anywhere on this project since fine particles from the native soils and backfill could potentially migrate into the voids in the clear crushed stone and cause loss of lateral pipe support.

Cover material from spring line of the pipe to at least 300 millimetres above the top of pipe, should consist of OPSS Granular A or Granular B Type I with a maximum particle size of 25 millimetres. The cover material should be compacted to at least 95 percent of the material's SPMDD.

It should generally be possible to re-use the sandy silt and glacial till as trench backfill. Where the trench will be covered with hard surfaced areas (e.g., pavements, sidewalks, or paving stones), the type of native material placed in the frost zone (between subgrade level and 1.8 metres depth) should match the soil exposed on the trench walls for frost heave compatibility.

All trench backfill should be placed in maximum 300 millimetre loose lifts and be uniformly compacted to at least 95 percent of the material's SPMDD using suitable compaction equipment. Backfilling operations carried out during cold weather should avoid inclusions of frozen lumps of soil, snow and ice.

5.11 Pavement Design

In preparation for pavement construction, all topsoil and any unsuitable fill (i.e., fill containing organic matter) should be excavated from the pavement areas for predictable pavement performance.

Those portions of the fill not containing organic matter may be left in place provided that some long term settlement of the pavement surface can be tolerated. However, the surface of the fill material at subgrade level should be proof rolled with a heavy smooth drum roller under the supervision of qualified geotechnical personnel to compact the surface of the existing fill and to identify soft areas requiring sub-excavation and replacement with more suitable fill.

Areas requiring grade raising to proposed subgrade level should be filled using acceptable (compactable and inorganic) earth borrow or OPSS Select Subgrade Material. The existing inorganic fill on site may be suitable for this purpose but that would need to be confirmed by the geotechnical engineer at the time of construction. Subgrade fill should be placed in maximum 300 millimetre thick lifts and should be compacted to at least 95 percent of the material's standard Proctor maximum dry density using suitable compaction equipment.

The pavement structure for car parking areas should consist of:

Pavement Component	Thickness (mm)
Asphaltic Concrete	50
OPSS Granular A Base	150
OPSS Granular B Type II Subbase	300

The pavement structure for access roadways and truck traffic areas should consist of:

Pavement Component	Thickness (mm)
Asphaltic Concrete	90
OPSS Granular A Base	150
OPSS Granular B Type II Subbase	450

The granular base and subbase materials should be uniformly compacted to at least 100 percent of the material's standard Proctor maximum dry density using suitable vibratory compaction equipment. The asphaltic concrete should be compacted in accordance with Table 10 of OPSS 310.

The composition of the asphaltic concrete pavement in car parking areas should be as follows:

- Superpave 12.5 Surface Course – 50 millimetres

The composition of the asphaltic concrete pavement in access roadways and truck traffic areas should be as follows:

- Superpave 12.5 Surface Course – 40 millimetres
- Superpave 19.0 Binder Course – 50 millimetres

The pavement design should be based on a Traffic Category of Level B. The asphalt cement used on this project should be made with PG 58-34 asphalt cement on all lifts.

The above pavement designs are based on the assumption that the pavement subgrade has been acceptably prepared (i.e., where the trench backfill and grade raise fill have been adequately compacted to the required densities and the subgrade surface not disturbed by construction operations or precipitation). Depending on the actual conditions of the pavement subgrade at the time of construction, it could be necessary to increase the thickness of the subbase and/or to place a woven geotextile beneath the granular materials.

5.12 Impacts to Adjacent Structures or Services

Based on the distance to adjacent structures and to the existing roadways, the absence of compressible soils (i.e., clays) and relatively limited excavation depths, impacts to adjacent structures are not anticipated. This should be reviewed as the designs progress.

5.13 Trees

Based on the geotechnical investigation results, the soil types encountered at this site (i.e., fill, sandy silt and silty sand glacial till) has a low potential to undergo shrinkage as a result of water depletion by trees. Therefore, there are no restrictions on the types or sizes of trees that may be planted or tree to foundation setback distances, based on geotechnical considerations.

5.14 Corrosion

Two samples of soil from test pits 19-03 and 19-04 were subjected to basic chemical analyses related to potential sulphate attack on buried concrete elements and potential corrosion of buried ferrous elements. The results of this testing are provided in Appendix C and are summarized in the table below.

Test Pit Number	Sample Number	Depth Interval (metres)	Chloride (%)	Sulphate (%)	Electrical Conductivity (mS/cm)	pH	Resistivity (Ohm-cm)
19-03	5	4.2 – 4.4	<0.002	0.02	0.34	7.35	2,900
19-04	5	2.8 – 3.0	<0.002	0.01	0.17	7.78	5,850

The results indicate that concrete made with Type GU Portland cement should be acceptable for substructures. The results also indicate an elevated potential for corrosion of exposed ferrous metal, which should be considered during the design of the substructures.

6.0 ADDITIONAL CONSIDERATIONS

The soils at this site are sensitive to disturbance from ponded water, construction traffic, and frost.

All footing and subgrade areas should be inspected by experienced geotechnical personnel prior to filling or concreting to ensure that soil having adequate bearing capacity has been reached and that the bearing surfaces have been properly prepared. The placing and compaction of any engineered fill as well as sewer bedding and backfill should be inspected to ensure that the materials used conform to the specifications from both a grading and compaction point of view.

At the time of the writing of this report, only preliminary details for the proposed development were available. Golder Associates should be retained to review the final drawings and specifications for this project prior to tendering to ensure that the guidelines in this report have been adequately interpreted.

Golder Associates Ltd.

Ali Ghirian, P.Eng.
Geotechnical Engineer

Bill Cavers, P.Eng.
Associate, Senior Geotechnical Engineer

AG/WC/hdw
https://golderassociates.sharepoint.com/sites/114589/project files/6 deliverables/geotechnical/19128449-001-r-rev1-rpt-glenview geotech investigation 4639 bank st. 2019-10-01.docx

IMPORTANT INFORMATION AND LIMITATIONS OF THIS REPORT

Standard of Care: Golder Associates Ltd. (Golder) has prepared this report in a manner consistent with that level of care and skill ordinarily exercised by members of the engineering and science professions currently practicing under similar conditions in the jurisdiction in which the services are provided, subject to the time limits and physical constraints applicable to this report. No other warranty, expressed or implied is made.

Basis and Use of the Report: This report has been prepared for the specific site, design objective, development and purpose described to Golder by the Client, **Glenview Properties Inc.**. The factual data, interpretations and recommendations pertain to a specific project as described in this report and are not applicable to any other project or site location. Any change of site conditions, purpose, development plans or if the project is not initiated within eighteen months of the date of the report may alter the validity of the report. Golder cannot be responsible for use of this report, or portions thereof, unless Golder is requested to review and, if necessary, revise the report.

The information, recommendations and opinions expressed in this report are for the sole benefit of the Client. No other party may use or rely on this report or any portion thereof without Golder's express written consent. If the report was prepared to be included for a specific permit application process, then the client may authorize the use of this report for such purpose by the regulatory agency as an Approved User for the specific and identified purpose of the applicable permit review process, provided this report is not noted to be a draft or preliminary report, and is specifically relevant to the project for which the application is being made. Any other use of this report by others is prohibited and is without responsibility to Golder. The report, all plans, data, drawings and other documents as well as all electronic media prepared by Golder are considered its professional work product and shall remain the copyright property of Golder, who authorizes only the Client and Approved Users to make copies of the report, but only in such quantities as are reasonably necessary for the use of the report by those parties. The Client and Approved Users may not give, lend, sell, or otherwise make available the report or any portion thereof to any other party without the express written permission of Golder. The Client acknowledges that electronic media is susceptible to unauthorized modification, deterioration and incompatibility and therefore the Client cannot rely upon the electronic media versions of Golder's report or other work products.

The report is of a summary nature and is not intended to stand alone without reference to the instructions given to Golder by the Client, communications between Golder and the Client, and to any other reports prepared by Golder for the Client relative to the specific site described in the report. In order to properly understand the suggestions, recommendations and opinions expressed in this report, reference must be made to the whole of the report. Golder cannot be responsible for use of portions of the report without reference to the entire report.

Unless otherwise stated, the suggestions, recommendations and opinions given in this report are intended only for the guidance of the Client in the design of the specific project. The extent and detail of investigations, including the number of test holes, necessary to determine all of the relevant conditions which may affect construction costs would normally be greater than has been carried out for design purposes. Contractors bidding on, or undertaking the work, should rely on their own investigations, as well as their own interpretations of the factual data presented in the report, as to how subsurface conditions may affect their work, including but not limited to proposed construction techniques, schedule, safety and equipment capabilities.

Soil, Rock and Groundwater Conditions: Classification and identification of soils, rocks, and geologic units have been based on commonly accepted methods employed in the practice of geotechnical engineering and related disciplines. Classification and identification of the type and condition of these materials or units involves judgment, and boundaries between different soil, rock or geologic types or units may be transitional rather than abrupt. Accordingly, Golder does not warrant or guarantee the exactness of the descriptions.

Special risks occur whenever engineering or related disciplines are applied to identify subsurface conditions and even a comprehensive investigation, sampling and testing program may fail to detect all or certain subsurface conditions. The environmental, geologic, geotechnical, geochemical and hydrogeologic conditions that Golder interprets to exist between and beyond sampling points may differ from those that actually exist. In addition to soil variability, fill of variable physical and chemical composition can be present over portions of the site or on adjacent properties. **The professional services retained for this project include only the geotechnical aspects of the subsurface conditions at the site, unless otherwise specifically stated and identified in the report.** The presence or implication(s) of possible surface and/or subsurface contamination resulting from previous activities or uses of the site and/or resulting from the introduction onto the site of materials from off-site sources are outside the terms of reference for this project and have not been investigated or addressed.

Soil and groundwater conditions shown in the factual data and described in the report are the observed conditions at the time of their determination or measurement. Unless otherwise noted, those conditions form the basis of the recommendations in the report. Groundwater conditions may vary between and beyond reported locations and can be affected by annual, seasonal and meteorological conditions. The condition of the soil, rock and groundwater may be significantly altered by construction activities (traffic, excavation, groundwater level lowering, pile driving, blasting, etc.) on the site or on adjacent sites. Excavation may expose the soils to changes due to wetting, drying or frost. Unless otherwise indicated the soil must be protected from these changes during construction.

Sample Disposal: Golder will dispose of all uncontaminated soil and/or rock samples 90 days following issue of this report or, upon written request of the Client, will store uncontaminated samples and materials at the Client's expense. In the event that actual contaminated soils, fills or groundwater are encountered or are inferred to be present, all contaminated samples shall remain the property and responsibility of the Client for proper disposal.

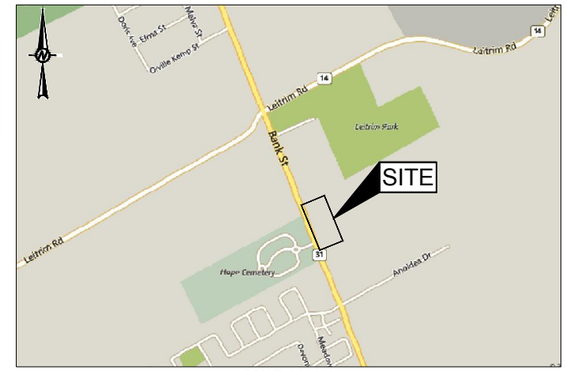
Follow-Up and Construction Services: All details of the design were not known at the time of submission of Golder's report. Golder should be retained to review the final design, project plans and documents prior to construction, to confirm that they are consistent with the intent of Golder's report.

During construction, Golder should be retained to perform sufficient and timely observations of encountered conditions to confirm and document that the subsurface conditions do not materially differ from those interpreted conditions considered in the preparation of Golder's report and to confirm and document that construction activities do not adversely affect the suggestions, recommendations and opinions contained in Golder's report. Adequate field review, observation and testing during construction are necessary for Golder to be able to provide letters of assurance, in accordance with the requirements of many regulatory authorities. In cases where this recommendation is not followed, Golder's responsibility is limited to interpreting accurately the information encountered at the borehole locations, at the time of their initial determination or measurement during the preparation of the Report.

Changed Conditions and Drainage: Where conditions encountered at the site differ significantly from those anticipated in this report, either due to natural variability of subsurface conditions or construction activities, it is a condition of this report that Golder be notified of any changes and be provided with an opportunity to review or revise the recommendations within this report. Recognition of changed soil and rock conditions requires experience and it is recommended that Golder be employed to visit the site with sufficient frequency to detect if conditions have changed significantly.

Drainage of subsurface water is commonly required either for temporary or permanent installations for the project. Improper design or construction of drainage or dewatering can have serious consequences. Golder takes no responsibility for the effects of drainage unless specifically involved in the detailed design and construction monitoring of the system.

KEY MAP



SCALE: 1:25,000

LEGEND

TEST PIT LOCATION

REFERENCE(S)

1. PROJECTION: TRANSVERSE MERCATOR, DATUM; NAD 83 CSRS, COORDINATE SYSTEM: UTM ONE 18, VERTICAL DATUM: CGVD28

0 25 50
1:1,000 METRES

CLIENT
GLENVIEW PROPERTIES INC.

PROJECT
GEOTECHNICAL INVESTIGATION
RESIDENTIAL COMMUNITY DEVELOPMENT
4639 BANK STREET, OTTAWA, ONTARIO

TITLE
TEST PIT LOCATION PLAN

CONSULTANT
GOLDER

YYYY-MM-DD	2019-08-16
DESIGNED	----
PREPARED	ZS
REVIEWED	AG
APPROVED	WC

PROJECT NO.	CONTROL	REV.	FIGURE
19128449	0001	A	1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

0 25 mm

APPENDIX A

List of Abbreviations and Symbols Record of Test Pits

TABLE 1

RECORD OF TEST PITS

Test Pit Number Elevation (Metres)	Depth (metres)	Description
TP 19-01 (103.8 metres)	0.0 – 0.3	TOPSOIL (FILL) – (ML) sandy CLAYEY SILT, trace gravel; dark brown; contains organic matter and rootlets, cohesive, w<PL
453191.6 E 5019487.5 N	0.3 – 1.6	FILL – (ML/CL) gravelly SILTY CLAY to CLAYEY SILT, some sand; grey-brown; contains organic matter, rootlets and shale fragments, cohesive, w<PL
	1.6 – 1.9	FILL – (SM) gravelly SILTY SAND; dark grey; contains cobbles, non-cohesive, moist to wet
	1.9 – 3.8	(ML) sandy SILT, trace gravel; brown to grey; contains cobbles and boulders; non-cohesive, moist
	3.8 – 5.0	(SM) gravelly SILTY SAND; grey; contains cobbles and boulders (GLACIAL TILL), non-cohesive, wet
	5.0	END OF TEST PIT
		Note: water seepage at 3.8 m depth upon completion

Sample	Depth (m)	Water Content (%)
1	0.3 – 0.6	
2	1.6 – 1.8	
3	1.9 – 2.2	
4	3.1 – 3.2	20
5	3.8 – 3.9	11
6	4.8 – 5.0	8

:

TABLE 1

RECORD OF TEST PITS

Test Pit Number Elevation (Metres)	Depth (metres)	Description
TP 19-02 (103.1 metres) 453231.8 E 5019510.9 N	0.0 – 0.15	TOPSOIL (FILL) – (ML) CLAYEY SILT, some sand, trace gravel; dark brown; contains organic matter and rootlets, cohesive, w<PL
	0.15 – 0.75	FILL – (CL/ML) gravelly CLAYEY SILT to SILTY CLAY, trace to some sand, contains large shale fragments; grey-brown; cohesive, w<PL
	0.75 – 2.2	(ML) sandy SILT, trace gravel; grey brown; contains cobbles and boulders, non-cohesive, moist to wet
	2.2 – 4.8	(SM) gravelly SILTY SAND; grey brown to grey; contains cobbles and boulders (GLACIAL TILL), non-cohesive, moist to wet
	4.8	END OF TEST PIT (Refusal)
		Note: water seepage at 2.4 m depth upon completion

Sample	Depth (m)	Water Content (%)
1	0.15 – 0.75	
2	0.9 – 1.0	
3	2.3 - 2.5	
4	3.1 – 3.2	9
5	3.9 – 4.0	9
6	4.7 – 4.8	10

TABLE 1

RECORD OF TEST PITS

Test Pit Number Elevation (Metres)	Depth (metres)	Description
TP 19-03 (103.5 metres)	0.0 – 0.25	TOPSOIL (FILL) – (ML) sandy CLAYEY SILT, trace gravel; dark brown; contains organic matter and rootlets, cohesive, w<PL
453230.8 E 5019452.0 N	0.25 – 1.5	FILL – (ML) gravelly sandy SILT; light brown to brown; contains cobbles and large shale fragments, non-cohesive, moist
	1.5 – 3.0	(ML) sandy SILT, trace gravel; brown to grey; contains cobbles, non-cohesive, moist
	3.0 – 5.2	(SM/ML) gravelly SILTY SAND to sandy SILT; grey; contains cobbles and boulders (GLACIAL TILL), non-cohesive, wet
	5.2	END OF TEST PIT
		Note: water seepage at 3.2 m depth upon completion

Sample	Depth (m)	Water Content (%)
1	0.25 – 0.8	
2	1.5 – 1.6	
3	2.2 – 2.4	16
4	3.0 – 3.2	12
5	4.2 – 4.4	8
6	5.0 – 5.2	11

TABLE 1

RECORD OF TEST PITS

Test Pit Number Elevation (Metres)	Depth (metres)	Description
TP 19-04 (103.4 metres)	0.0 – 0.23	TOPSOIL (FILL) – (ML) sandy CLAYEY SILT, trace to some gravel; dark brown; contains organic matter and rootlets, cohesive, w<PL
453234.6 E 5019408.7 N	0.23 – 1.05	FILL – (ML) gravelly sandy SILT; brown; contains cobbles, boulders, rootlets and large shale fragments, non-cohesive, moist
	1.05 – 1.5	FILL – (SM/ML) gravelly sandy SILT to SILTY SAND, dark brown; contains sand pockets, cobbles and large shale fragments, non-cohesive, moist
	1.5 – 1.7	FILL – (CL/CH) SILTY CLAY to CLAY, some sand and gravel; grey; cohesive, w>PL
	1.7 – 3.0	(ML) sandy SILT, trace gravel; brown; contains cobbles and boulders, non-cohesive, moist
	3.8 – 4.8	(SM) gravelly SILTY SAND; grey; contains cobbles and boulders (GLACIAL TILL), non-cohesive, wet
	4.80	END OF TEST PIT (Refusal)
		Note: water seepage at 3.2 m depth upon completion

Sample	Depth (m)	Water Content (%)
1	0.23 - 0.75	
2	1.05 – 1.1	
3	1.5 – 1.7	
4	1.7 – 1.9	
5	2.8 – 3.0	19
6	3.0 – 3.1	12
7	4.0 – 4.3	8
8	4.6 – 4.8	9

TABLE 1

RECORD OF TEST PITS

Test Pit Number Elevation (Metres)	Depth (metres)	Description
TP 19-05 (103.2 metres) 453274.1 E 5019396.1 N	0.0 – 0.22	TOPSOIL (FILL) – (ML) CLAYEY SILT, trace to some sand and gravel; dark brown; contains organic matter and rootlets, cohesive, w<PL
	0.22 – 0.7	FILL – (ML/CL) gravelly SILTY CLAY to CLAYEY SILT, some sand; grey-brown; highly fissured, contains gravelly sand pockets, organic matter, rootlets and large shale fragments, cohesive, w<PL
	0.7 – 0.9	FILL – (ML/SM) gravelly sandy SILT to SILTY SAND; trace to some clay, contains large shale fragments; dark brown; non-cohesive, moist
	0.9 – 1.7	(ML) sandy SILT; brown; non-cohesive, moist
	1.7 – 2.4	(SM) gravelly SILTY SAND; grey; contains cobbles and boulders (GLACIAL TILL), non-cohesive, wet
	2.40	END OF TEST PIT (Refusal)
		Note: water seepage at 2.4 m depth upon completion

Sample	Depth (m)	Water Content (%)
1	0.22 – 0.7	
2	0.7 – 0.75	
3	1.3 – 1.5	22
4	2.0 – 2.1	7

TABLE 1

RECORD OF TEST PITS

Test Pit Number Elevation (Metres)	Depth (metres)	Description
TP 19-06 (103.7 metres) 453252.0 E 5019347.3 N	0.0 – 0.3	TOPSOIL (FILL) – (ML) CLAYEY SILT, some sand, some to trace gravel; dark brown; contains organic matter and rootlets; cohesive, w<PL
	0.3 – 1.05	FILL – (ML) gravelly sandy SILT, brown; contains concrete, cobbles, boulders and large shale fragments, non-cohesive, moist
	1.05 – 1.8	FILL – (SM) gravelly SILTY SAND, fine to coarse; black to brown; contains silty sand pockets, non-cohesive, moist
	1.8 – 3.8	(ML) gravelly sandy SILT; brown; contains cobbles and boulders (GLACIAL TILL), non-cohesive, moist to wet
	3.8 – 4.3	(SM) gravelly SILTY SAND; black to brown; contains cobbles and boulders (GLACIAL TILL), non-cohesive, wet
	4.3	END OF TEST PIT (Refusal)
		Note: water seepage at 3.5 m depth upon completion

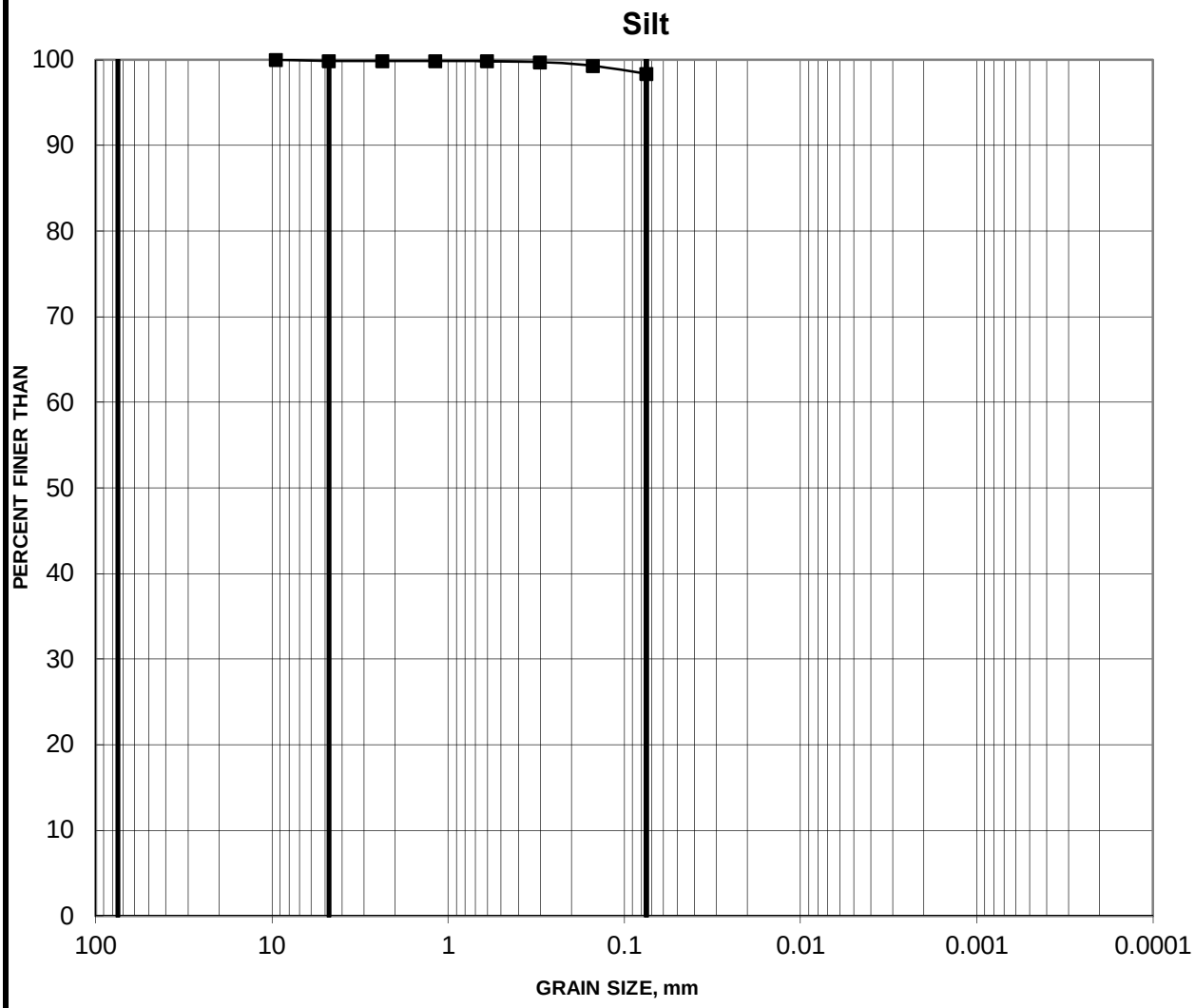
Sample	Depth (m)	Water Content (%)
1	0.3 – 1.05	
2	1.5 – 1.6	
3	2.0 – 2.4	
4	3.0 – 3.1	11
5	3.3 – 3.5	12
6	4.0 – 4.1	14

APPENDIX B

Soil Laboratory Test Results

GRAIN SIZE DISTRIBUTION

B-1



COBBLE SIZE	GRAVEL SIZE		SAND SIZE			SILT AND CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Testpit	Sample	Depth (m)	Constituents (%) Gravel	Sand	Fines
19-01	4	3.10-3.20	0	2	98

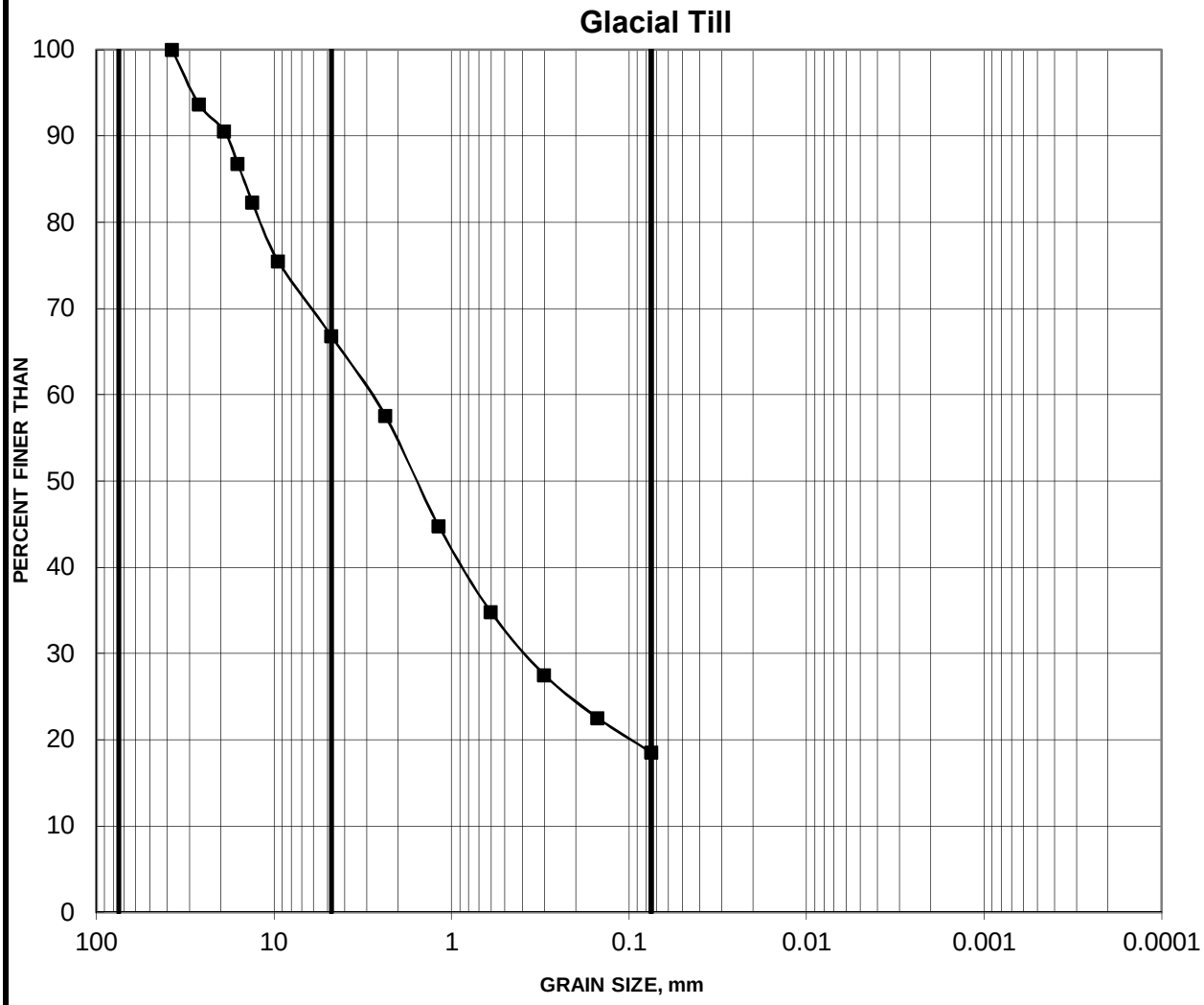
Project: 19128449

Golder Associates

Created by: MI
Checked by: CM

GRAIN SIZE DISTRIBUTION

B-2



COBBLE SIZE	GRAVEL SIZE		SAND SIZE			SILT AND CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Testpit	Sample	Depth (m)	Constituents (%) Gravel	Sand	Fines
19-02	5	3.90-4.00	33	48	19

Project: 19128449

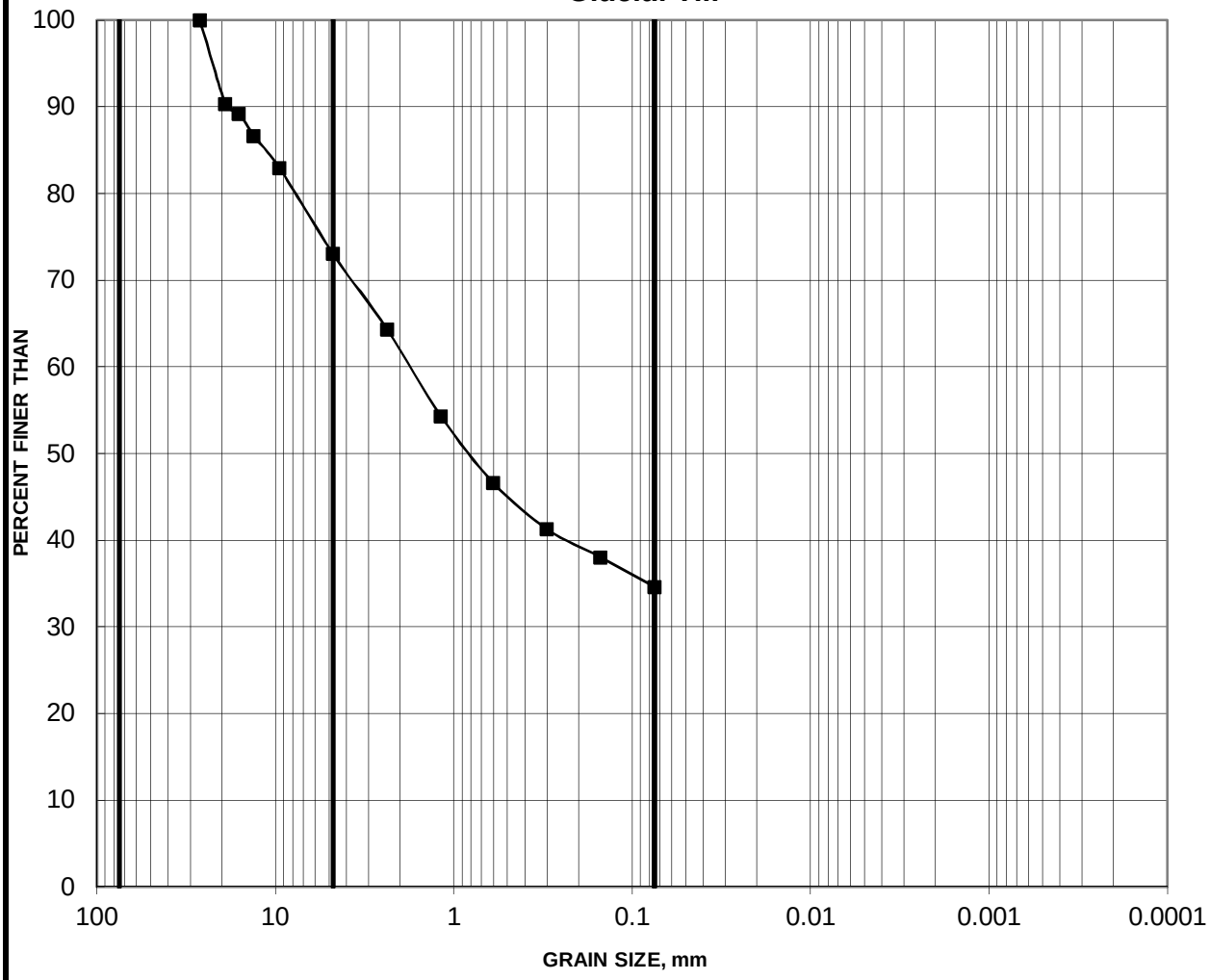
Golder Associates

Created by: MI
Checked by: CM

GRAIN SIZE DISTRIBUTION

B-3

Glacial Till



COBBLE SIZE	GRAVEL SIZE		SAND SIZE			SILT AND CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Testpit	Sample	Depth (m)	Constituents (%) Gravel	Sand	Fines
19-03	4	3.00-3.20	27	38	35

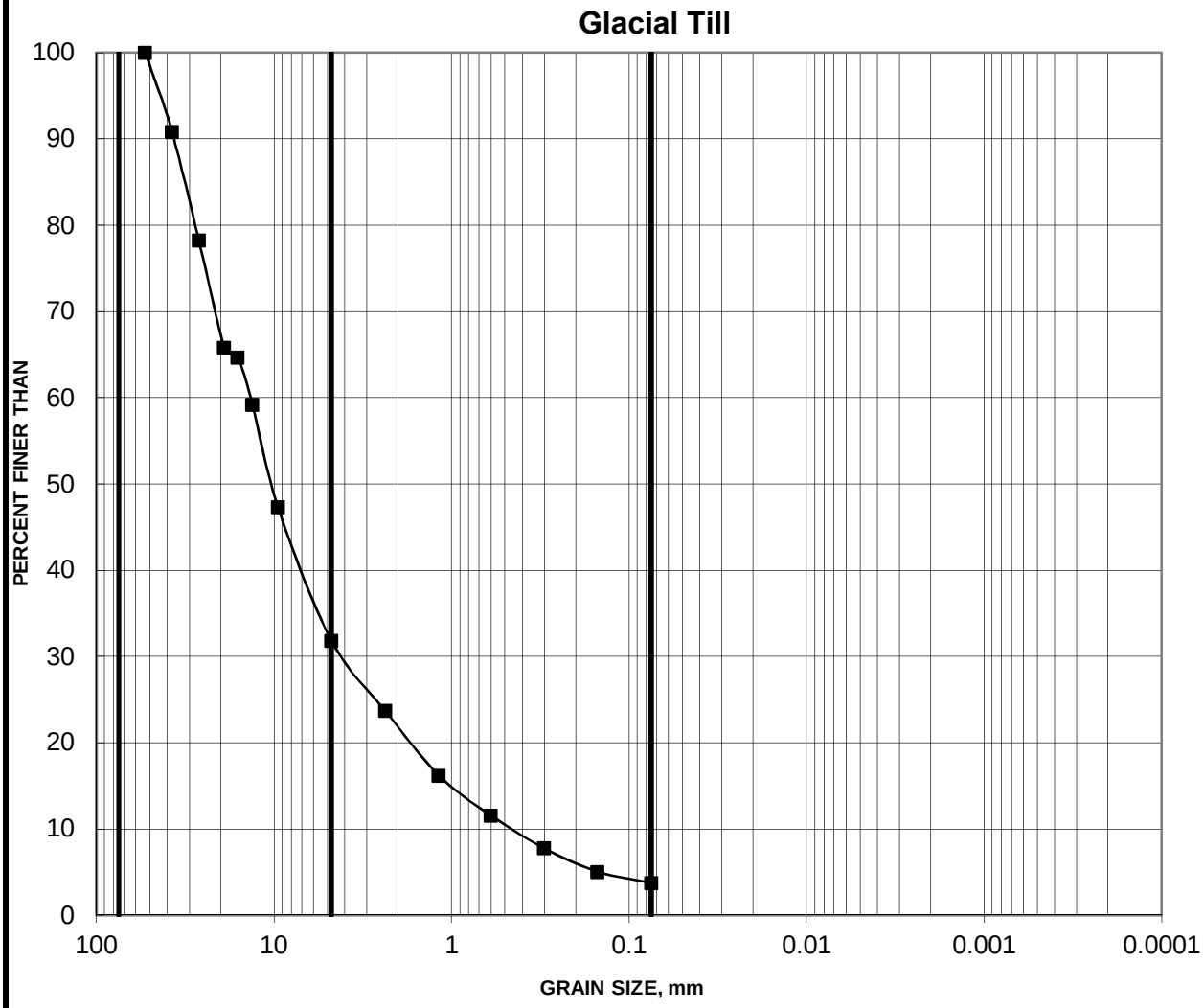
Project: 19128449

Golder Associates

Created by: MI
Checked by: CM

GRAIN SIZE DISTRIBUTION

B-4



COBBLE SIZE	GRAVEL SIZE		SAND SIZE			SILT AND CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Testpit	Sample	Depth (m)	Constituents (%) Gravel	Sand	Fines
19-04	7	4.00-4.30	68	28	4

Project: 19128449

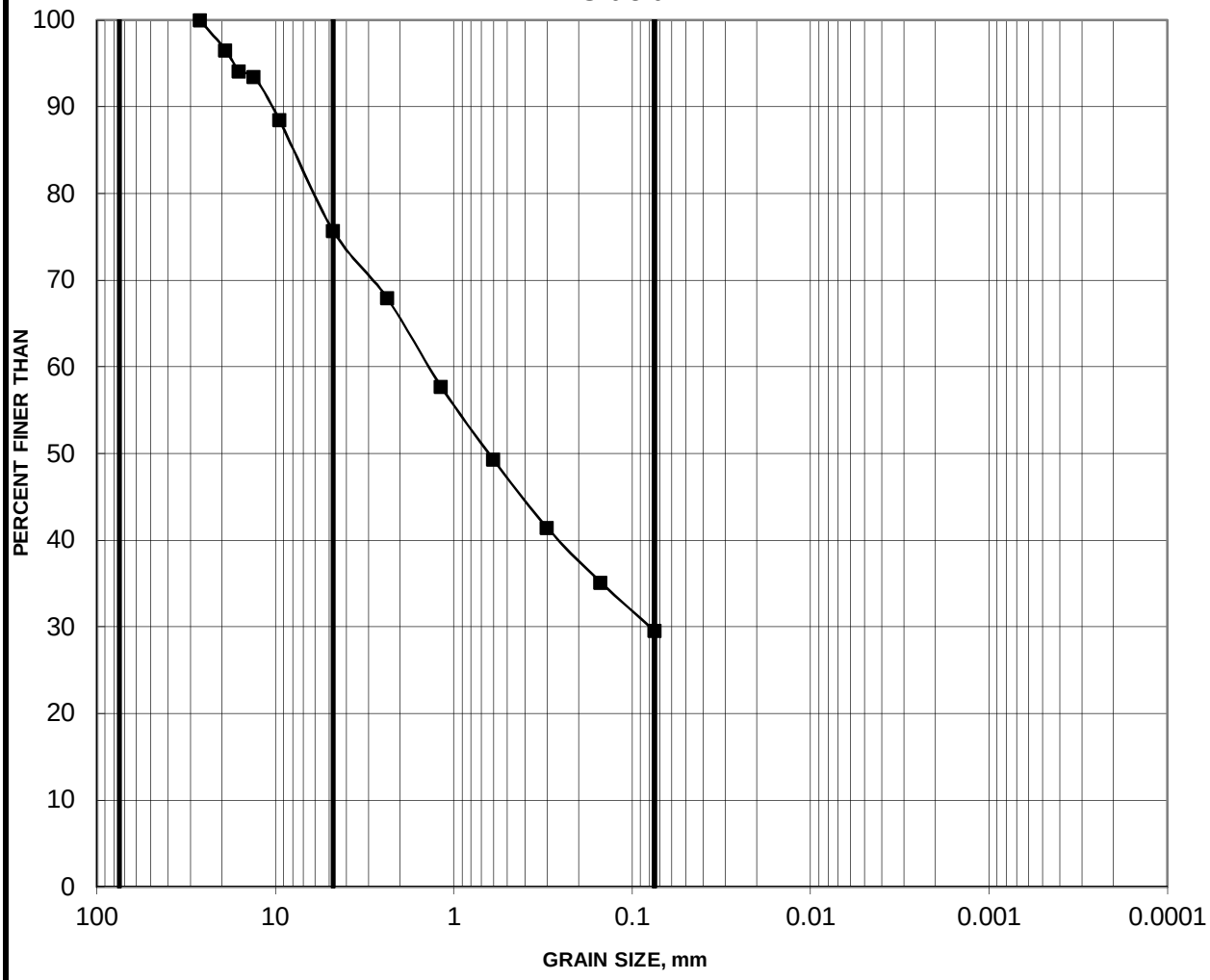
Golder Associates

Created by: MI
Checked by: CM

GRAIN SIZE DISTRIBUTION

B-5

Glacial Till



COBBLE SIZE	GRAVEL SIZE		SAND SIZE			SILT AND CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Testpit	Sample	Depth (m)	Constituents (%) Gravel	Sand	Fines
—■— 19-06	5	3.30-3.50	24	46	30

Project: 19128449

Golder Associates

Created by: MI
Checked by: CM

APPENDIX C

Chemical Test Results

eurofins | Environment Testing

Certificate of Analysis

Client: Golder Associates Ltd. (Ottawa)
1931 Robertson Road
Ottawa, ON
K2H 5B7
Attention: Ms. Ali Ghirian
PO#:
Invoice to: Golder Associates Ltd. (Ottawa)

Report Number: 1917177
Date Submitted: 2019-09-19
Date Reported: 2019-09-26
Project: 19128449
COC #: 849212

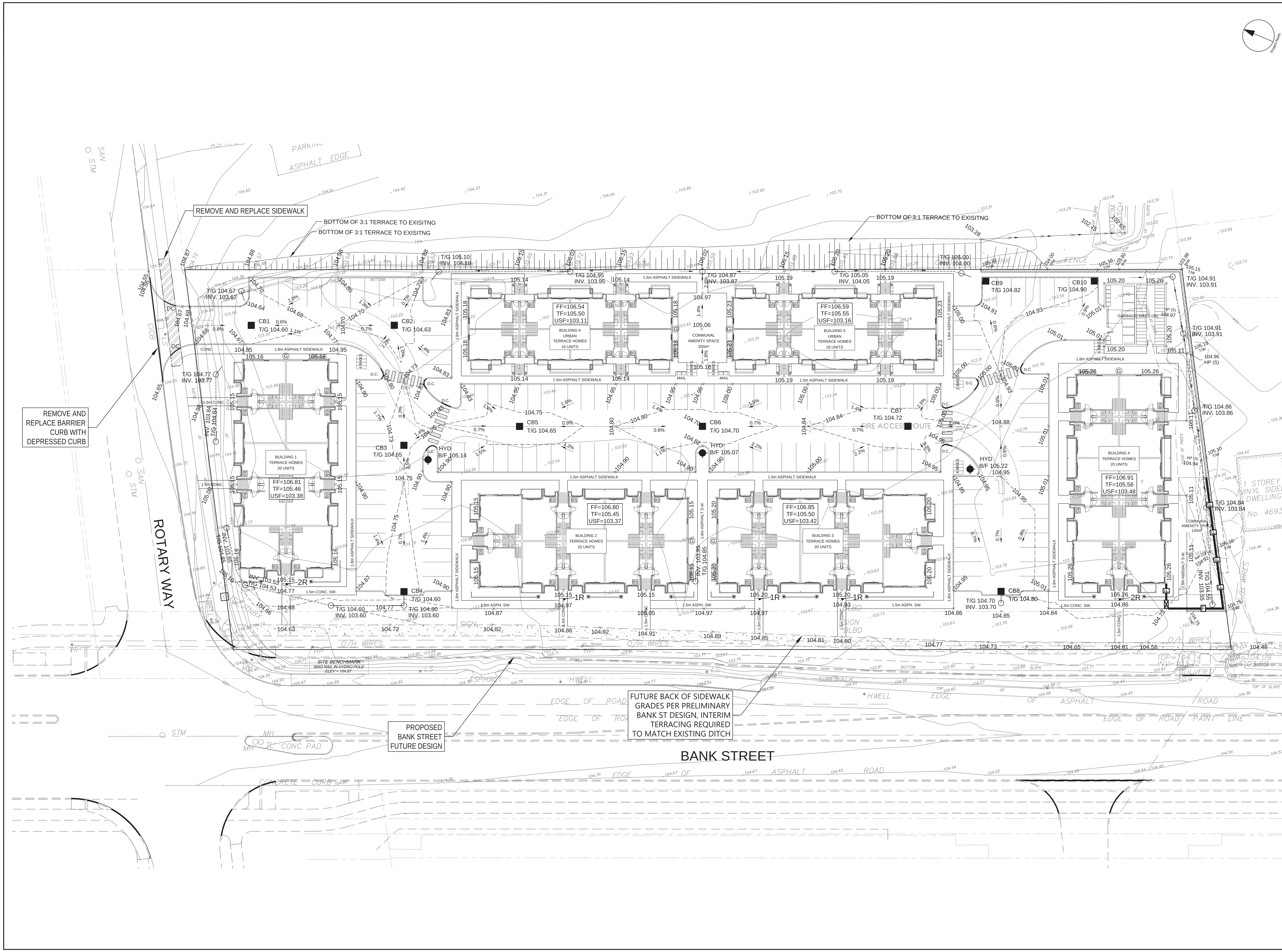
Group	Analyte	MRL	Units	Guideline	Lab I.D. Sample Matrix Sample Type Sampling Date Sample I.D.	1454752 Soil 2019-09-05 19-03 sa5 / 4.2-4.4m	1454753 Soil 2019-09-05 19-04 sa5 / 2.8-3.0m
Anions	Cl	0.002	%			<0.002	<0.002
	SO4	0.01	%			0.02	0.01
General Chemistry	Electrical Conductivity	0.05	mS/cm			0.34	0.17
	pH	2.00				7.35	7.78
	Resistivity	1	ohm-cm			2900	5850

Guideline = *** = Guideline Exceedence**

Results relate only to the parameters tested on the samples submitted.
Methods references and/or additional QA/QC information available on request.

MRL = Method Reporting Limit, AO = Aesthetic Objective, OG = Operational Guideline, MAC = Maximum Acceptable Concentration, IMAC = Interim Maximum Acceptable Concentration, STD = Standard, PWQO = Provincial Water Quality Guideline, IPWQO = Interim Provincial Water Quality Objective, TDR = Typical Desired Range

golder.com



CLIENT

GLENVIEW HOMES

Glenview homes

190 O'Connor St., 11th floor, Ottawa, ON

ISSUES

No.	DESCRIPTION	DATE
1	SUBMITTED FOR ZBA AND SPA	2020-08-28

NOT FOR CONSTRUCTION

KEY PLAN

SITE

CONSULTANTS

Project Coordinator
Terrain Development Consulting
Architect:
M. David Blakely Architects Inc.
Landscape:
James B. Lennox & Assoc. Inc.
Surveyor:
J.D.Barnes Ltd.
Geotech:
Golder Associates Ltd.

1:300

SEAL

LICENSED PROFESSIONAL ENGINEER
Yannoulopoulos
2020-08-28
PROVINCE OF ONTARIO

IBI GROUP
Suite 400 – 333 Preston Street
Ottawa ON K1S 5N4 Canada
tel 613 225 1311 / 613 241 3300 fax 613 225 9868
ibigroup.com

PROJECT

4639 BANK STREET

4639 Bank Street

PROJECT NO: 125600	
DRAWN BY: D.D./E.H.	CHECKED BY: R.M.
PROJECT MGR: D.Y.	APPROVED BY: D.Y.

SHEET TITLE

GRADING PLAN

SHEET NUMBER	ISSUE
C-200	1

TOPOGRAPHIC DETAIL OF

PART OF LOT 17
CONCESSION 5 (RIDEAU FRONT)

GEOGRAPHIC TOWNSHIP OF GLOUCESTER

NOW IN THE CITY OF

CITY OF OTTAWA

J.D. BARNES LIMITED

SCALE 1 : 250

5 0 5 10 15 metres

METRIC DISTANCES AND/OR COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

NOTES

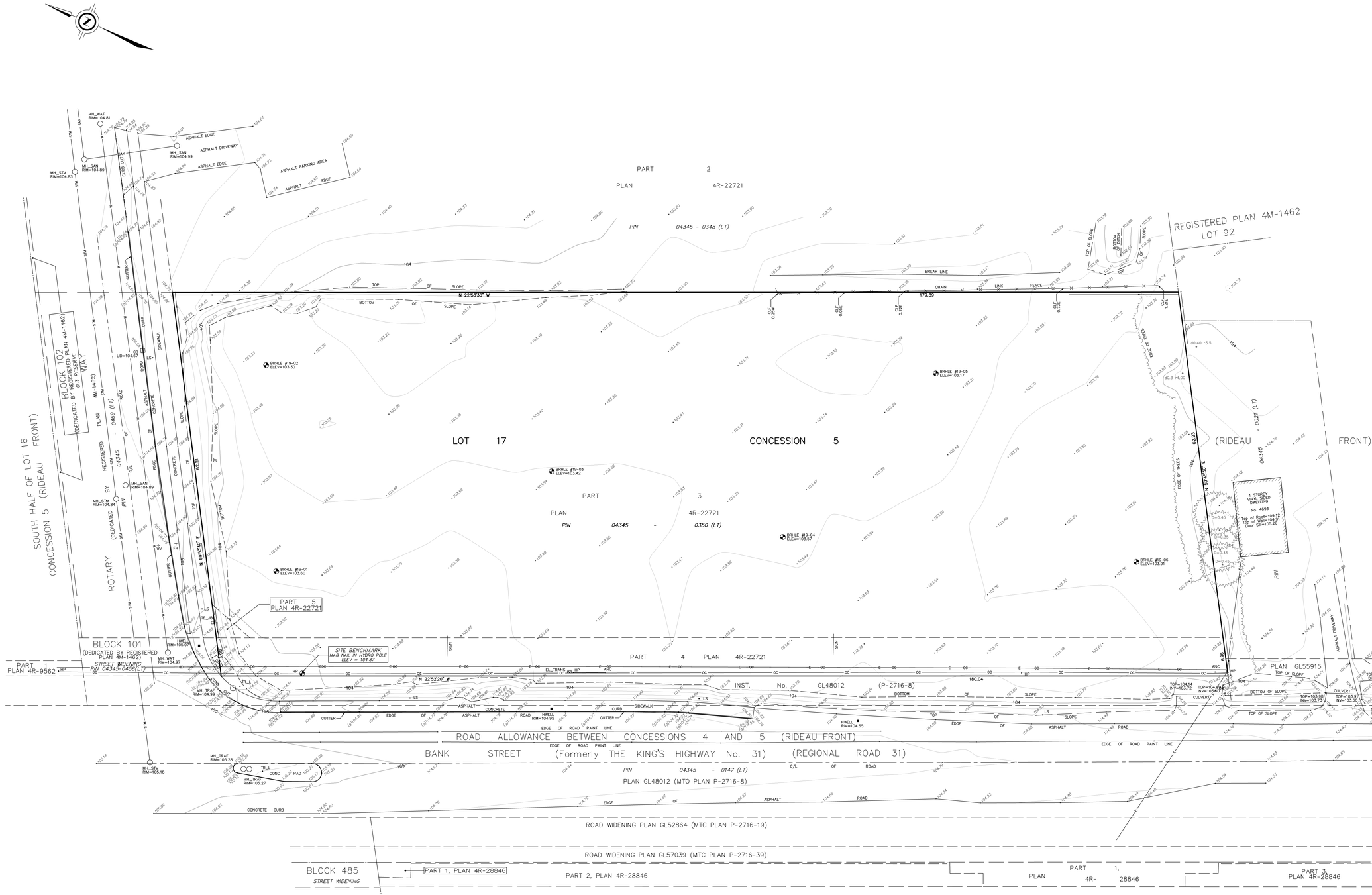
BEARINGS ARE MTM GRID, AND DERIVED FROM GLOBAL NAVIGATION SATELLITE SYSTEMS (GNSS) BY REAL TIME NETWORK (RTN) OBSERVATIONS, MTM ZONE 9, NAD 83, (CSRS) (2010).

DISTANCES ARE GROUND.

THIS PLAN IS NOT A LEGAL PLAN OF SURVEY. INFORMATION SHOWN HEREON IS COMPILED FROM VARIOUS SOURCES AND IS SUBJECT TO A FIELD SURVEY FOR CONFIRMATION OF VALUES AND INFORMATION.

ELEVATIONS

1. ELEVATIONS ARE GEODETIC AND ARE ESTABLISHED USING GLOBAL POSITIONING SYSTEM (GPS) EQUIPMENT TO ESTABLISH ELLIPSOIDAL HEIGHTS.ELLIPSOIDAL HEIGHTS WERE TRANSFORMED TO COVD-1928 DATUM (GEODETIC) USING THE FEDERAL HT2.0 HEIGHT TRANSFORMATION MODEL.
2. IT IS THE RESPONSIBILITY OF THE USER OF THIS INFORMATION TO VERIFY THAT THE SITE BENCHMARKS HAVE NOTE BEEN ALTERED OR DISTURBED AND THAT IT'S RELATIVE ELEVATION AND DESCRIPTION AGREES WITH THE INFORMATION SHOWN ON THIS DRAWING.



TOPOGRAPHIC LEGEND

CP	DENOTES CONCRETE PAD
CONC	DENOTES CONCRETE
FDN	DENOTES FOUNDATION
CLF	DENOTES CHAIN LINK FENCE
C/L	DENOTES CENTERLINE
Ø	DENOTES DIAMETER
INV	DENOTES INVERT
(CC)	DENOTES CURB CUT
(g)	DENOTES GUTTER
BRHLE	DENOTES BOREHOLE
HP	DENOTES HYDRO POLE
LS	DENOTES LIGHT STANDARD
TR_L	DENOTES TRAFFIC LIGHTS
ANC	DENOTES ANCHOR
FH	DENOTES FIRE HYDRANT
WV	DENOTES WATER VALVE
TE_JB	DENOTES TELEPHONE JUNCTION BOX
EL-TRANS	DENOTES HYDRO TRANSFORMER
HWELL	DENOTES HANDWELL
CB	DENOTES CATCH BASIN
MH_WAT	DENOTES WATER MANHOLE
MH_STM	DENOTES STORM MANHOLE
MH_SAN	DENOTES SANITARY MANHOLE
MH_TRAF	DENOTES TRAFFIC MANHOLE
OC	DENOTES OVERHEAD UTILITY CABLE
E	DENOTES OVERHEAD HYDRO CABLE
SAN	DENOTES UNDERGROUND SANITARY SEWER
STM	DENOTES UNDERGROUND STORM SEWER
W	DENOTES UNDERGROUND WATER LINE
103.59	DENOTES SPOT ELEVATION
	DENOTES DECIDUOUS TREE
	DENOTES CONIFEROUS TREE
	CONTOUR INTERVALS ARE SHOWN AS 1.00m FOR MAJOR AND 0.25m FOR MINOR
	DENOTES MAJOR CONTOUR
	DENOTES MINOR CONTOUR

N=NORTH S=SOUTH E=EAST W=WEST

J.D.BARNES LIMITED SURVEYING MAPPING GIS
LAND INFORMATION SPECIALISTS
2430 DON REID DRIVE, SUITE 204, OTTAWA, ON K1H 1E1
T: (613) 731-7244 F: (613) 731-8955 www.jdbarnes.com

DRAWN BY:	CHECKED BY:	REFERENCE NO.:
NS/RP	GZ	20-10-013-00

FILE: C:\20-10-013\00\Drawing\Bank Street Topo\20-10-013-00 BANK STREET Topo.dgn