



Stormwater Management Report and Servicing Brief

CIV-7 Storey Condo Redevelopment
424 Churchill Avenue, Ottawa, ON

Prepared for:

Churchill Properties Inc.
145 Select Avenue
Unit 5, Toronto ON
M1V 5M8

Attention: Jemmy Taing

LRL File No.: 220224

July 16, 2024



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1 INTRODUCTION AND SITE DESCRIPTION

LRL Associates Ltd. was retained by Churchill Properties Inc to complete a Stormwater Management Analysis and Servicing Brief for the development of a 7-storey condo building with 2 level of underground garage parking. Part of the work will include the demolition of a one-storey commercial building located on the site.

The subject property consists of one (1) lot with an existing one-storey commercial building. The lot is legally described as being part of Lot 1 and Part of Lot 2 (South Danforth Avenue) Registered Plan 204, in the City of Ottawa. The subject lot is zoned TM H (24) (Traditional Mainstreet Zone).

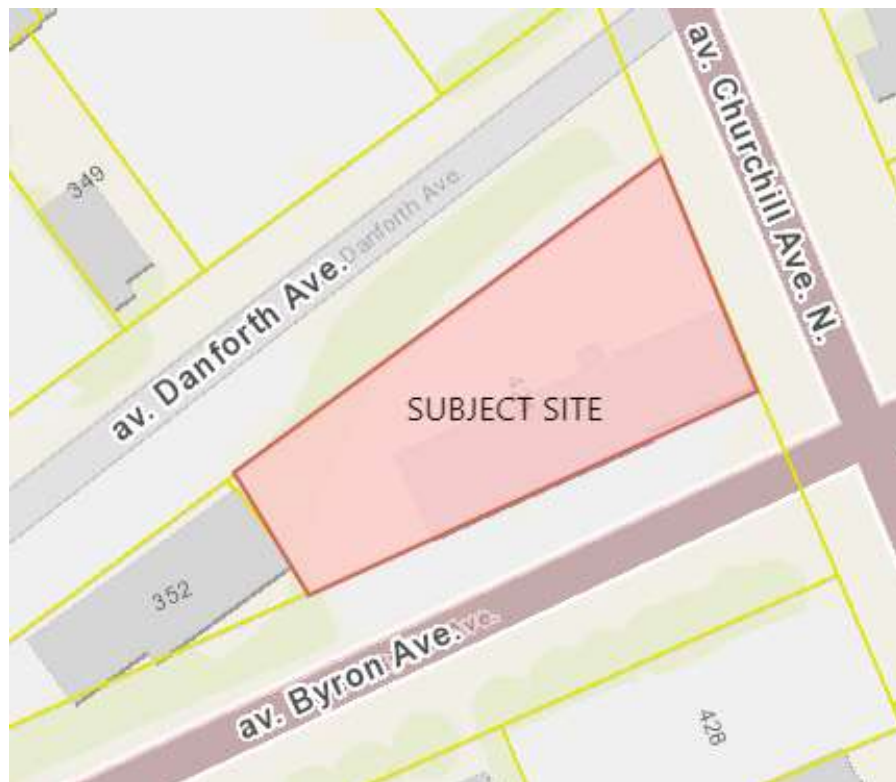


Figure 1: Aerial View of Subject Lands

The subject property is irregular shaped and measures approximately 55m in frontage along Danforth Avenue, 25.5m along Churchill Avenue and 50m along Byron Avenue. The total site area is approximately **0.101 Ha**.

The proposed development will be constructed in a single phase, which includes the demolition of the existing one-storey commercial building and the construction of the 7-storey condo building. Refer to **Site Plan** included in **Appendix F** for more details.

This report has been prepared in consideration of the terms and conditions noted above and with the civil drawings prepared for the new development. Should there be any changes in the design features, which may relate to the stormwater and servicing considerations, LRL Associates Ltd. should be advised to review the report recommendations.



2 EXISTING SITE AND DRAINAGE DESCRIPTION

The subject site measures **0.101 ha** and currently consists of a one-storey commercial building with associated asphalt parking and entrances, located along Byron Avenue and Churchill Avenue. The asphalt surface of the site is generally flat and slopes towards the North and East property lines. At the Northwest corner of the site there is a steep slope with tree cover that slopes down to Danforth Avenue. There is a drop of approximately 1m along the East property line, from the Southeast site corner and sloping down along Churchill Avenue towards Danforth Avenue. There is also a drop of approximately 6m along the northwest property line of the site, from the North property line down to Danforth Avenue. To accommodate for this drop there is an existing retaining wall which wraps around the northeast corner of the site and runs primarily along the North property line of the site. Part of the retaining wall is located just outside of the property line and part of it runs across the site along the treed area.

Sewer and watermain mapping, along with as-built information collected from the City of Ottawa indicate the following existing infrastructure located within the adjacent right-of-ways:

Churchill Avenue N:

- 300mm PVC sanitary sewer (2010)
- 300mm CONC storm sewer (2010)
- 400mm PVC watermain (2010)

Danforth Avenue:

- 225mm CONC sanitary sewer (1940)
- 150mm DI watermain (1984)

3 SCOPE OF WORK

As per applicable guidelines, the scope of work includes the following:

Stormwater management

- Calculate the allowable stormwater release rate.
- Calculate the anticipated post-development stormwater release rates.
- Demonstrate how the target quantity objectives will be achieved.

Water services

- Calculate the expected water supply demand at average and peak conditions.
- Calculate the required fire flow as per the Fire Underwriters Survey (FUS) method.
- Confirm the adequacy of water supply and pressure during peak flow and fire flow.
- Describe the proposed water distribution network and connection to the existing system.

Sanitary services

- Describe the existing sanitary sewers available to receive wastewater from the building.
- Calculate peak flow rates from the development.



- Describe the proposed sanitary sewer system.
- Review impact of increased sanitary flow on downstream sanitary sewer.

4 REGULATORY APPROVALS

An MECP Environmental Compliance Approval is not expected to be required for installation of the proposed storm and sanitary sewers within the site. A Permit to Take Water is not anticipated to be required for pumping requirements for sewer installation. The Rideau Valley Conservation Authority will need to be consulted to obtain municipal approval for site development. No other approval requirements from other regulatory agencies are anticipated.

5 WATER SUPPLY AND FIRE PROTECTION

5.1 Existing Water Supply Services and Fire Hydrant Coverage

The subject property lies within the City of Ottawa 1W water distribution network pressure zone. There is an existing 400 mm PVC watermain within Churchill Avenue N and a 150mm PVC watermain in Danforth Avenue. There are currently seven (7) existing fire hydrants within proximity to the subject property. Refer to **Appendix B** for the location of fire hydrants.

5.2 Water Supply Servicing Design

According to the City of Ottawa Water Distribution Guidelines (Technical Bulletin ISDTB-2014-02), since the subject site is anticipated to house more than 50 residential units, it is required to be serviced by two water service laterals, separated by an isolation valve, for redundancy and to avoid creation of a vulnerable service area. Additionally, considering the presence of automatic sprinkler system inside the building and a recommended size to service the sprinkler system, the subject property is proposed to be serviced via two (2) 150 mm diameter service laterals connected to the existing 406mm PVC watermain within Churchill Ave and the 152mm DI watermain located in Danforth Ave. Refer to *Site Servicing Plan C.401* in **Appendix E** for servicing layout and connection points.

We have analyzed the water demand requirements for the proposed 7-storey condo building. The residential water demands, and anticipated population were determined using Appendix 4-A, Table 4.1 and Table 4.2 from the *City of Ottawa Water Distribution Design Guidelines* and Table 3-3 from the *MOE Design Guidelines for Drinking Water Systems*.

Through reviewing the architectural floor plans of the proposed building, it was determined that the building will have a total combined floorspace of **7,818 m²**, **58** residential units, **1,670 m²** of amenity space and **3** office spaces.

The water supply requirements for the residential units, office spaces and amenity space in the proposed development have been calculated using the following formulas:



$$Q = (q \times P \times M), \text{ for the residential and office spaces and}$$

$$Q = (q \times A \times M), \text{ for the amenity space.}$$

Where:

q = average water consumption (L/capita/day) or (L/ha/day)

P = design population (capita)

M = Peak factor

A = area (ha)

Residential

The proposed building will include **52** one-bedroom units and **6** two-bedroom units. Based on the City of Ottawa Design guidelines for population projection, this translates to approximately **85.4** residents. *Table 1* below summarizes the proposed residential population count as interpreted using Table 4-1 from the *City of Ottawa Water Distribution Design Guideline*.

Table 1: Development Residential Population Estimate

Proposed Unit Type	Persons Per Unit	Number of Units	Total Population
1 Bedroom	1.4	52	72.8
2 Bedroom	2.1	6	12.6
Total		58	85.4

With reference to *Table 4.1 of the City of Ottawa Water Distribution Design Guidelines*, an average water consumption rate of 280 L/c/d was used. With reference to Table 3-3 of the *MOE Design Guidelines for Drinking Water Systems* a Maximum Daily Demand Factor and Maximum Hour Demand Factor were calculated to be 7.2 and 10.9, respectively. The anticipated residential demands were calculated as follows:

- Average daily domestic water demand is **0.28 L/s**,
- Maximum daily demand is **2.00 L/s**, and
- Maximum hourly demand is **3.01 L/s**.

Commercial/Institutional

Appendix 4-A and *Table 4.2 of the City of Ottawa Water Distribution Design Guidelines* were used to determine the consumption rates and peak factors of the amenity and office spaces. A water consumption rate of 75L/p/d was used for office employees and a consumption rate of 28,000L/ha/d was used for the amenity space. The Maximum Daily Demand Factor and the Maximum Hourly Demand Factor were 1.5 and 1.8 respectively. *Table 2* below summarizes the proposed institutional/ commercial demands.

Table 2: Institutional/ Commercial Demands

Property Type	Unit	Rate	Units	Demand (L/d)
Office	75	L/p/d	3 people	225.0
Amenity Space	28,000	L/ha/d	0.0167 ha	467.6



Using the peak factors, the anticipated institutional and commercial demands were calculated as follows:

- Average daily domestic water demand is **0.008 L/s**,
- Maximum daily demand is **0.012 L/s**, and
- Maximum hourly demand is **0.022L/s**.

Combined - Residential/Commercial/Institutional

The combined peak factors for the site are anticipated to equal the following:

- Average daily domestic water demand is **0.28 L/s**,
- Maximum daily demand is **2.01 L/s**, and
- Maximum hourly demand is **3.03 L/s**.

Refer to **Appendix B** for water demand calculations.

The City of Ottawa was contacted to obtain boundary conditions associated with the estimated water demand, as indicated in the boundary request correspondence included in **Appendix B. Table 3** below summarizes boundary conditions for the proposed development.

Table 3: Summary of Boundary Conditions

Design Parameter	Anticipated Demand (L/s)	Boundary Conditions @ Churchill Ave & Danforth Ave	
		Connection 1* (m H2O / kPa)	Connection 2** (m H2O / kPa)
Average Daily Demand	0.28	41.21 / 404.13	44.04 / 431.88
Max Day + Max Fire Flow (per FUS)	2.01 + 216.7	35.61 / 349.22	15.04 / 147.49
Peak Hour	3.03	35.01 / 343.33	37.84 / 371.08
*Ground Elevation assumed at 73.69m for Connection 1 @ Churchill Ave			
** Ground Elevation assumed at 70.86m for Connection 2 @ Danforth Ave			

As indicated in Table 3, pressures in all scenarios meet the required pressure range stated in the City of Ottawa Design Guidelines – Water Distribution (Section 4.2.2). Refer to **Appendix B** for Boundary Conditions.

The estimated fire flow for the proposed buildings was calculated in accordance with *ISTB-2018-02*. The following parameters were provided by the Architect:

- Type of construction – Non-combustible construction
- Occupancy type – Limited Combustible
- Sprinkler Protection –Fully Automatic Sprinkler System



The estimated fire flow demand was estimated to be **13,000 L/min**, see **Appendix B** for details.

There are six (6) existing fire hydrants in proximity to the proposed buildings that are available to provide the required fire flow demands of 13,000 L/min. Refer to **Appendix G** for fire hydrant locations. The proposed development has been reviewed in the context of the location of the surrounding fire hydrants. Given the surrounding layout of the fire hydrants, these hydrants are accessible to fight fire at the subject property. Table 4 below summarizes the aggregate fire flow of the contributing hydrants in proximity to the proposed development based on Table 18.5.4.3 of *ISTB-2018-02*.

Table 4: Fire Protection Summary Table

	Max. Fire Flow Demand (L/min)	Fire Hydrant(s) within 75m	Fire Hydrant(s) within 150m	Available Combined Fire Flow (L/min)
Contemplated Development	13,000	2	4	(2 x 5678) + (4 x 3785) = 26,496

The total available fire flow from contributing hydrants is equal to **26,496 L/min** which is sufficient to provide adequate fire flow for the proposed development. A certified fire protection system specialist will need to be employed to design the building’s fire suppression system and confirm the actual fire flow demand.

The proposed water supply design conforms to all relevant City Guidelines and Policies.

6 SANITARY SERVICE

6.1 Existing Sanitary Sewer Services

There is an existing 300mm PVC Sanitary sewer located in Churchill Ave N and a 225mm CONC Sanitary Sewer located in Danforth Ave. It is anticipated that the contemplated development will be connected to the existing 300mm PVC sanitary sewer located within Churchill Ave N, to be connected to the proposed building.

6.2 Sanitary Sewer Servicing Design

The proposed development will be serviced via a 150 mm dia. sanitary service connected to the existing 300mm diameter sanitary sewer within Churchill Avenue N. Refer to LRL drawing C.401, included in **Appendix F**, for the proposed sanitary servicing.

The parameters used to calculate the anticipated sanitary flows are residential average population per unit of 1.4 person for single units, 2.1 persons for two-bedroom units and a residential daily demand of 280 L/p/day, a residential peaking factor of 3.5 and a total infiltration rate of 0.33 L/s/ha. Based on these parameters and the total site area of 0.101 ha, the total anticipated wet wastewater flow was estimated to be **1.04 L/s**. Refer to **Appendix C** for the site sanitary sewer design sheet.



As requested in the pre-consultation with City staff, the calculated sanitary demands for the proposed development were coordinated with the City of Ottawa to confirm there is sufficient capacity in the downstream municipal sewers. As per correspondence attached, see **Appendix C**, the downstream municipal sewers can sufficiently accommodate the increase in sanitary flows from the proposed development.

7 STORMWATER MANAGEMENT

7.1 Existing Stormwater Infrastructure

The subject property is tributary to the Ottawa River West sub-watershed. Stormwater runoff from the subject property is tributary to the City of Ottawa sewer system as such, approvals for the proposed development within this area are under the approval authority of the City of Ottawa.

There is an existing 300mm CONC storm sewer available in Churchill Avenue N. In the pre-development conditions, drainage from the subject lot is depicted by existing watershed EWS-01 (0.101ha), which drains towards the North and West property lines. Refer to plan C701 included in **Appendix E** for pre-development drainage characteristics. Refer to **Appendix D** for pre-development and post-development watershed information.

7.2 Design Criteria

The stormwater management criteria for this development are based on the pre-consultation with City of Ottawa officials, the City of Ottawa Sewer Design Guidelines including City of Ottawa Stormwater Management Design Guidelines, 2012 (City standards), as well as the Ministry of the Environment's Stormwater Management Planning and Design Manual, 2003 (SWMP Manual).

7.2.1 Water Quality

The subject property lies within the Ottawa River West sub-watershed and is therefore subject to review by the Rideau Valley Conservation Authority (RVCA). It was determined that water quality controls would not be required on this site as treatment would be handled by municipal infrastructure. Correspondence with RVCA is included in **Appendix A**.

7.2.2 Water Quantity

Based on pre-consultation with the City, correspondence included in **Appendix A**, the following stormwater management requirements were identified for the subject site:

- Meet an allowable release rate based on a Rational Method Coefficient of 0.50, employing the City of Ottawa IDF parameters for a 2-year storm with a calculated time of concentration equal to 10 minutes; and
- Attenuate all storms up to and including the City of Ottawa 100-year storm event on site.
- Water quality treatment will not be required on this site as the water being collected and conveyed to the storm system is rooftop water.



As per the pre-application consultation meeting with the City of Ottawa, it was recommended that it would be acceptable to control only the roof portion of the building up to the 100-year storm event, to a 2-year pre-development level and that the remainder of the site could be left uncontrolled as long as the uncontrolled portion is directed towards the right of way. Based on these stormwater objectives for the subject site, it was determined that the allowable release rate for the site is **10.81 L/s** for all storms up to and including the 100-year storm. Refer to **Appendix D** for calculations.

7.3 Method of Analysis

The Modified Rational Method has been used to calculate the runoff rate from the site to quantify the detention storage required for quantity control of the development. Refer to **Appendix D** for storage calculations.

7.4 Proposed Stormwater Quantity Controls

The proposed stormwater management quantity control for this development will be accomplished using rooftop storage and roof drains with controls. A proposed 250mm diameter PVC storm sewer pipe will outlet stormwater flows from the site to the existing 300mm PVC storm sewer located within Churchill Avenue N. An additional 150mm diameter PVC storm sewer is proposed to outlet stormwater flows from the foundation drain directly to the existing 300mm PVC storm sewer located within Churchill Avenue N. The foundation drain outlet will have a backflow prevention device at the connection to the building and will be equipped with a sump pump as well as a backup pump and backup power source to ensure flow from the foundation level reaches elevation at the city sewer. Pumping details are to be designed by the mechanical engineer and provided at the Building permit stage. The proposed servicing layout and connection points are shown on drawing C.401 in **Appendix E**, and detailed calculations can be found in **Appendix D**.

The site has been analyzed and six (6) post-development watersheds have been allocated.

WS-01 to WS-05 (0.070 ha) consist of the proposed building’s roof envelope and will be captured via roof drains with controls.

WS-06 (0.031 ha) is uncontrolled and consists of the remainder of the site that is not part of the roof. Runoff from this area will be directed to the City Right of Way.

Refer to C601, Stormwater Management Plan and C702, Post-Development Watershed Plan C702 in **Appendix E** for reference.

Table 5 below summarizes post-development drainage areas. Calculations can be seen in **Appendix D**.

Table 5: Post-Development Estimated Areas & Runoff Coefficients

WATERSHED	C = 0.90 Building Area/ Asphalt & Concrete (m ²)	Total Area (ha)	Weighted Runoff Coefficient (C)
-----------	-----------------------------------------------------------------------	-----------------	------------------------------------



WS-01(ROOF)	116.29	0.012	0.90
WS-02 (ROOF)	141.44	0.014	0.90
WS-03 (ROOF)	248.09	0.025	0.90
WS-04 (ROOF)	62.07	0.006	0.90
WS-05 (ROOF)	130.54	0.013	0.90
WS-06(UN-CONTROLLED)	313.97	0.031	0.90
TOTAL	1012.4	0.101	0.90

The proposed building's rooftop was analysed, and it was determined that there would be 33.53m³ of roof storage available. A total of **ten (10)** roof drains would be used, each roof drain would have a restricted discharge rate of **0.63L/s**, resulting in a total release rate from the roof of **6.30 L/s** with a proposed head of 0.15m. The proposed roof drains are to be fully closed WATTS Adjustable Accutrol RD-100-A1. For calculations for available area of rooftop storage and for more information regarding the selected roof drain and flow restrictor, refer to **Appendix D**. For additional details on the roof storage areas refer to drawing **C.601** in **Appendix E**.

Table 6 below summarizes the release rates and storage volumes required to meet the allowable release rate of **10.81 L/s** for 100-year flow rates.

Table 6: Stormwater Release Rate & Storage Volume Summary (100 Year)

CATCHMENT AREAS	DRAINAGE AREAS (ha)	100-YEAR RELEASE RATE (L/s)	100-YEAR REQUIRED STORAGE (m ³)	TOTAL AVAILABLE STORAGE (m ³)
WS-01(ROOF)	0.012	1.26	3.15	6.03
WS-02 (ROOF)	0.014	1.26	4.23	4.55
WS-03 (ROOF)	0.025	1.26	9.46	13.17
WS-04 (ROOF)	0.006	1.26	1.09	3.14
WS-05 (ROOF)	0.013	1.26	3.76	6.64
TOTAL CONTROLLED	0.070	6.30	21.69	33.53
WS-06 (UNCONTROLLED)	0.031	15.59	0	0
TOTAL UNCONTROLLED	0.031	15.59	0.00	0.00
TOTAL	0.101	21.89	21.68	33.53

To attenuate flows to the allowable release rate of **10.81 L/s**, it is calculated that a total of **19.53 m³** of storage will be required on the roof top. The required storage is proposed to be met via the building rooftop ponding. The total required storage, storage available and allowable release rate is the following;

- **19.53 m³** is required for rooftop storage in WS-01 corresponding to a maximum restricted flow of **6.30 L/s** via roof drain controls;
- There is **33.53 m³** of available rooftop storage.

The 100-year maximum ponding extents can be found on drawing "C601 – Stormwater Management Plan" in **Appendix E**.



8 EROSION AND SEDIMENT CONTROL

During construction, erosion and sediment controls will be provided primarily via a sediment control fence to be erected along the perimeter of the site where runoff has the potential of leaving the site. Inlet sediment control devices are also to be provided in any catch basin and/or manholes in and around the site that may be impacted by the site construction. Construction and maintenance requirements for erosion and sediment controls are to comply with Ontario Provincial Standard Specification OPSS 577. For more details refer to drawing C101 Erosion and Sediment Control Plan in **Appendix E**.

9 CONCLUSION

This Stormwater Management and Servicing Report for the development proposed at 424 Churchill Avenue N presents the rationale and details for the servicing requirements for the subject property.

In accordance with the report objectives, the servicing requirements for the development are summarized below:

Water Service

- The maximum required fire flow was calculated to be **13,000 L/min** using the FUS method.
- There are six (6) existing fire hydrants available to service the proposed development. They will provide a combined fire flow of **26,496 L/min** to the site.
- The new development will be serviced via two (2) 150mm diameter services connected to the existing 406mm PVC watermain within Churchill Ave N and the 152mm DI watermain located in Danforth Ave.
- Boundary conditions received from the City of Ottawa indicate that sufficient pressure is available to service the proposed site.

Sanitary Service

- The total calculated wet wastewater flow from the proposed development is **1.04 L/s**.
- The proposed development will discharge **1.04 L/s** to the existing 300 mm PVC sanitary sewer within Churchill Avenue N via a proposed 150mm PVC sanitary service lateral.

Stormwater Management

- The stormwater release rates from the proposed development will meet the calculated allowable release rate of **10.81L/s**.
- As per the pre-application consultation meeting with the City of Ottawa, only the roof portion of the building will be controlled up to the 100-year storm event, to a 2-year pre-development level and the remainder of the site will be left uncontrolled and will be directed towards the right of way
- The site stormwater quantity control objectives will be met through ponding on the roof. 21.69m³ of storage will be required and there will be **33.53m³** of available rooftop storage.



Ten **(10)** area drains will be used to control the flows to **0.63L/s** each, which when combined will produce a controlled 100-year release rate of **6.30L/s**.

- The roof drains will each be WATTS Adjustable Accutrol RD-100-A1 that are fully closed.

10 REPORT CONDITIONS AND LIMITATIONS

The report conclusions are applicable only to this specific project described in the preceding pages. Any changes, modifications or additions will require a subsequent review by LRL Associates Ltd. to ensure the compatibility with the recommendations contained in this document.

If you have any questions or comments, please contact the undersigned.

Prepared by:
LRL Associates Ltd.



Tamara Harb, EIT, SPESC-IT
Civil Designer



Virginia Johnson, P. Eng.
Civil Engineer



APPENDIX A
Pre-consultation / Correspondance



Tamara Harb

From: Bakhit, Reza <reza.bakhit@ottawa.ca>
Sent: September 22, 2022 7:37 AM
To: Tamara Harb
Cc: Amr Salem
Subject: RE: LRL220224 - CIV 7-Storey Condo Redevelopment Boundary Conditions Request (Water and Sanitary)
Attachments: 424 Churchill Avenue September 2022.pdf

Hi,

The following are boundary conditions, HGL, for hydraulic analysis at 424 Churchill Avenue (zone 1W) assumed to be connected to the 406 mm watermain on Churchill Avenue and the 152 mm on Danforth Avenue (see attached PDF for location).

Both Connections:

Minimum HGL: 108.7 m

Maximum HGL: 114.9 m

Max Day + Fire Flow (216.7 L/s): 109.3 m (Churchill Connection) and 85.9 m (Danforth connection)

These are for current conditions and are based on computer model simulation.

Disclaimer: The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation.

Reza Bakhit, P.Eng, C.E.T

Project Manager

Planning, Real Estate and Economic Development Department / Direction générale de la planification, des biens immobiliers et du développement économique

Development Review - Central Branch

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613.580.2424 ext./poste 19346, reza.bakhit@ottawa.ca

Please note: Given the current pandemic, I will be working from home until further notice; reaching me by email is the easiest. I will be checking my voicemail, just not as frequently as I normally would be.

From: Tamara Harb <tharb@lrl.ca>
Sent: Wednesday, September 07, 2022 11:03 AM
To: Bakhit, Reza <reza.bakhit@ottawa.ca>
Cc: Amr Salem <asalem@lrl.ca>
Subject: LRL220224 - CIV 7-Storey Condo Redevelopment Boundary Conditions Request (Water and Sanitary)

CAUTION: This email originated from an External Sender. Please do not click links or open attachments unless you recognize the source.

Tamara Harb

From: Bakhit, Reza <reza.bakhit@ottawa.ca>
Sent: September 19, 2022 7:36 AM
To: Tamara Harb
Cc: Amr Salem
Subject: RE: LRL220224 - CIV 7-Storey Condo Redevelopment Boundary Conditions Request (Water and Sanitary)

Hi Tamara,

Not sure if I sent you this email, but just in case, please note that there is no concern with the proposed SAN flow .

Thanks,

Reza Bakhit, P.Eng, C.E.T

Project Manager

Planning, Real Estate and Economic Development Department / Direction générale de la planification, des biens immobiliers et du développement économique

Development Review - Central Branch

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613.580.2424 ext./poste 19346, reza.bakhit@ottawa.ca

Please note: Given the current pandemic, I will be working from home until further notice; reaching me by email is the easiest. I will be checking my voicemail, just not as frequently as I normally would be.

From: Tamara Harb <tharb@lrl.ca>
Sent: Wednesday, September 07, 2022 11:03 AM
To: Bakhit, Reza <reza.bakhit@ottawa.ca>
Cc: Amr Salem <asalem@lrl.ca>
Subject: LRL220224 - CIV 7-Storey Condo Redevelopment Boundary Conditions Request (Water and Sanitary)

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ATTENTION : Ce courriel provient d'un expéditeur externe. Ne cliquez sur aucun lien et n'ouvrez pas de pièce jointe, excepté si vous connaissez l'expéditeur.

Good morning Reza,

I would like to request boundary conditions for the development of a 7-storey condo building located at 424 Churchill Ave, Ottawa ON.

Water Connection

We are proposing two water service laterals connected to the existing 400mm municipal watermain in Churchill Avenue and the existing 150mm municipal watermain in Danforth Avenue. Please provide the boundary conditions for the proposed building using the following proposed development demands:

- Type of development: **7 Storey condo building with 2 levels of underground parking and 58 units (52 one-bedroom & 6 two-bedroom)**

From: [Bakhit, Reza](#)
To: [Gauthier, Steve](#)
Subject: PC2022-0016 Pre-application Consultation Meeting 424 Churchill Avenue N
Date: Tuesday, March 8, 2022 4:48:37 PM
Attachments: [oledata.mso](#)
[image021.png](#)
[image001.emz](#)
[image003.png](#)

Hi Steve

Please forward the below information to the applicant regarding a development proposal at **424 Churchill Avenue N, Ottawa for the 9 story apartment building..** Note that the information is considered **preliminary** and the assigned Development Review Project Manager may modify and/or add additional requirements and conditions upon review of an application if deemed necessary.

General:

- It is the sole responsibility of the consultant to investigate the location of existing underground utilities in the proposed servicing area and submit a request for locates to avoid conflict(s). The location of existing utilities and services shall be documented on an **Existing Conditions Plan**.
- Any easements on the subject site shall be identified and respected by any development proposal and shall adhere to the conditions identified in the easement agreement. A **legal survey plan** shall be provided and all easements shall be shown on the engineering plans.
- A deep excavation and dewatering operations have the potential to cause damages to the neighboring adjacent buildings/ City infrastructure. Document that construction activities (excavation, dewatering, vibrations associated with construction, etc.) will not have an impact on any adjacent buildings and infrastructure.
- A **Record of Site Condition (RSC) in accordance with O.Reg. 153/04** will be required to be filed and acknowledged by the Ministry prior to issuance of a building permit due to a change to a more sensitive property use.

0. Reference documents for information purposes :

- Ottawa Sewer Design Guidelines (October 2012)
- Technical Bulletin PIEDTB-2016-01
- Technical Bulletins ISTB-2018-01, ISTB-2018-02 and ISTB-2018-03.
- Ottawa Design Guidelines - Water Distribution (2010)
- Technical Bulletin ISTB-2021-03
- Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa (2007)
- City of Ottawa Slope Stability Guidelines for Development Applications (revised 2012)
- City of Ottawa Environmental Noise Control Guidelines (January 2016)
- City of Ottawa Accessibility Design Standards (2012) (City recommends development be in accordance with these standards on private property)
- Ottawa Standard Tender Documents (latest version)
- Ontario Provincial Standards for Roads & Public Works (2013)
- Record drawings and utility plans are also available for purchase from the City (Contact the City's Information Centre by email at InformationCentre@ottawa.ca or by phone at (613) 580-424 x.44455).

Please note that this is the applicant responsibility to refer to the latest applicable guidelines while preparing reports and studies.



Disclaimer:

The City of Ottawa does not guarantee the accuracy or completeness of the data and information contained on the above image(s) and does not assume any responsibility or liability with respect to any damage or loss arising from the use or interpretation of the image(s) provided. This image is for schematic purposes only.

Stormwater Management Criteria and Information:

- **Water Quantity Control:** In the absence of area specific SWM criteria please control post-development runoff from the subject site, up to and including the **100-year storm event**, to a **2-year pre-development level**. The pre-development runoff coefficient will need to be determined **as per existing conditions** but in no case more than 0.5. **[If 0.5 applies it needs to be clearly demonstrated in the report that the pre-development runoff coefficient is greater than 0.5]**. The time of concentration (T_c) used to determine the pre-development condition should be calculated. *T_c should not be less than 10 min. since IDF curves become unrealistic at less than 10 min; T_c of 10 minutes shall be used for all post-development calculations*].
- Any storm events greater than the established **2-year allowable** release rate, up to and including the **100-year storm event**, shall be detained on-site. The SWM measures required to avoid impact on downstream sewer system will be subject to review.
- Please note that foundation drainage is to be independently connected to sewer main unless being pumped with appropriate back up power, sufficient sized pump and back flow prevention. **It is recommended that the foundation drainage system be drained by a sump pump connection to the storm sewer to minimize risk of basement flooding as it will provide the best protection from the uncontrolled sewer system compared to relying on the backwater valve.**

Water Quality Control: Please consult with the local conservation authority (RVCA) regarding water quality criteria prior to submission of a Site Plan Control Proposal application to establish any water quality control restrictions, criteria and measures for the site. Correspondence and clearance shall be provided in the Appendix of the report.

- Please note that as per *Technical Bulletin PIEDTB-2016-01 section 8.3.11.1 (p.12 of 14)* **there shall be no surface ponding on private parking areas during the 5-year storm rainfall event.**
- **If Underground Storage proposed:** Please note that the Modified Rational Method for storage computation in the Sewer Design Guidelines was originally intended to be used for above ground storage (i.e. parking lot) where the change in head over the orifice varied from 1.5 m to 1.2 m (assuming a 1.2 m deep CB and a max ponding depth of 0.3 m). This change in head was small and hence the release rate fluctuated little, therefore there was no need to use an average release rate.

When underground storage is used, the release rate fluctuates from a maximum peak flow based on maximum head down to a release rate of zero. This difference is large and has a significant impact on storage requirements. **We therefore require that an average release rate equal to 50% of the peak allowable rate shall be applied to estimate the required volume. Alternatively, the consultant may choose to use a submersible pump in the design to ensure a constant release rate.**

In the event that there is a disagreement from the designer regarding the required storage, The City will require that the designer demonstrate their rationale utilizing dynamic modelling, that will then be reviewed by City modellers in the Water Resources Group.

Please provide information on UG storage pipe. Provide required cover over pipe and details, chart of storage values, capacity etc. How will this pipe be cleaned of sediment and debris?

Provide information on type of underground storage system including product name and model, number of chambers, chamber configuration, confirm invert of chamber system, top of chamber system, required cover over system and details, interior bottom slope (for self-cleansing), chart of storage values, length, width and height, capacity, entry ports (maintenance) etc.

Provide a cross section of underground chamber system showing invert and obvert/top, major and minor HWLs, top of ground, system volume provided during major and minor events. UG storage to provide actual 2- and 100-year event storage requirements.

In regard to all proposed UG storage, ground water levels (and in particular HGW levels) will need to be reviewed to ensure that the proposed system does not become surcharged and thereby ineffective.

Modeling can be provided to ensure capacity for both storm and sanitary sewers for the proposed development by City's Water Distribution Dept. – Modeling Group, through PM and upon request.

- Please note that the minimum orifice dia. for a plug style **ICD is 83mm and the minimum flow rate from a vortex ICD is 6 L/s** in order to reduce the likelihood of plugging.
- Post-development site grading shall match existing property line grades in order to minimize disruption to the adjacent residential properties. A **topographical plan of survey** shall be provided as part of the submission and a note provided on the plans.
- Please provide a **Pre-Development Drainage Area Plan** to define the pre-development drainage areas/patterns. **Existing drainage patterns shall be maintained and discussed as part of the proposed SWM solution.**
- **If rooftop control** and storage is proposed as part of the SWM solutions sufficient details (Cl. 8.3.8.4) shall be discussed and document in the report and on the plans. Roof drains are to be connected downstream of any incorporated ICDs within the SWM system and not to the

foundation drain system. Provide a **Roof Drain Plan** as part of the submission.

- **Considering the size of the site, it would be acceptable to control the roof portion only (100-year storm event, to a 2-year pre-development level) and leave the remainder of the site uncontrol as long as the uncontrolled portion is directed towards the right of way. This approach should be discussed in the SWM report. Also, the grading plan should clearly demonstrate that the runoff from the uncontrolled portion of the site will be directed towards the ROW**
- If **Window wells** are proposed, they are to be indirectly connected to the footing drains. A detail of window well with indirect connection is required, as is a note at window well location speaking to indirect connection.
- There must be at least **15cm of vertical clearance** between the spill elevation and the ground elevation at the building envelope that is in proximity of the flow route or ponding area. The exception in this case would be at reverse sloped loading dock locations. At these locations, a minimum of 15cm of vertical clearance must be provided below loading dock openings. Ensure to provide discussion in report and ensure grading plan matches if applicable.

Storm Sewer:

- A 300mm dia. CONC storm sewer (2010) is available within Churchill Avenue N.

Sanitary Sewer Maclaren St:

- A 250 mm dia. PVC Sanitary sewer (2010) is available within Churchill Avenue N.
- A 225 mm dia. CONC Sanitary sewer (1940) is available within Danforth Avenue.
- Please provide the new Sanitary sewer discharge and we confirm if sanitary sewer main has the capacity. An analysis and demonstration that there is sufficient/adequate residual capacity to accommodate any increase in wastewater flows in the receiving and downstream wastewater system is required to be provided. Needs to be demonstrated that there is adequate capacity to support any increase in wastewater flow.
- Please apply the wastewater design flow parameters *in Technical Bulletin PIEDTB-2018-01*.
- Sanitary sewer monitoring maintenance hole is required to be installed at the property line (on the private side of the property) as per City of Ottawa Sewer-Use By-Law 2003-514 (14) *Monitoring Devices*.
- A backwater valve is required on the sanitary service for protection.

Water :

- A 406 mm dia. PVC watermain (2010) is available within Churchill Avenue N.
- A 152 mm dia. DI watermain (1984) is available within Danforth Avenue.
- Existing residential service to be blanked at the main.
- **Water Supply Redundancy:** Residential buildings with a basic day demand greater than 50m³/day (0.57 L/s) are required to be connected to a minimum of two water services separated by an isolation valve to avoid a vulnerable service area as per the *Ottawa Design Guidelines - Water Distribution, WDG001, July 2010 Clause 4.3.1 Configuration*.
- Please **review Technical Bulletin ISTB-2018-0**, maximum fire flow hydrant capacity is provided in Section 3 Table 1 of Appendix I. A **hydrant coverage figure** shall be provided and **demonstrate there is adequate fire protection for the proposal**. Two or more public hydrants are anticipated to be required to handle fire flow.
- Boundary conditions are required to confirm that the require fire flows can be achieved as well as availability of the domestic water pressure on the City street in front of the development. Use Table 3-3 of the MOE Design Guidelines for Drinking-Water System to determine Maximum Day and Maximum Hour peaking factors for 0 to 500 persons and use Table 4.2 of

the Ottawa Design Guidelines, Water Distribution for 501 to 3,000 persons. Please provide the following information to the City of Ottawa via email to request water distribution network boundary conditions for the subject site. Please note that once this information has been provided to the City of Ottawa it takes approximately 5-10 business days to receive boundary conditions.

0. Type of Development and Units
1. Site Address
2. A plan showing the proposed water service connection location.
3. **Average Daily Demand** (L/s)
4. **Maximum Daily Demand** (L/s)
5. **Peak Hour Demand** (L/s)
6. **Fire Flow** (L/min)

*[Fire flow demand requirements shall be based on **Fire Underwriters Survey (FUS) Water Supply for Public Fire Protection 1999**]*

*[Fire flow demand requirements shall be based on **ISTB-2021-03**]*

Note: The OBC method can be used if the fire demand for the private property is less than 9,000 L/min. If the OBC fire demand reaches 9000 L/min, then the FUS method is to be used.

Exposure separation distances shall be defined on a figure to support the FUS calculation and required fire flow (RFF).

7. **Hydrant capacity shall be assessed to demonstrate the RFF can be achieved.** Please identify which hydrants are being considered to meet the RFF on a fire hydrant coverage plan as part of the boundary conditions request.

Snow Storage:

0. Any portion of the subject property which is intended to be used for permanent or temporary snow storage shall be as shown on the approved site plan and grading plan. Snow storage shall not interfere with approved grading and drainage patterns or servicing. Snow storage areas shall be setback from the property lines, foundations, fencing or landscaping a minimum of 1.5m. Snow storage areas shall not occupy driveways, aisles, required parking spaces or any portion of a road allowance. If snow is to be removed from the site please indicate this on the plan(s).

Gas pressure regulating station

A gas pressure regulating station may be required depending on HVAC needs (typically for 12+ units). Be sure to include this on the Grading, Site Servicing, SWM and Landscape plans. This is to ensure that there are no barriers for overland flow routes (SWM) or conflicts with any proposed grading or landscape features with installed structures and has nothing to do with supply and demand of any product.

Regarding Quantity Estimates:

Please note that external Garbage and/or bicycle storage structures are to be added to QE under Landscaping as it is subject to securities. In addition, sump pumps for Sanitary and Storm laterals and/or cisterns are to be added to QE under Hard items as it is subject to securities, even though it is internal and is spoken to under SWM and Site Servicing Report and Plan.

CCTV sewer inspection

CCTV sewer inspection required for pre and post construction conditions to ensure no damage to City Assets surrounding site.

Pre-Construction Survey

Pre-Construction (Piling/Hoe Ramming or close proximity to City Assets) and/or Pre-Blasting (if applicable) Survey required for any buildings/dwellings in proximity of 75m of site and circulation of notice of vibration/noise to residents within 150 m of site. Conditions for Pre-Construction/ Pre-Blast Survey & Use of Explosives will be applied to agreements. Refer to City's Standard S.P. No. F-1201 entitled Use of Explosives, as amended.

Road Reinstatement

Where servicing involves three or more service trenches, either a full road width or full lane width 40 mm asphalt overlay will be required, as per amended Road Activity By-Law 2003-445 and City Standard Detail Drawing R10. The amount of overlay will depend on condition of roadway and width of roadway(s).

Required Engineering Plans and Studies:

PLANS:

- Existing Conditions and Removals Plan
- Site Servicing Plan
- Grade Control and Drainage Plan
- Erosion and Sediment Control Plan
- Roof Drainage Plan (When rooftop storage is proposed)
- Topographical survey

REPORTS:

- Site Servicing and Stormwater Management Report (is required per section 4.7.1, policy 6 and section 4.7.1, policy 23 of the OP
- Geotechnical Study/Investigation (including sensitive marine clays and unstable slopes) is required per section 10.1.4 of OP
- Noise Control Study required as per section 10.2.1
- Phase I ESA 4) A Phase 1 and, where required, a Phase 2 ESA are required per section 10.1.6 OP
- Phase II ESA (Depending on recommendations of Phase I ESA) . It appears the site is contaminated .
- RSC (Record of the site Conditions)
- Site lighting certificate
- Wind analysis
- Shadow Study

Please refer to the [City of Ottawa Guide to Preparing Studies and Plans \[Engineering\]:](#)

Specific information has been incorporated into both the [Guide to Preparing Studies and Plans](#) for a site plan. The guide outlines the requirement for a statement to be provided on the plan about where the property boundaries have been derived from.

Added to the general information for servicing and grading plans is a note that an **O.L.S.** should be engaged when reporting on or relating information to property boundaries or existing conditions. The importance of engaging an O.L.S. for development projects is emphasized.

Phase One Environmental Site Assessment:

- A Phase I ESA is required to be completed in accordance with Ontario Regulation 153/04 in

support of this development proposal to determine the potential for site contamination. Depending on the Phase I recommendations a Phase II ESA may be required.

- The Phase I ESA shall provide all the required Environmental Source Information as required by O. Reg. 153/04. ERIS records are available to public at a reasonable cost and need to be included in the ESA report to comply with O.Reg. 153/04 and the Official Plan. The City will not be in a position to approve the Phase I ESA without the inclusion of the ERIS reports.
- Official Plan Section 4.8.4:

<https://ottawa.ca/en/city-hall/planning-and-development/official-plan-and-master-plans/official-plan/volume-1-official-plan/section-4-review-development-applications#4-8-protection-health-and-safety>

RSC (Record of the site Conditions)

- A RSC is required when changing the land use (zoning) of a property to a more sensitive land use.

[Submitting a record of site condition | Ontario.ca](#)

Geotechnical Investigation:

- A Geotechnical Study/Investigation shall be prepared in support of this development proposal.
- Reducing the groundwater level in this area can lead to potential damages to surrounding structures due to excessive differential settlements of the ground. The impact of groundwater lowering on adjacent properties needs to be discussed and investigated to ensure there will be no short term and long term damages associated with lowering the groundwater in this area.
- Geotechnical Study shall be consistent with the **Geotechnical Investigation and Reporting Guidelines for Development Applications**.

-
https://documents.ottawa.ca/sites/documents/files/geotech_report_en.pdf

-

Noise Study:

- A **Transportation Noise Assessment** is required as the subject development is located within 100m proximity of an Arterial Road
- A **Stationary Noise Assessment** is required in order to assess the noise impact of the proposed sources of stationary noise (mechanical HVAC system/equipment) of the development onto the surrounding residential area to ensure the noise levels do not exceed allowable limits specified in the City Environmental Noise Control Guidelines.

https://documents.ottawa.ca/sites/default/files/documents/enviro_noise_guide_en.pdf

Wind analysis:

0. A wind analysis must be prepared, signed and stamped by an engineer who specializes in pedestrian level wind evaluation. Where a wind analysis is prepared by a company which do not have extensive experience in pedestrian level wind evaluation, an independent peer review may be required at the expense of the proponent.

[Terms of Reference: Wind Analysis \(ottawa.ca\)](#)

Shadow Study

When greater than 9 storey in height, a Shadow Study required for all buildings/dwellings.

Exterior Site Lighting:

1. Any proposed light fixtures (both pole-mounted and wall mounted) must be part of the approved Site Plan. All external light fixtures must meet the criteria for Full Cut-off Classification as recognized by the Illuminating Engineering Society of North America (IESNA or IES), and must result in minimal light spillage onto adjacent properties (as a guideline, 0.5 fc is normally the maximum allowable spillage). In order to satisfy these criteria, the please provide the City with a **Certification (Statement) Letter** from an acceptable professional engineer stating that the design is compliant.

Fourth (4th) Review Charge:

Please be advised that additional charges for each review, after the 3rd review, will be applicable to each file. There will be no exceptions.

Construction approach – Please contact the Right-of-Ways Permit Office TMconstruction@ottawa.ca early in the Site Plan process to determine the ability to construct site and copy File Lead Steve.Gauthier@ottawa.ca on this request.

Please note that these comments are considered preliminary based on the information available to date and therefore maybe amended as additional details become available and presented to the City. It is the responsibility of the applicant to verify the above information. The applicant may contact me for follow-up questions related to engineering/infrastructure prior to submission of an application if necessary.

If you have any questions or require any clarification, please let me know.

Regards,

Reza Bakhit, P.Eng, C.E.T

Project Manager

Planning, Real Estate and Economic Development Department / Direction générale de la planification, des biens immobiliers et du développement économique

Development Review - Central Branch

City of Ottawa | Ville d'Ottawa

110 Laurier Avenue West Ottawa, ON | 110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1

613.580.2400 ext./poste 19346, reza.bakhit@ottawa.ca

Please note: Given the current pandemic, I will be working from home until further notice; reaching me by email is the easiest. I will be checking my voicemail, just not as frequently as I normally would be.

APPENDIX B
Water Supply Calculations





Water Supply Calculations

LRL File No. 220224
 Date 2022-09-07
 Prepared by Tamara Harb

Water Demand based on the City of Ottawa Design Guidelines-Water Distribution, 2010

Domestic Demand			
Unit Type	Persons Per Unit	Number of Units	Population
1 Bedroom Apartment	1.4	52	72.8
2 Bedroom Apartment	2.1	6	12.6
	Total	58	85.4

*Based on a daily demand of 280L/day per person as identified by Appendix 4-A of the Sewer design guidelines.

Average Water Consumption Rate	280 L/c/d		
Average Day Demand	23,912 L/d	0.28 L/s	
Maximum Day Factor	7.2	Table (3-3) MOE Peaking Factors	
Maximum Daily Demand	172,910 L/d	2.00 L/s	
Peak Hour Factor	10.9	Table (3-3) MOE Peaking Factors	
Maximum Hour Demand	260,015 L/d	3.01 L/s	

Institutional / Commercial / Industrial Demand			
Property Type	Unit Rate	Units	Demand (L/d)
Office	75 L/p/d	3 people	225.0
Amenities	28000 L/ha/d	0.0167 ha	467.6

Average Day Demand	693 L/d	0.008 L/s	
Maximum Day Factor	1.5 (Design Guidelines-Water Distribution Table 4.2)		
Maximum Daily Demand	1,039 L/d	0.012 L/s	
Peak Hour Factor	1.8 (Design Guidelines-Water Distribution Table 4.2)		
Maximum Hour Demand	1,870 L/d	0.022 L/s	

TOTAL DEMAND			
Average Day Demand	24,605 L/d	0.28 L/s	
Maximum Daily Demand	173,949 L/d	2.01 L/s	
Maximum Hour Demand	261,885 L/d	3.03 L/s	

Water Service Pipe Sizing

$$Q = VA$$

Where: V = velocity
 A = area of pipe
 Q = flow rate

Assuming a maximum velocity of 1.8m/s, the diameter of pipe is calculated as:

$$\begin{aligned} \text{Minimum pipe diameter (d)} &= (4Q/\pi V)^{1/2} \\ &= 0.046 \text{ m} \\ &= 46 \text{ mm} \\ \\ \text{Proposed pipe diameter (d)} &= 150 \text{ mm} \\ &= 6 \text{ Inches} \end{aligned}$$



Fire Flow Calculations

LRL File No. 220224
 Date September 8, 2022
 Method Fire Underwriters Survey (FUS)
 Prepared by Tamara Harb

Step	Task	Term	Options	Multiplier	Choose:	Value	Unit	Fire Flow	
Structural Framing Material									
1	Choose frame used for building	Coefficient C related to the type of construction	Wood Frame	1.5	Non-combustible construction	0.8			
			Ordinary Construction	1.0					
			Non-combustible construction	0.8					
			Fire resistive construction <2 hrs	0.7					
			Fire resistive construction >2 hrs	0.6					
Floor Space Area (A)									
2			Total area			6,961	m ²		
3	Obtain fire flow before reductions	Required fire flow (rounded to nearest 1,000 L/min)	Fire Flow = 220 x C x A ^{0.5}					L/min	15,000
Reductions or surcharge due to factors affecting burning									
4	Choose combustibility of contents	Occupancy hazard reduction or surcharge	Non-combustible	-25%	Limited combustible	-15%	L/min	12,750	
			Limited combustible	-15%					
			Combustible	0%					
			Free burning	15%					
			Rapid burning	25%					
5	Choose reduction for sprinklers	Sprinkler reduction	Full automatic sprinklers	-30%	True	-30%	L/min	7,650	
			Water supply is standard for both the system and fire department hose lines	-10%	True	-10%			
			Fully supervised system	-10%	False	0%			
6	Choose separation	Exposure distance between units	North side	>30m	0%		L/min	13,388	
			West side	0 to 3m	25%				
			East side	20.1 to 30m	10%				
			South side	20.1 to 30m	10%				45%
Net required fire flow									
7	Obtain fire flow, duration, and volume						Minimum required fire flow rate (rounded to nearest 1000)	L/min	13,000
							Minimum required fire flow rate	L/s	216.7
							Required duration of fire flow	hr	2.75

APPENDIX C

Wastewater Collection Calculations





LRL File No. 220224
Project: CIV 7 Storey Condo Redevelopment
Location: 424 Churchill Avenue
Date: September 6,2022

Sanitary Design Parameters

Commercial & Institutional Flow = 28000 L/ha/day
 Light Industrial Flow = 35000 L/ha/day
 Heavy Industrial Flow = 55000 L/ha/day
 Maximum Residential Peak Factor = 4.0
 Commercial & Institutional Peak Factor = 1.5

Average Daily Flow = 280 L/p/day
 Daily Flow for Places of Employment = 75L/p/day
 Industrial Peak Factor = as per Appendix 4-B = 7
 Extraneous Flow = 0.33L/s/gross ha

Pipe Design Parameters

Minimum Velocity = 0.60 m/s
 Manning's n = 0.013

LOCATION			RESIDENTIAL AREA AND POPULATION					COMMERCIAL		INDUSTRIAL			OFFICE		C+I+I			INFILTRATION			TOTAL FLOW (l/s)	PIPE				
STREET	FROM	TO	AREA (Ha)	POP.	CUMMULATIVE AREA (Ha)	POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (Ha)	ACCU. AREA (Ha)	AREA (Ha)	ACCU. AREA (Ha)	PEAK FACT.	POP	ACCU. POP	PEAK FLOW (l/s)	TOTAL AREA (Ha)	ACCU. AREA (Ha)	INFILT. FLOW (l/s)	LENGT H (m)		DIA. (mm)	SLOPE (%)	MATERIAL	CAP. (FULL) (l/s)	VEL. (FULL) (m/s)
Churchill Ave	Bldg	PROP SAN MH01	0.101	85.4	0.101	85.4	3.6	1.00	0.017	0.017	0.00	0.00	7.0	3.0	3.0	0.01	0.101	0.101	0.03	13.1	150	2.00%	PVC	21.54	1.22	


NOTES Existing inverts and slopes are estimated. They are to be confirmed on-site.

Designed: TH	PROJECT: CIV 7-Storey Condo Redevelopment		
Checked: AS	LOCATION: 424 Churchil Avenue		
Dwg. Reference: C.401	File Ref.: 220224	Date: 2022-09-06	Sheet No. 1 of 1

APPENDIX D
Stormwater Management Calculations
Watts Roof Drain Specification



LRL Associates Ltd.
Storm Watershed Summary

	<p>LRL File No. 220224 Project: CIV 7-Storey Condo Building Location: 424 Churchill Avenue Date: April 9, 2023 Designed: Tamara Harb Drawing Reference: C701/C702</p>	
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Pre-Development Catchments

WATERSHED	C = 0.2	C=0.7	C = 0.90	Total Area (m ²)	Total Area (ha)	Combined C
EWS-01	119.4	0.0	893.0	1012.4	0.101	0.82
TOTAL	119.4	0.0	893.0	1012.4	0.101	0.82

Post-Development Catchments

WATERSHED	C = 0.20	C = 0.70	C = 0.90	Total Area (m ²)	Total Area (ha)	Combined C
WS-01(ROOF)	0.00	0.00	116.29	116.29	0.012	0.90
WS-02 (ROOF)	0.00	0.00	141.44	141.44	0.014	0.90
WS-03 (ROOF)	0.00	0.00	248.09	248.09	0.025	0.90
WS-04 (ROOF)	0.00	0.00	62.07	62.07	0.006	0.90
WS-05 (ROOF)	0.00	0.00	130.54	130.54	0.013	0.90
WS-06(UN-CONTROLLED)	0.00	0.00	313.97	313.97	0.031	0.90
TOTAL	0.0	0.0	1012.4	1012.4	0.101	0.90



LRL File No. 220224
Project: CIV 7-Storey Condo Building
Location: 424 Churchill Ave
Date: April 9, 2023
Designed: Tamara Harb
Drawing Ref.: C601

Stormwater Management
Design Sheet-100 Year

Runoff Equation

$Q = 2.78CIA$ (L/s)
 C = Runoff coefficient
 $I = \text{Rainfall intensity (mm/hr)} = A / (T_d + C)^B$
 A = Area (ha)
 $T_c = \text{Time of concentration (min)}$

Pre-development Stormwater Management - 2 Year Storm

2 year storm

$I_2 = 732.95 / (T_d + 6.199)^{0.81}$

a = 732.951

b = 0.810

C = 6.199

C = 0.50 max of 0.5 as per City of Ottawa
 I = 76.8 mm/hr
 T_c = 10 min
 Total Area = 0.101 ha

Allowable Release Rate = 10.81 L/s

Post-development Stormwater Management

					ΣR _{24h}	ΣR ₁₀₀
	Total Site Area =	0.070	ha	ΣR=		
Controlled	WS-01 (ROOF)	0.012	ha	R=	0.90	1.00
	WS-02 (ROOF)	0.014	ha	R=	0.90	1.00
	WS-03 (ROOF)	0.025	ha	R=	0.90	1.00
	WS-04 (ROOF)	0.006	ha	R=	0.90	1.00
	WS-05 (ROOF)	0.013	ha	R=	0.90	1.00
	Total Controlled	0.070	ha	ΣR=	0.90	1.00
Un-controlled	WS-06 (UNCONTROLLED)	0.031	ha	R=	0.90	1.00
	Total Un-Controlled =	0.031	ha	ΣR=	0.90	1.00

Post-development Stormwater Management (Uncontrolled Catchment WS-06)

100 Year Storm Event:

$I_{100} = 1735.688 / (T_d + 6.014)^{0.820}$

a = 1735.688

b = 0.820

C = 6.014

Time (min)	Intensity (mm/hr)	Uncontrolled Runoff (L/s)	Controlled Release Rate Constant (L/s)	Total Release Rate (L/s)
10	178.6	15.59	0.00	15.59



LRL File No. 220224
 Project: CIV 7-Storey Condo Building
 Location: 424 Churchill Ave
 Date: April 9, 2023
 Designed: Tamara Harb
 Drawing Ref.: C601

Stormwater Management
 Design Sheet-100 Year

Post-development Stormwater Management (WS-01 ROOF)

100 Year Storm Event:

$$I_{100} = 1735.688 / (Td + 6.014)^{0.820}$$

a = 1735.688

b = 0.820

C = 6.014

Time (min)	Intensity (mm/hr)	Storage Required		Controlled Release Rate Constant (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
		Controlled Runoff (L/s)	Storage Volume (m ³)			
10	178.6	5.77	2.71	1.26	0.00	1.26
15	142.9	4.62	3.02	1.26	0.00	1.26
20	120.0	3.88	3.14	1.26	0.00	1.26
25	103.8	3.36	3.15	1.26	0.00	1.26
30	91.9	2.97	3.08	1.26	0.00	1.26
35	82.6	2.67	2.96	1.26	0.00	1.26
40	75.1	2.43	2.81	1.26	0.00	1.26
45	69.1	2.23	2.63	1.26	0.00	1.26
50	64.0	2.07	2.42	1.26	0.00	1.26
60	55.9	1.81	1.97	1.26	0.00	1.26
70	49.8	1.61	1.47	1.26	0.00	1.26
80	45.0	1.45	0.93	1.26	0.00	1.26
90	41.1	1.33	0.37	1.26	0.00	1.26
100	37.9	1.23	0.00	1.26	0.00	1.26
110	35.2	1.14	0.00	1.26	0.00	1.26
120	32.9	1.06	0.00	1.26	0.00	1.26

Summary of Roof Storage

Maximum Required Roof Storage (100 Year) = 3.15 m³
 Proposed Head = 150 mm
 Control Flow/Drain = 0.63 L/s
 Number of Roof Drains = 2
 Total Flow from Roof Drain = 1.26 L/s
 Available Roof Surface = 116.28 m²
 Roof Drain Model = WATTS adjustable roof drain w/ weir opening-closed

Total Storage Required = 3.15 m³
 Available Roof Storage = 6.03 m³

*An Emergency overflow scupper is provided above this height.

refer to LRL Plan C601

Post-development Stormwater Management (WS-02 ROOF)

100 Year Storm Event:

$$I_{100} = 1735.688 / (Td + 6.014)^{0.820}$$

a = 1735.688

b = 0.820

C = 6.014

Time (min)	Intensity (mm/hr)	Storage Required		Controlled Release Rate Constant (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
		Controlled Runoff (L/s)	Storage Volume (m ³)			
10	178.6	7.02	3.46	1.26	0.00	1.26
15	142.9	5.62	3.92	1.26	0.00	1.26
20	120.0	4.72	4.15	1.26	0.00	1.26
25	103.8	4.08	4.23	1.26	0.00	1.26
30	91.9	3.61	4.23	1.26	0.00	1.26
35	82.6	3.25	4.17	1.26	0.00	1.26
40	75.1	2.95	4.07	1.26	0.00	1.26
45	69.1	2.72	3.93	1.26	0.00	1.26
50	64.0	2.51	3.76	1.26	0.00	1.26
60	55.9	2.20	3.38	1.26	0.00	1.26
70	49.8	1.96	2.93	1.26	0.00	1.26
80	45.0	1.77	2.44	1.26	0.00	1.26
90	41.1	1.62	1.93	1.26	0.00	1.26
100	37.9	1.49	1.38	1.26	0.00	1.26
110	35.2	1.38	0.82	1.26	0.00	1.26
120	32.9	1.29	0.24	1.26	0.00	1.26

Summary of Roof Storage

Maximum Required Roof Storage (100 Year) = 4.23 m³
 Proposed Head = 150 mm
 Control Flow/Drain = 0.63 L/s
 Number of Roof Drains = 2
 Total Flow from Roof Drain = 1.26 L/s
 Available Roof Surface = 141 m²
 Roof Drain Model = WATTS adjustable roof drain w/ weir opening-closed

Total Storage Required = 4.23 m³
 Available Roof Storage = 4.55 m³

*An Emergency overflow scupper is provided above this height.

refer to LRL Plan C601



LRL File No. 220224
 Project: CIV 7-Storey Condo Building
 Location: 424 Churchill Ave
 Date: April 9, 2023
 Designed: Tamara Harb
 Drawing Ref.: C601

Stormwater Management
 Design Sheet-100 Year

Post-development Stormwater Management (WS-03 ROOF)

100 Year Storm Event:

$$I_{100} = 1735.688 / (Td + 6.014)^{0.820}$$

a = 1735.688

b = 0.820

C = 6.014

Time (min)	Intensity (mm/hr)	Storage Required		Controlled Release Rate Constant (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
		Controlled Runoff (L/s)	Storage Volume (m ³)			
10	178.6	12.32	6.63	1.26	0.00	1.26
15	142.9	9.86	7.74	1.26	0.00	1.26
20	120.0	8.27	8.42	1.26	0.00	1.26
25	103.8	7.16	8.85	1.26	0.00	1.26
30	91.9	6.34	9.14	1.26	0.00	1.26
35	82.6	5.70	9.31	1.26	0.00	1.26
40	75.1	5.18	9.41	1.26	0.00	1.26
45	69.1	4.76	9.46	1.26	0.00	1.26
50	64.0	4.41	9.45	1.26	0.00	1.26
60	55.9	3.86	9.34	1.26	0.00	1.26
70	49.8	3.43	9.13	1.26	0.00	1.26
80	45.0	3.10	8.85	1.26	0.00	1.26
90	41.1	2.84	8.51	1.26	0.00	1.26
100	37.9	2.61	8.13	1.26	0.00	1.26
110	35.2	2.43	7.71	1.26	0.00	1.26
120	32.9	2.27	7.26	1.26	0.00	1.26

Summary of Roof Storage

Maximum Required Roof Storage (100 Year) = 9.46 m³
 Proposed Head = 150 mm
 Control Flow/Drain = 0.63 L/s
 Number of Roof Drains = 2
 Total Flow from Roof Drain = 1.26 L/s
 Available Roof Surface = 248 m²
 Roof Drain Model = WATTS adjustable roof drain w/ weir opening-closed

*An Emergency overflow scupper is provided above this height.

Total Storage Required = 9.46 m³
 Available Roof Storage = 13.17 m³

refer to LRL Plan C601

Post-development Stormwater Management (WS-04 ROOF)

100 Year Storm Event:

$$I_{100} = 1735.688 / (Td + 6.014)^{0.820}$$

a = 1735.688

b = 0.820

C = 6.014

Time (min)	Intensity (mm/hr)	Storage Required		Controlled Release Rate Constant (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
		Controlled Runoff (L/s)	Storage Volume (m ³)			
10	178.6	3.08	1.09	1.26	0.00	1.26
15	142.9	2.47	1.09	1.26	0.00	1.26
20	120.0	2.07	0.97	1.26	0.00	1.26
25	103.8	1.79	0.80	1.26	0.00	1.26
30	91.9	1.59	0.59	1.26	0.00	1.26
35	82.6	1.42	0.35	1.26	0.00	1.26
40	75.1	1.30	0.09	1.26	0.00	1.26
45	69.1	1.19	0.00	1.26	0.00	1.26
50	64.0	1.10	0.00	1.26	0.00	1.26
60	55.9	0.96	0.00	1.26	0.00	1.26
70	49.8	0.86	0.00	1.26	0.00	1.26
80	45.0	0.78	0.00	1.26	0.00	1.26
90	41.1	0.71	0.00	1.26	0.00	1.26
100	37.9	0.65	0.00	1.26	0.00	1.26
110	35.2	0.61	0.00	1.26	0.00	1.26
120	32.9	0.57	0.00	1.26	0.00	1.26

Summary of Roof Storage

Maximum Required Roof Storage (100 Year) = 1.09 m³
 Proposed Head = 150 mm
 Control Flow/Drain = 0.63 L/s
 Number of Roof Drains = 2
 Total Flow from Roof Drain = 1.26 L/s
 Available Roof Surface = 62.07 m²
 Roof Drain Model = WATTS adjustable roof drain w/ weir opening-closed

*An Emergency overflow scupper is provided above this height.

Total Storage Required = 1.09 m³
 Available Roof Storage = 3.14 m³

refer to LRL Plan C601



LRL File No. 220224
 Project: CIV 7-Storey Condo Building
 Location: 424 Churchill Ave
 Date: April 9, 2023
 Designed: Tamara Harb
 Drawing Ref.: C601

Stormwater Management
 Design Sheet-100 Year

Post-development Stormwater Management (WS-05 ROOF)

100 Year Storm Event:

$$I_{100} = 1735.688 / (Td + 6.014)^{0.820}$$

a = 1735.688

b = 0.820

C = 6.014

Time (min)	Intensity (mm/hr)	Storage Required		Controlled Release Rate Constant (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
		Controlled Runoff (L/s)	Storage Volume (m ³)			
10	178.6	6.48	3.13	1.26	0.00	1.26
15	142.9	5.19	3.53	1.26	0.00	1.26
20	120.0	4.35	3.71	1.26	0.00	1.26
25	103.8	3.77	3.76	1.26	0.00	1.26
30	91.9	3.33	3.73	1.26	0.00	1.26
35	82.6	3.00	3.65	1.26	0.00	1.26
40	75.1	2.73	3.52	1.26	0.00	1.26
45	69.1	2.51	3.36	1.26	0.00	1.26
50	64.0	2.32	3.18	1.26	0.00	1.26
60	55.9	2.03	2.77	1.26	0.00	1.26
70	49.8	1.81	2.30	1.26	0.00	1.26
80	45.0	1.63	1.79	1.26	0.00	1.26
90	41.1	1.49	1.25	1.26	0.00	1.26
100	37.9	1.38	0.69	1.26	0.00	1.26
110	35.2	1.28	0.12	1.26	0.00	1.26
120	32.9	1.19	0.00	1.26	0.00	1.26

Summary of Roof Storage

Maximum Required Roof Storage (100 Year) = 3.76 m³
 Proposed Head = 150 mm
 Control Flow/Drain = 0.63 L/s
 Number of Roof Drains = 2
 Total Flow from Roof Drain = 1.26 L/s
 Available Roof Surface = 131 m²
 Roof Drain Model = WATTS adjustable roof drain w/ weir opening-closed

*An Emergency overflow scupper is provided above this height.

Total Storage Required = 3.76 m³
 Available Roof Storage = 6.64 m³

refer to LRL Plan C.601

SUMMARY OF RELEASE RATES AND STORAGE VOLUMES

CATCHMENT AREAS	DRAINAGE AREAS (ha)	100-YEAR RELEASE RATE	100-YEAR REQUIRED STORAGE (m3)	TOTAL AVAILABLE STORAGE (m3)
WS-01(ROOF)	0.012	1.26	3.15	6.03
WS-02 (ROOF)	0.014	1.26	4.23	4.55
WS-03 (ROOF)	0.025	1.26	9.46	13.17
WS-04 (ROOF)	0.006	1.26	1.09	3.14
WS-05 (ROOF)	0.013	1.26	3.76	6.64
TOTAL CONTROLLED	0.070	6.30	21.69	33.53
WS-06 (UNCONTROLLED)	0.031	15.59	0	0
TOTAL UNCONTROLLED	0.031	15.59	0.00	0.00
TOTAL	0.101	21.89	21.69	33.53

* Allowable Release Rate = 10.81L/s. As per City comments it's acceptable to only control the roof portion of the site. The remainder can be uncontrolled if it flows to the City ROW. Total controlled flow = 6.30L/s meeting the allowable release rate of 10.81L/s.



LRL File No. 220224
Project: CIV 7-Storey Condo Building
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Stormwater Management
Design Sheet 5-YR

Runoff Equation

$Q = 2.78CIA$ (L/s)
 C = Runoff coefficient
 $I = \text{Rainfall intensity (mm/hr)} = A / (T_d + C)^B$
 A = Area (ha)
 $T_c = \text{Time of concentration (min)}$

Pre-development Stormwater Management - 2 Year Storm

2 year storm

$I_2 = 732.95 / (T_d + 6.199)^{0.81}$

a = 732.951

b = 0.810

C = 6.199

C = 0.50 max of 0.5 as per City of Ottawa
 I = 76.8 mm/hr
 T_c = 10 min
 Total Area = 0.101 ha

Allowable Release Rate = 10.81 L/s

Post-development Stormwater Management

				∑R=	∑R _{2&5}
Controlled	Total Site Area =	0.070	ha	∑R=	
	WS-01 (ROOF)	0.012	ha	R=	0.90
	WS-02 (ROOF)	0.014	ha	R=	0.90
	WS-03 (ROOF)	0.025	ha	R=	0.90
	WS-04 (ROOF)	0.006	ha	R=	0.90
	WS-05 (ROOF)	0.013	ha	R=	0.90
	Total Controlled	0.070	ha	∑R=	0.90
Un-controlled	WS-06 (UNCONTROLLED)	0.031	ha	R=	0.90
	Total Un-Controlled =	0.031	ha	∑R=	0.90

Post-development Stormwater Management (Uncontrolled Catchment WS-06)

5 Year Storm Event:

$I_5 = 998.071 / (T_d + 6.053)^{0.814}$

a = 998.071

b = 0.814

C = 6.053

Time (min)	Intensity (mm/hr)	Uncontrolled Runoff (L/s)	Controlled Release Rate Constant (L/s)	Total Release Rate (L/s)
10	104.2	8.18	0.00	8.18



LRL File No. 220224
 Project: CIV 7-Storey Condo Building
 Location: 424 Churchill Ave
 Date: April 9, 2023
 Designed: Tamara Harb
 Drawing Ref.: C601

Stormwater Management
 Design Sheet 5-YR

Post-development Stormwater Management (WS-01 ROOF)

5 Year Storm Event:

$I_s = 998.071 / (T_d + 6.053)^{0.814}$

a = 998.071

b = 0.814

C = 6.053

Time (min)	Intensity (mm/hr)	Storage Required		Controlled Release Rate Constant (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
		Controlled Runoff (L/s)	Storage Volume (m ³)			
10	104.2	3.03	1.06	1.26	0.00	1.26
15	83.6	2.43	1.05	1.26	0.00	1.26
20	70.3	2.04	0.94	1.26	0.00	1.26
25	60.9	1.77	0.77	1.26	0.00	1.26
30	53.9	1.57	0.56	1.26	0.00	1.26
35	48.5	1.41	0.32	1.26	0.00	1.26
40	44.2	1.29	0.06	1.26	0.00	1.26
45	40.6	1.18	0.00	1.26	0.00	1.26
50	37.7	1.10	0.00	1.26	0.00	1.26
60	32.9	0.96	0.00	1.26	0.00	1.26
70	29.4	0.85	0.00	1.26	0.00	1.26
80	26.6	0.77	0.00	1.26	0.00	1.26
90	24.3	0.71	0.00	1.26	0.00	1.26
100	22.4	0.65	0.00	1.26	0.00	1.26
110	20.8	0.61	0.00	1.26	0.00	1.26
120	19.5	0.57	0.00	1.26	0.00	1.26

Summary of Roof Storage

Maximum Required Roof Storage (100 Year) = 1.06 m³
 Proposed Head = 150 mm *An Emergency overflow scupper is provided above this height.
 Control Flow/Drain = 0.63 L/s
 Number of Roof Drains = 2
 Total Flow from Roof Drain = 1.26 L/s
 Available Roof Surface = 116.28 m²
 Roof Drain Model = WATTS adjustable roof drain w/ weir opening-closed

Total Storage Required = 1.06 m³
 Available Roof Storage = 6.03 m³ refer to LRL Plan C601

Post-development Stormwater Management (WS-02 ROOF)

5 Year Storm Event:

$I_s = 998.071 / (T_d + 6.053)^{0.814}$

a = 998.071

b = 0.814

C = 6.053

Time (min)	Intensity (mm/hr)	Storage Required		Controlled Release Rate Constant (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
		Controlled Runoff (L/s)	Storage Volume (m ³)			
10	104.2	3.69	1.46	1.26	0.00	1.26
15	83.6	2.96	1.53	1.26	0.00	1.26
20	70.3	2.49	1.47	1.26	0.00	1.26
25	60.9	2.16	1.34	1.26	0.00	1.26
30	53.9	1.91	1.17	1.26	0.00	1.26
35	48.5	1.72	0.96	1.26	0.00	1.26
40	44.2	1.56	0.73	1.26	0.00	1.26
45	40.6	1.44	0.48	1.26	0.00	1.26
50	37.7	1.33	0.22	1.26	0.00	1.26
60	32.9	1.17	0.00	1.26	0.00	1.26
70	29.4	1.04	0.00	1.26	0.00	1.26
80	26.6	0.94	0.00	1.26	0.00	1.26
90	24.3	0.86	0.00	1.26	0.00	1.26
100	22.4	0.79	0.00	1.26	0.00	1.26
110	20.8	0.74	0.00	1.26	0.00	1.26
120	19.5	0.69	0.00	1.26	0.00	1.26

Summary of Roof Storage

Maximum Required Roof Storage (100 Year) = 1.53 m³
 Proposed Head = 150 mm *An Emergency overflow scupper is provided above this height.
 Control Flow/Drain = 0.63 L/s
 Number of Roof Drains = 2
 Total Flow from Roof Drain = 1.26 L/s
 Available Roof Surface = 141 m²
 Roof Drain Model = WATTS adjustable roof drain w/ weir opening-closed

Total Storage Required = 1.53 m³
 Available Roof Storage = 4.55 m³ refer to LRL Plan C601



LRL File No. 220224
 Project: CIV 7-Storey Condo Building
 Location: 424 Churchill Ave
 Date: April 9, 2023
 Designed: Tamara Harb
 Drawing Ref.: C601

Stormwater Management
 Design Sheet 5-YR

Post-development Stormwater Management (WS-03 ROOF)

5 Year Storm Event:

$I_s = 998.071 / (T_d + 6.053)^{0.814}$

a = 998.071

b = 0.814

C = 6.053

Time (min)	Intensity (mm/hr)	Storage Required		Controlled Release Rate Constant (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
		Controlled Runoff (L/s)	Storage Volume (m ³)			
10	104.2	6.47	3.12	1.26	0.00	1.26
15	83.6	5.19	3.53	1.26	0.00	1.26
20	70.3	4.36	3.72	1.26	0.00	1.26
25	60.9	3.78	3.78	1.26	0.00	1.26
30	53.9	3.35	3.76	1.26	0.00	1.26
35	48.5	3.01	3.68	1.26	0.00	1.26
40	44.2	2.74	3.56	1.26	0.00	1.26
45	40.6	2.52	3.41	1.26	0.00	1.26
50	37.7	2.34	3.23	1.26	0.00	1.26
60	32.9	2.04	2.83	1.26	0.00	1.26
70	29.4	1.82	2.37	1.26	0.00	1.26
80	26.6	1.65	1.87	1.26	0.00	1.26
90	24.3	1.51	1.34	1.26	0.00	1.26
100	22.4	1.39	0.79	1.26	0.00	1.26
110	20.8	1.29	0.21	1.26	0.00	1.26
120	19.5	1.21	0.00	1.26	0.00	1.26

Summary of Roof Storage

Maximum Required Roof Storage (100 Year) = 3.78 m³
 Proposed Head = 150 mm
 Control Flow/Drain = 0.63 L/s
 Number of Roof Drains = 2
 Total Flow from Roof Drain = 1.26 L/s
 Available Roof Surface = 248 m²
 Roof Drain Model = WATTS adjustable roof drain w/ weir opening-closed

*An Emergency overflow scupper is provided above this height.

Total Storage Required = 3.78 m³
 Available Roof Storage = 13.17 m³ refer to LRL Plan C601

Post-development Stormwater Management (WS-04 ROOF)

5 Year Storm Event:

$I_s = 998.071 / (T_d + 6.053)^{0.814}$

a = 998.071

b = 0.814

C = 6.053

Time (min)	Intensity (mm/hr)	Storage Required		Controlled Release Rate Constant (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
		Controlled Runoff (L/s)	Storage Volume (m ³)			
10	104.2	1.62	0.21	1.26	0.00	1.26
15	83.6	1.30	0.03	1.26	0.00	1.26
20	70.3	1.09	0.00	1.26	0.00	1.26
25	60.9	0.95	0.00	1.26	0.00	1.26
30	53.9	0.84	0.00	1.26	0.00	1.26
35	48.5	0.75	0.00	1.26	0.00	1.26
40	44.2	0.69	0.00	1.26	0.00	1.26
45	40.6	0.63	0.00	1.26	0.00	1.26
50	37.7	0.58	0.00	1.26	0.00	1.26
60	32.9	0.51	0.00	1.26	0.00	1.26
70	29.4	0.46	0.00	1.26	0.00	1.26
80	26.6	0.41	0.00	1.26	0.00	1.26
90	24.3	0.38	0.00	1.26	0.00	1.26
100	22.4	0.35	0.00	1.26	0.00	1.26
110	20.8	0.32	0.00	1.26	0.00	1.26
120	19.5	0.30	0.00	1.26	0.00	1.26

Summary of Roof Storage

Maximum Required Roof Storage (100 Year) = 0.21 m³
 Proposed Head = 150 mm
 Control Flow/Drain = 0.63 L/s
 Number of Roof Drains = 2
 Total Flow from Roof Drain = 1.26 L/s
 Available Roof Surface = 62.07 m²
 Roof Drain Model = WATTS adjustable roof drain w/ weir opening-closed

*An Emergency overflow scupper is provided above this height.

Total Storage Required = 0.21 m³
 Available Roof Storage = 3.14 m³ refer to LRL Plan C601



LRL File No. 220224
 Project: CIV 7-Storey Condo Building
 Location: 424 Churchill Ave
 Date: April 9, 2023
 Designed: Tamara Harb
 Drawing Ref.: C601

Stormwater Management
 Design Sheet 5-YR

Post-development Stormwater Management (WS-05 ROOF)

5 Year Storm Event:

$$I_s = 998.071 / (T_d + 6.053)^{0.814}$$

a = 998.071

b = 0.814

C = 6.053

Time (min)	Intensity (mm/hr)	Storage Required		Controlled Release Rate Constant (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
		Controlled Runoff (L/s)	Storage Volume (m ³)			
10	104.2	3.40	1.29	1.26	0.00	1.26
15	83.6	2.73	1.32	1.26	0.00	1.26
20	70.3	2.29	1.24	1.26	0.00	1.26
25	60.9	1.99	1.09	1.26	0.00	1.26
30	53.9	1.76	0.90	1.26	0.00	1.26
35	48.5	1.58	0.68	1.26	0.00	1.26
40	44.2	1.44	0.44	1.26	0.00	1.26
45	40.6	1.33	0.18	1.26	0.00	1.26
50	37.7	1.23	0.00	1.26	0.00	1.26
60	32.9	1.08	0.00	1.26	0.00	1.26
70	29.4	0.96	0.00	1.26	0.00	1.26
80	26.6	0.87	0.00	1.26	0.00	1.26
90	24.3	0.79	0.00	1.26	0.00	1.26
100	22.4	0.73	0.00	1.26	0.00	1.26
110	20.8	0.68	0.00	1.26	0.00	1.26
120	19.5	0.64	0.00	1.26	0.00	1.26

Summary of Roof Storage

Maximum Required Roof Storage (100 Year) = 1.32 m³
 Proposed Head = 150 mm
 Control Flow/Drain = 0.63 L/s
 Number of Roof Drains = 2
 Total Flow from Roof Drain = 1.26 L/s
 Available Roof Surface = 131 m²
 Roof Drain Model = WATTS adjustable roof drain w/ weir opening-closed

*An Emergency overflow scupper is provided above this height.

Total Storage Required = 1.32 m³
 Available Roof Storage = 6.64 m³ refer to LRL Plan C.601

SUMMARY OF RELEASE RATES AND STORAGE VOLUMES

CATCHMENT AREAS	DRAINAGE AREAS (ha)	5-YEAR RELEASE RATE	5-YEAR REQUIRED STORAGE (m ³)	TOTAL AVAILABLE STORAGE (m ³)
WS-01(ROOF)	0.012	1.26	1.06	6.03
WS-02 (ROOF)	0.014	1.26	1.53	4.55
WS-03 (ROOF)	0.025	1.26	3.78	13.17
WS-04 (ROOF)	0.006	1.26	0.21	3.14
WS-05 (ROOF)	0.013	1.26	1.32	6.64
TOTAL CONTROLLED	0.070	6.30	7.91	33.53
WS-06 (UNCONTROLLED)	0.031	8.18	0	0
TOTAL UNCONTROLLED	0.031	8.18	0.00	0.00
TOTAL	0.101	14.48	7.91	33.53

LRL Associates Ltd.
Storm Design Sheet



LRL File No. 220224
Project: CIV 7-Storey Condo Building
Location: 424 Churchill Avenue
Date: April 9, 2023
Designed: Tamara Harb
Drawing Reference: C.401

Storm Design Parameters

Rational Method $Q = 2.78CIA$

Q = Peak flow in litres per second (L/s)
 A = Drainage area in hectares (ha)
 C = Runoff coefficient
 I = Rainfall intensity (mm/hr)

Runoff Coefficient (C)
 Grass 0.20
 Gravel 0.70
 Asphalt / rooftop 0.90

Ottawa Macdonald-Cartier International Airport IDF curve
 equation (10 year event, intensity in mm/hr)
 $I_{100} = 1735.688 / (T_d + 6.014)^{0.820}$
 Min. velocity = 0.80 m/s
 Manning's "n" = 0.013

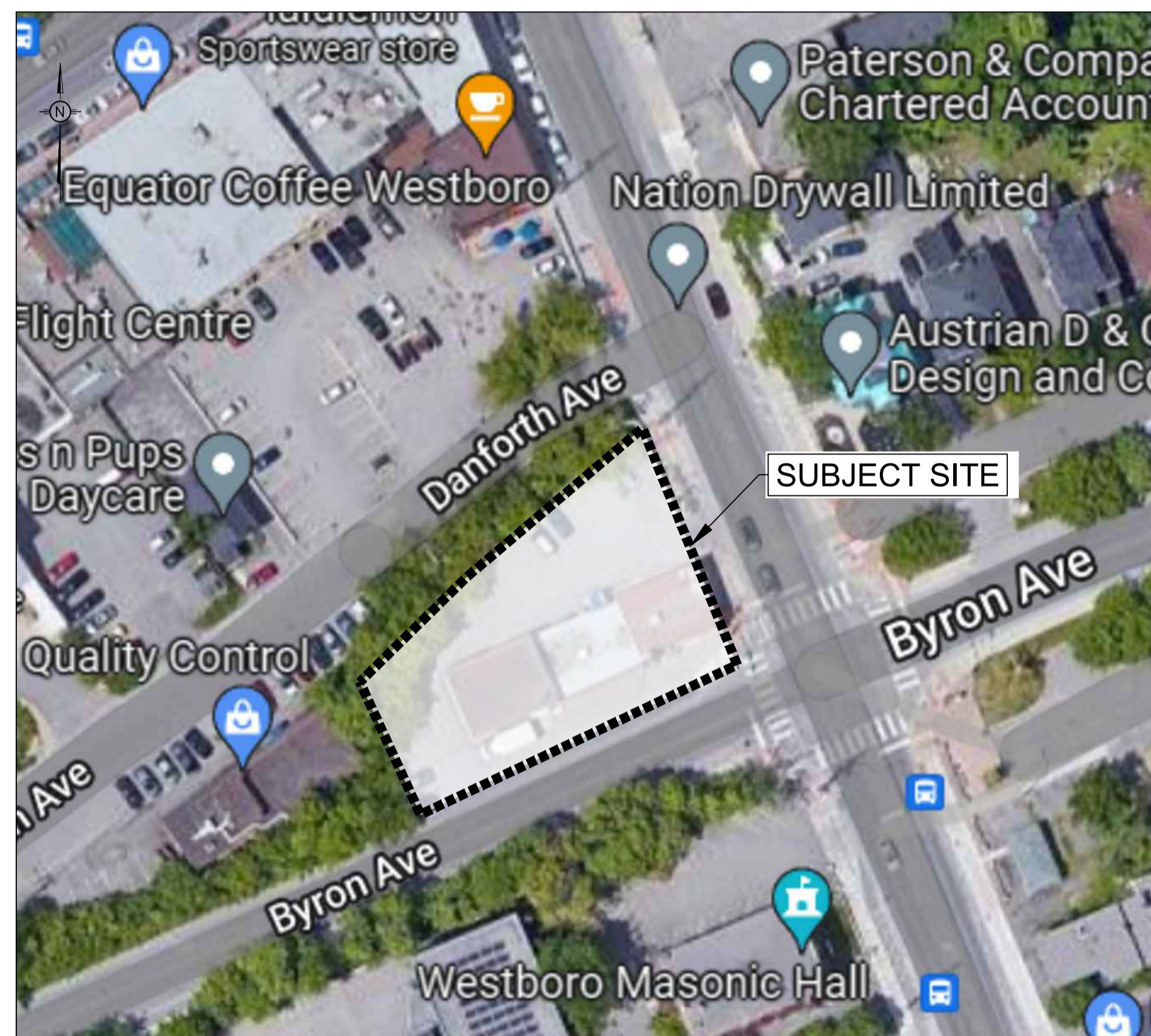
LOCATION			AREA (ha)			FLOW						STORM SEWER							
WATERSHED / STREET	From MH	To MH	C = 0.20	C = 0.70	C = 0.90	Indiv. 2.78AC	Accum. 2.78AC	Time of Conc. (min.)	Rainfall Intensity (mm/hr)	Peak Flow Q (L/s)	Controlled Flow Q (L/s)	Pipe Diameter (mm)	Type	Slope (%)	Length (m)	Capacity Full (L/s)	Velocity Full (m/s)	Time of Flow (min.)	Ratio (Q/Q _{FULL})
WS-01 to WS-05	Building	PROP STM MH01	0.000	0.000	0.070	0.175	0.175	10.00	178.6	31.28	6.30	250	PVC	2.00%	11.6	84.1	1.71	0.11	0.37

APPENDIX E
Civil Engineering Drawings



PROPOSED 7 STOREY CONDO REDEVELOPMENT 424 CHURCHILL AVE, OTTAWA ON

REVISION 4



KEY PLAN (N.T.S.)

DRAWING INDEX	
TITLE PAGE	
SEDIMENT AND EROSION CONTROL PLAN	C101
DEMOLITION PLAN	C102
GRADING AND DRAINAGE PLAN	C301
SERVICING PLAN	C401
STORMWATER MANAGEMENT PLAN	C601
PRE-DEVELOPMENT WATERSHED PLAN	C701
POST-DEVELOPMENT WATERSHED PLAN	C702
CONSTRUCTION DETAIL PLAN	C901



LRJ

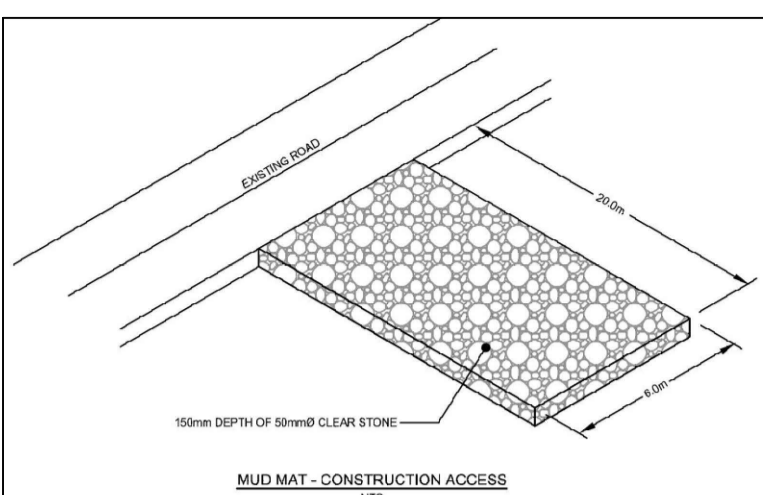
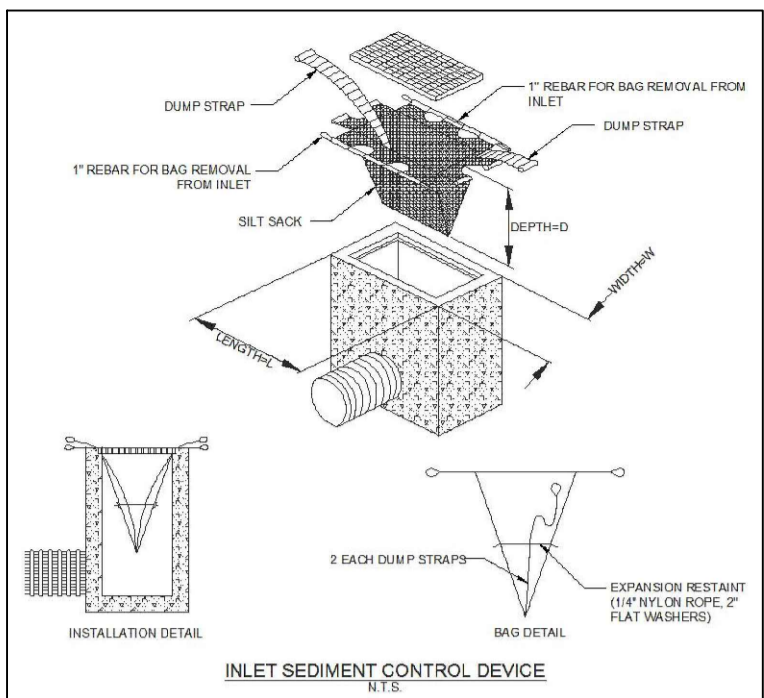
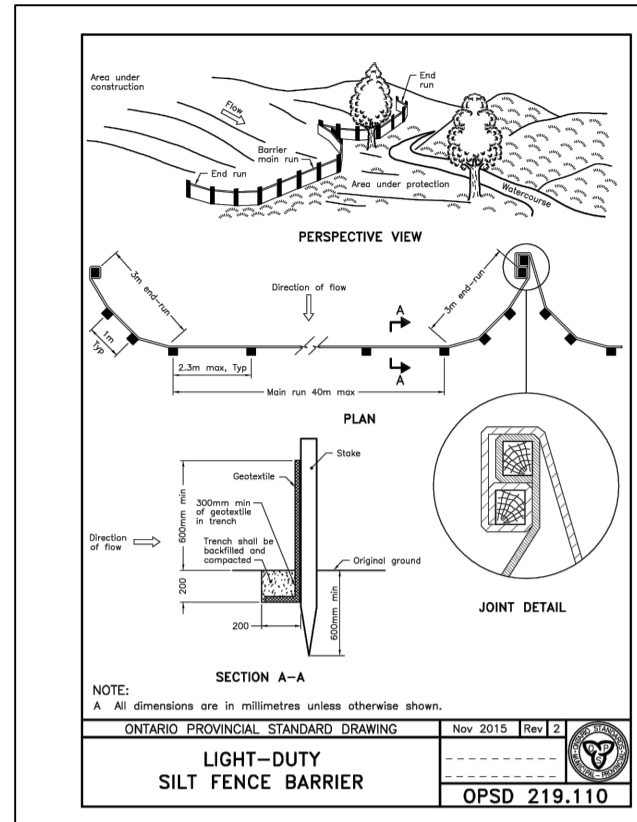
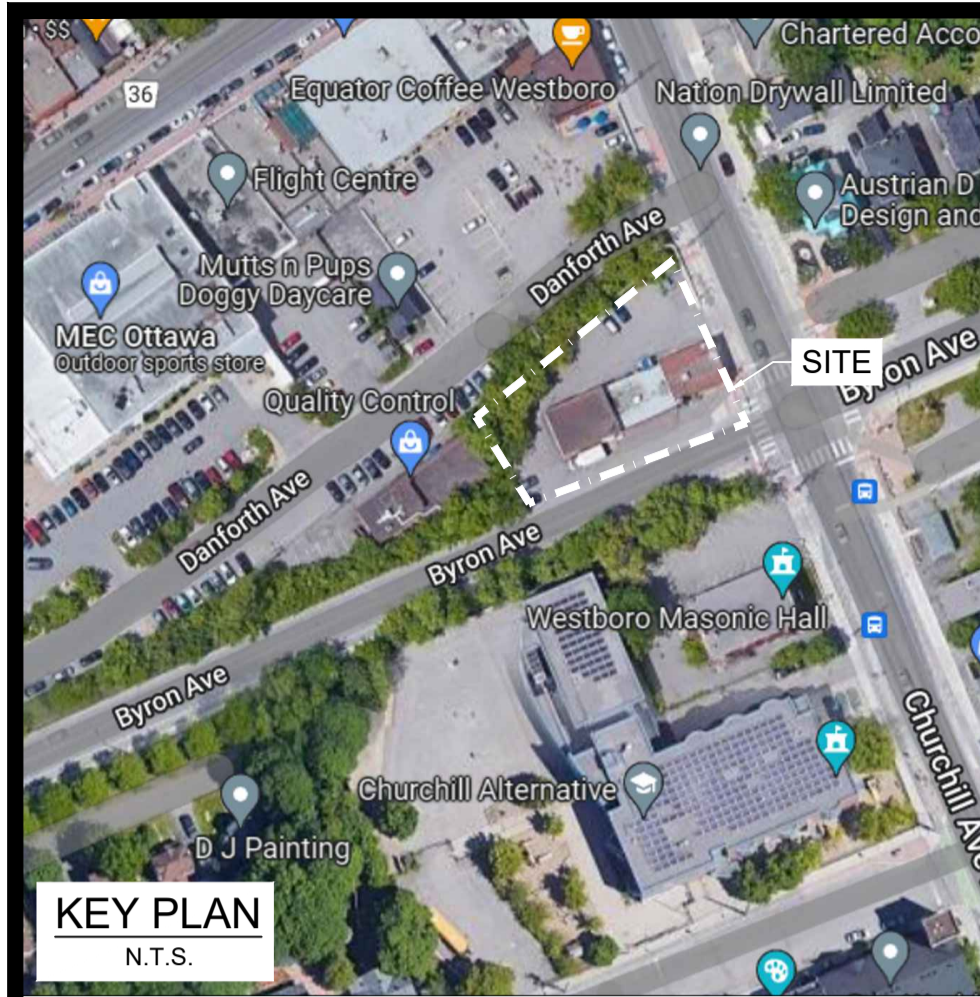
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5430 Canotek Road | Ottawa, ON, K1J 9G2
www.lrl.ca | (613) 842-3434

PROPOSED 7 STOREY CONDO REDEVELOPMENT
424 CHURCHILL AVE, OTTAWA ON
RE-ISSUED FOR APPROVAL - JULY, 2024
LRL PROJECT no: 220224



NOT AUTHENTIC UNLESS SIGNED AND DATED



LEGEND:

- EXISTING PROPERTY LINE TO REMAIN
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- AREA IN HECTARES

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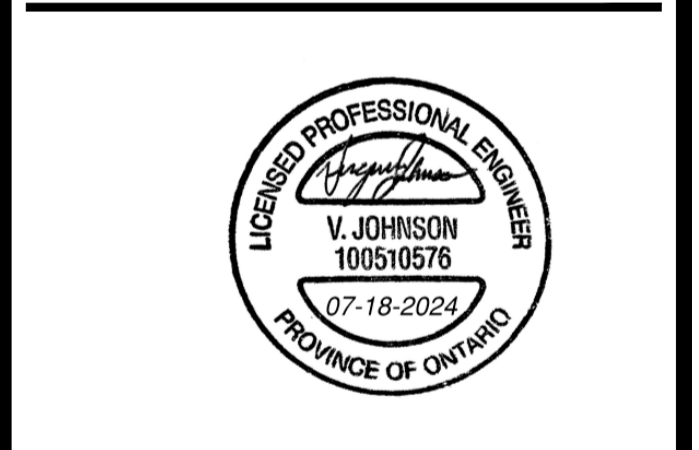
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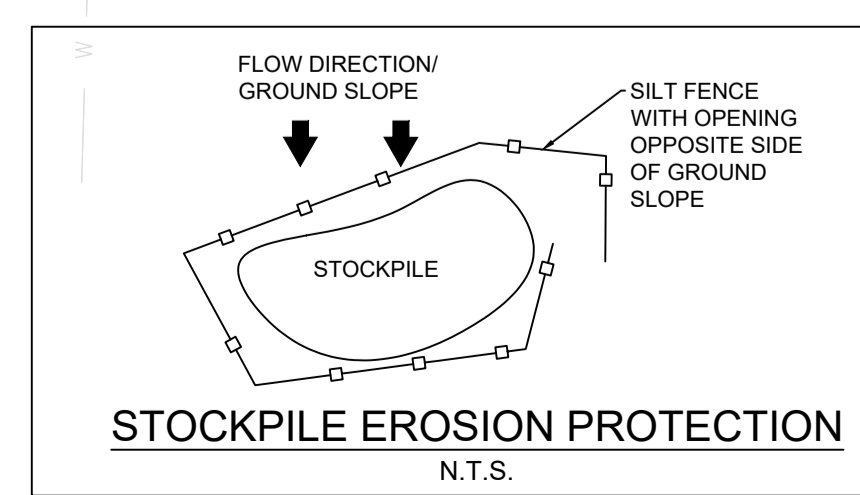
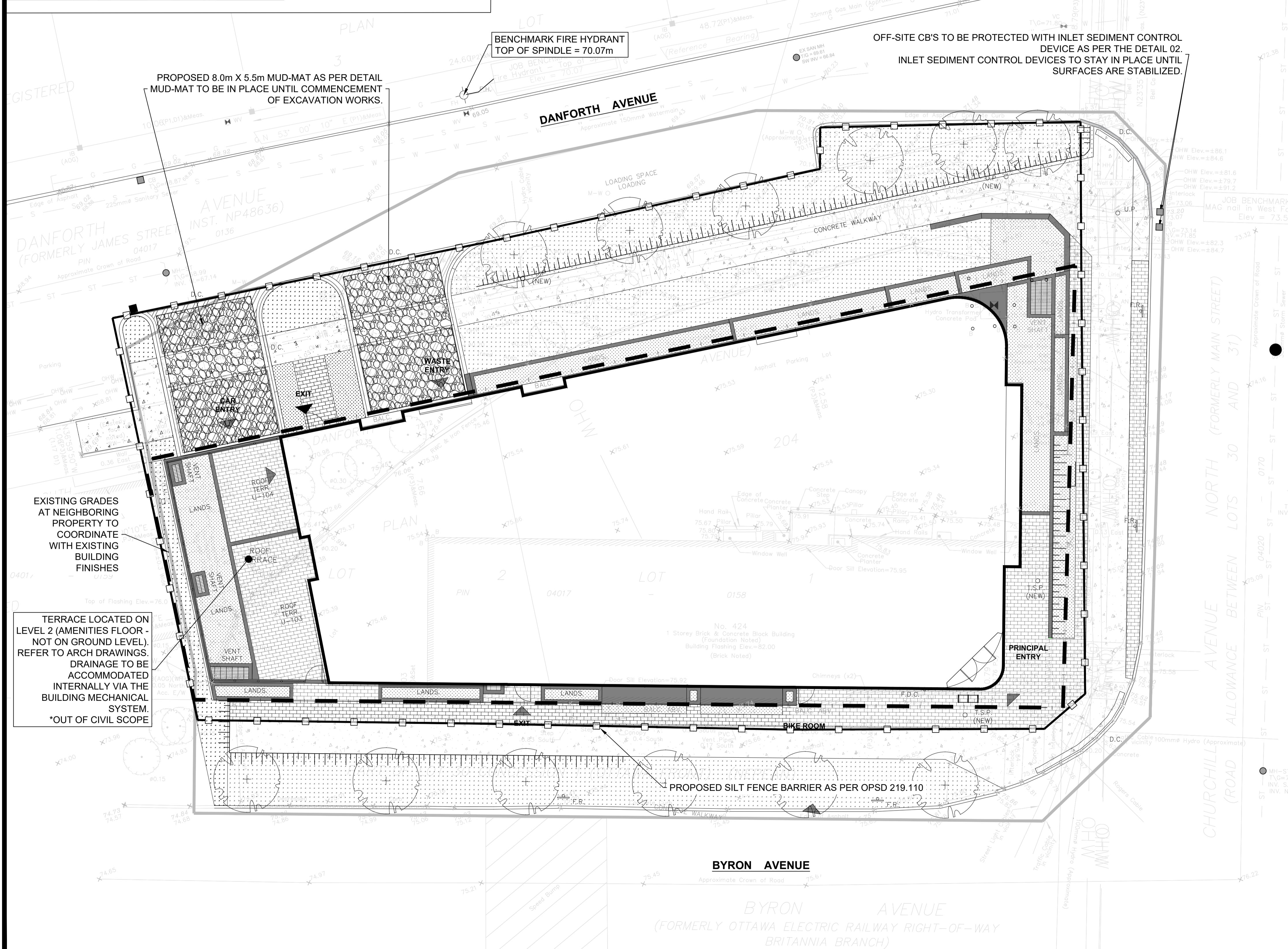
DESIGNED BY: T.H. DRAWN BY: T.H. APPROVED BY: V.J.

PROJECT: PROPOSED 7-STORY CONDO RE-DEVELOPMENT 424 CHURCHILL AVE OTTAWA, ON

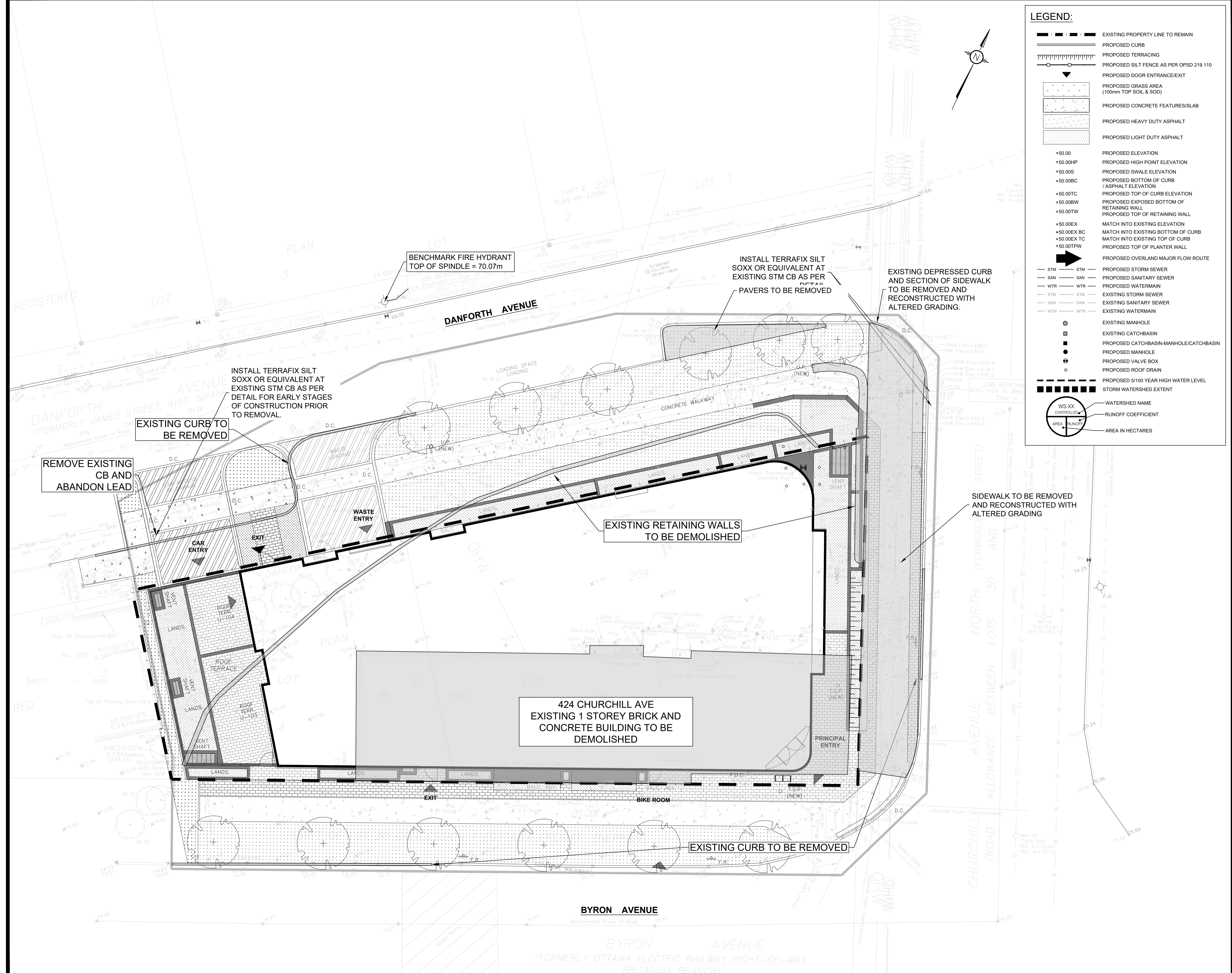
DRAWING TITLE: EROSION AND SEDIMENT CONTROL PLAN

PROJECT NO. 220224
DATE: APRIL, 2023

C101



D07-16-08-0022



LEGEND:

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Scale: 1:125

Scale bar: 1.5m, 3.0m, 6.0m

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Professional Engineer Seal: V. JOHNSON, 100510576, 07-18-2024, PROVINCE OF ONTARIO

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PROJECT: PROPOSED 7-STORY CONDO RE-DEVELOPMENT 424 CHURCHILL AVE OTTAWA, ON

DRAWING TITLE: DEMOLITION PLAN

PROJECT NO: 220224 DATE: APRIL, 2023

C102

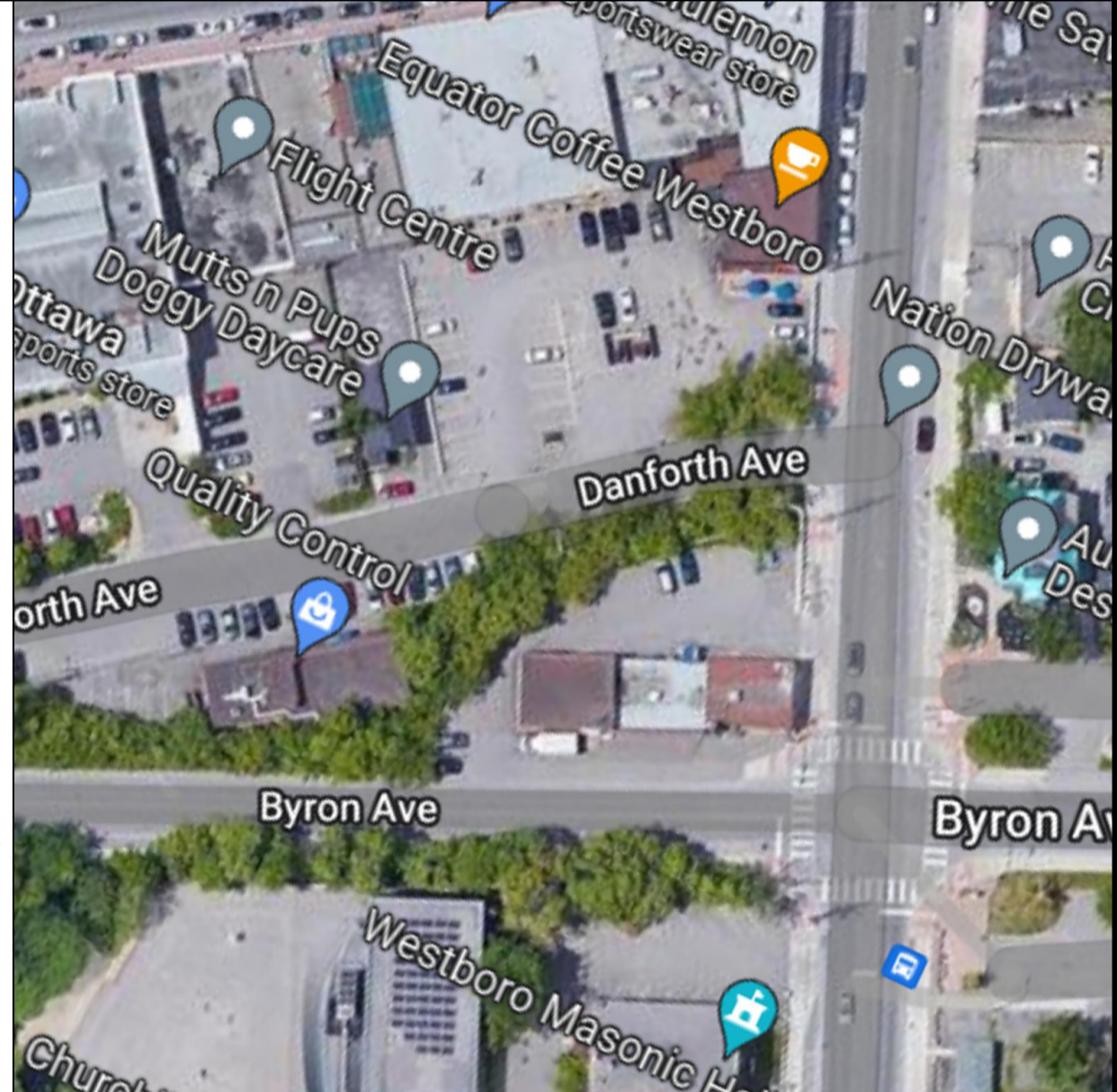
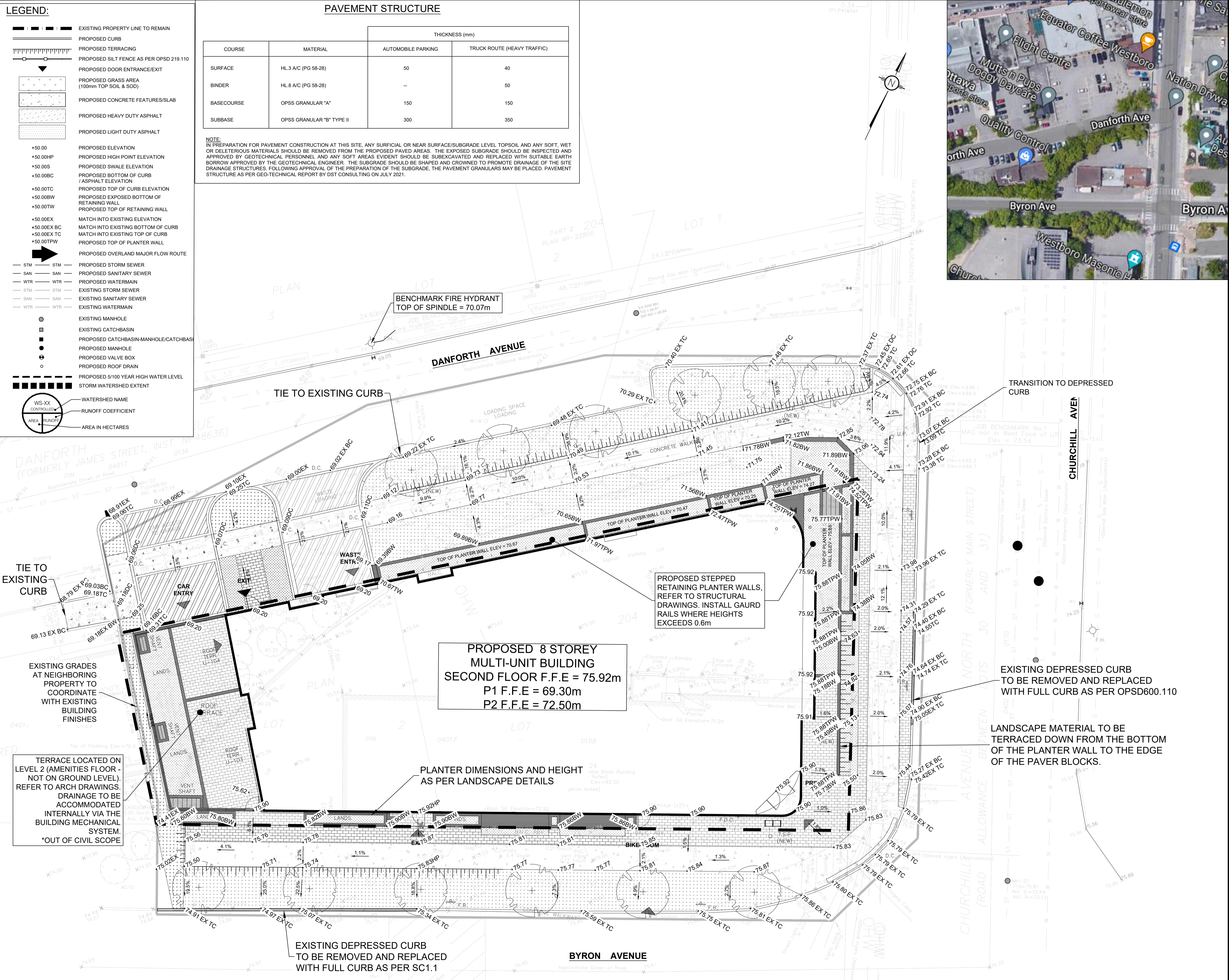
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- WS-XX WATERSHED NAME
- CONTROLLED RUNOFF COEFFICIENT
- AREA RUNOFF AREA IN HECTARES

PAVEMENT STRUCTURE

COURSE	MATERIAL	THICKNESS (mm)	
		AUTOMOBILE PARKING	TRUCK ROUTE (HEAVY TRAFFIC)
SURFACE	HL.3 A/C (PG 58-28)	50	40
BINDER	HL.8 A/C (PG 58-28)	—	50
BASECOURSE	OPSS GRANULAR "A"	150	150
SUBBASE	OPSS GRANULAR "B" TYPE II	300	350

NOTE:
 IN PREPARATION FOR PAVEMENT CONSTRUCTION AT THIS SITE, ANY SURFICIAL OR NEAR SURFACE/SUBGRADE LEVEL TOPSOIL AND ANY SOFT, WET OR DELETERIOUS MATERIALS SHOULD BE REMOVED FROM THE PROPOSED PAVED AREAS. THE EXPOSED SUBGRADE SHOULD BE INSPECTED AND APPROVED BY GEOTECHNICAL PERSONNEL AND ANY SOFT AREAS EVIDENT SHOULD BE SUBEXCAVATED AND REPLACED WITH SUITABLE EARTH BORROW APPROVED BY THE GEOTECHNICAL ENGINEER. THE SUBGRADE SHOULD BE SHAPED AND CROWNED TO PROMOTE DRAINAGE OF THE SITE DRAINAGE STRUCTURES FOLLOWING APPROVAL OF THE PREPARATION OF THE SUBGRADE, THE PAVEMENT GRANULARS MAY BE PLACED. PAVEMENT STRUCTURE AS PER GEO-TECHNICAL REPORT BY DST CONSULTING ON JULY 2021.



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No.	REVISIONS	BY	DATE
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01	ISSUED FOR APPROVAL	T.H.	11 OCT 2022



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 www.lri.ca | (613) 842-3434

CLIENT: **GSI PROPERTIES**

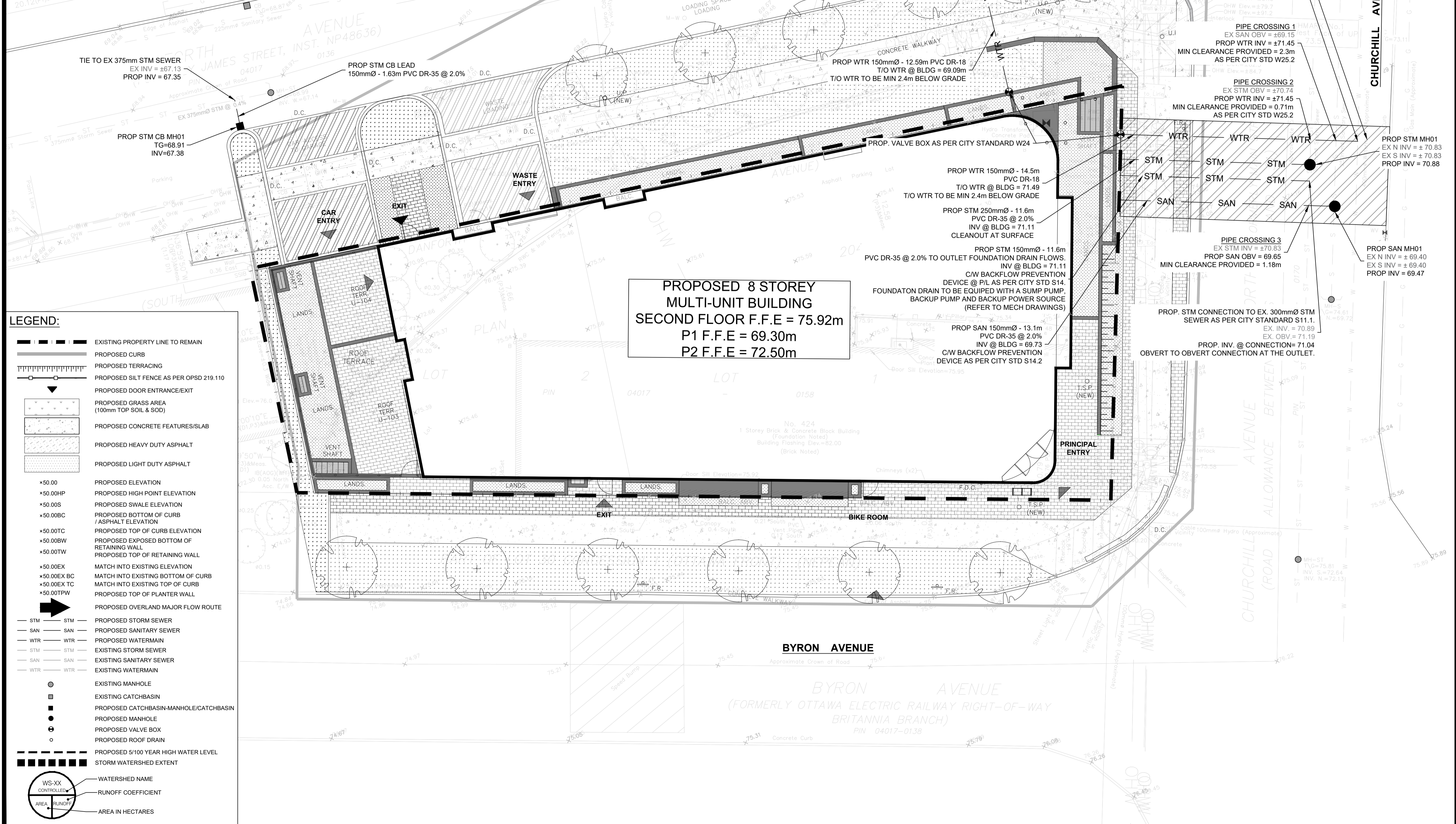
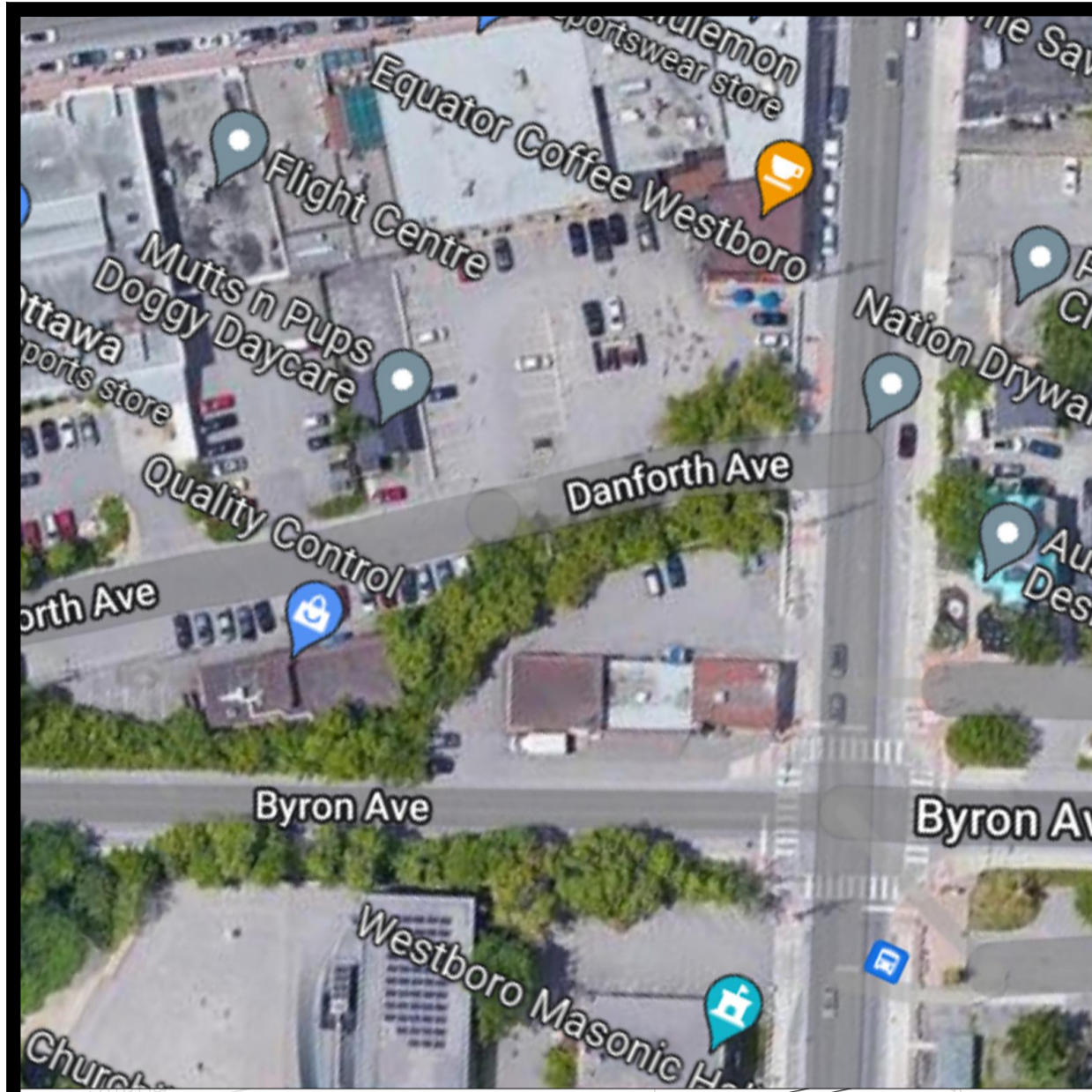
DESIGNED BY: T.H. DRAWN BY: T.H. APPROVED BY: V.J.

PROJECT: **PROPOSED 7-STORY CONDO RE-DEVELOPMENT 424 CHURCHILL AVE OTTAWA, ON**

DRAWING TITLE: **GRADING AND DRAINAGE PLAN**

PROJECT NO.: 220224
 DATE: APRIL, 2023

C301



USE AND INTERPRETATION OF DRAWINGS

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION ARE PART OF THE CONTRACT DOCUMENTS AND DESCRIBE THE USE AND INTENT OF THE DRAWINGS. THE CONTRACT DOCUMENTS INCLUDE NOT ONLY THE DRAWINGS, BUT ALSO THE OWNER-CONTRACTOR AGREEMENTS, CONDITIONS OF THE CONTRACT, THE SPECIFICATIONS, ADDENDA, AND MODIFICATIONS ISSUED AFTER EXECUTION OF THE CONTRACT. THESE CONTRACT DOCUMENTS ARE COMPLEMENTARY, AND WHAT IS REQUIRED BY ANY ONE SHALL BE BINDING AS IF REQUIRED BY ALL. WORK NOT COMPLETELY DELINEATED HEREON SHALL BE CONSTRUCTED OF THE SAME MATERIALS AND DETAILED SIMILARLY AS WORK SHOWN MORE COMPLETELY ELSEWHERE IN THE CONTRACT DOCUMENTS.

BY USE OF THE DRAWINGS FOR CONSTRUCTION OF THE PROJECT, THE OWNER CONFIRMS THAT HE HAS REVIEWED AND APPROVED THE DRAWINGS. THE CONTRACTOR CONFIRMS THAT HE HAS VISITED THE SITE, FAMILIARIZED HIMSELF WITH THE LOCAL CONDITIONS, VERIFIED FIELD DIMENSIONS AND CORRELATED HIS OBSERVATIONS WITH THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.

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1.5m 0 3.0 6.0m
SCALE: 1:225

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www.lri.ca | (613) 842-3434

CLIENT: **GSI PROPERTIES**

DESIGNED BY: T.H. DRAWN BY: T.H. APPROVED BY: V.J.

PROJECT: **PROPOSED 7-STORY CONDO RE-DEVELOPMENT 424 CHURCHILL AVE OTTAWA, ON**

DRAWING TITLE: **SERVICING PLAN**

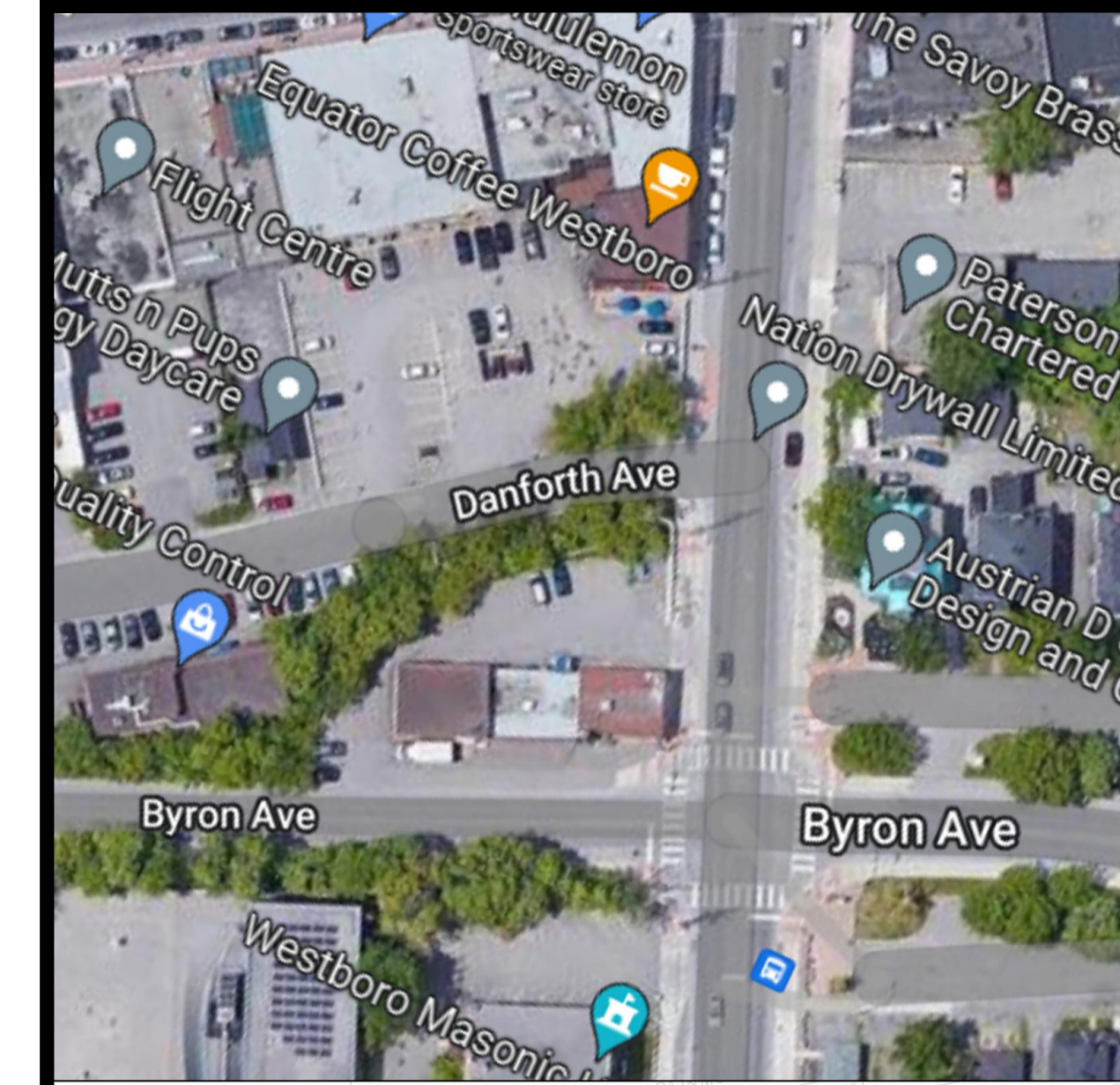
PROJECT NO: 220224
DATE: APRIL, 2023

C401

- LEGEND:**
- — — — — EXISTING PROPERTY LINE TO REMAIN
 - — — — — PROPOSED CURB
 - — — — — PROPOSED TERRACING
 - — — — — PROPOSED SILT FENCE AS PER OPSD 219.110
 - — — — — PROPOSED DOOR ENTRANCE/EXIT
 - — — — — PROPOSED GRASS AREA (100mm TOP SOIL & SOD)
 - — — — — PROPOSED CONCRETE FEATURES/SLAB
 - — — — — PROPOSED HEAVY DUTY ASPHALT
 - — — — — PROPOSED LIGHT DUTY ASPHALT
 - 50.00 PROPOSED ELEVATION
 - 50.00HP PROPOSED HIGH POINT ELEVATION
 - 50.00S PROPOSED SWALE ELEVATION
 - 50.00BC PROPOSED BOTTOM OF CURB / ASPHALT ELEVATION
 - 50.00TC PROPOSED TOP OF CURB ELEVATION
 - 50.00BW PROPOSED EXPOSED BOTTOM OF RETAINING WALL
 - 50.00TW PROPOSED TOP OF RETAINING WALL
 - 50.00EX MATCH INTO EXISTING ELEVATION
 - 50.00EX BC MATCH INTO EXISTING BOTTOM OF CURB
 - 50.00EX TC MATCH INTO EXISTING TOP OF CURB
 - 50.00TPW PROPOSED TOP OF PLANTER WALL
 - PROPOSED OVERLAND MAJOR FLOW ROUTE
 - STM — STM — PROPOSED STORM SEWER
 - SAN — SAN — PROPOSED SANITARY SEWER
 - WTR — WTR — PROPOSED WATERMAIN
 - STM — STM — EXISTING STORM SEWER
 - SAN — SAN — EXISTING SANITARY SEWER
 - WTR — WTR — EXISTING WATERMAIN
 - EXISTING MANHOLE
 - EXISTING CATCHBASIN
 - PROPOSED CATCHBASIN-MANHOLE/CATCHBASIN
 - PROPOSED MANHOLE
 - PROPOSED VALVE BOX
 - PROPOSED ROOF DRAIN
 - — — — — PROPOSED 5/100 YEAR HIGH WATER LEVEL
 - — — — — STORM WATERSHED EXTENT
 - WS-XX WATERSHED NAME
 - AREA RUNOFF RUNOFF COEFFICIENT
 - AREA IN HECTARES

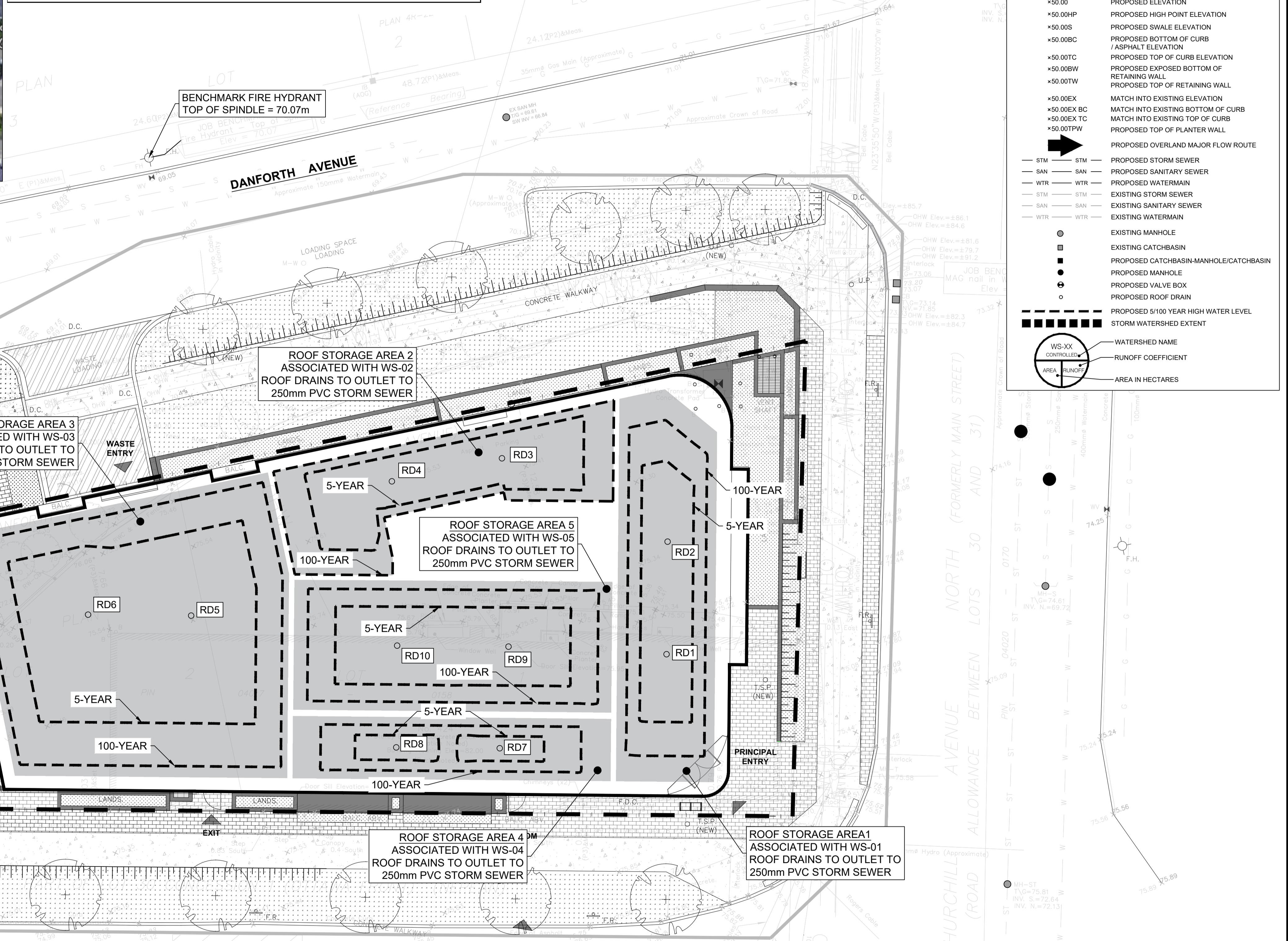
PROPOSED 8 STOREY MULTI-UNIT BUILDING
SECOND FLOOR F.F.E = 75.92m
P1 F.F.E = 69.30m
P2 F.F.E = 72.50m

BYRON AVENUE
(FORMERLY OTTAWA ELECTRIC RAILWAY RIGHT-OF-WAY BRITANNIA BRANCH)
PIN 04017-0138



SUMMARY OF RELEASE RATES AND STORAGE VOLUMES				
CATCHMENT AREAS	DRAINAGE AREAS (ha)	100-YEAR RELEASE RATE	100-YEAR REQUIRED STORAGE (m3)	TOTAL AVAILABLE STORAGE (m3)
WS-01 (ROOF)	0.012	1.26	3.15	6.03
WS-02 (ROOF)	0.014	1.26	4.23	4.55
WS-03 (ROOF)	0.025	1.26	9.46	13.17
WS-04 (ROOF)	0.006	1.26	1.09	3.14
WS-05 (ROOF)	0.013	1.26	3.76	6.64
TOTAL CONTROLLED	0.070	6.30	21.69	33.53
WS-06 (UNCONTROLLED)	0.031	15.59	0	0
TOTAL UNCONTROLLED	0.031	15.59	0.00	0.00
TOTAL	0.101	21.89	21.69	33.53

* Allowable Release Rate = 10.81L/s. As per City comments it's acceptable to only control the roof portion of the site. The remainder can be uncontrolled if it flows to the City ROW. Total controlled flow = 6.30L/s meeting the allowable release rate of 10.81L/s.



Watershed	Associated Roof Drains	Drain Type	Weir Opening	Flow/Drain (L/s)	Available Storage Volume (m3)	Maximum Ponding Depth (m)	Required 5-Year Volume (m3)	5-Year Ponding Depth (m)	Required 100-Year Volume (m3)	100-Year Ponding Depth (m)
WS-01	1	WATTS ADJUSTABLE ACCUTROL RD-100-A1	Fully Closed	0.63	6.03	0.15	1.06	0.08	3.15	0.12
	2	WATTS ADJUSTABLE ACCUTROL RD-100-A1	Fully Closed	0.63						
WS-02	3	WATTS ADJUSTABLE ACCUTROL RD-100-A1	Fully Closed	0.63	4.55	0.15	1.53	0.11	4.23	0.15
	4	WATTS ADJUSTABLE ACCUTROL RD-100-A1	Fully Closed	0.63						
WS-03	5	WATTS ADJUSTABLE ACCUTROL RD-100-A1	Fully Closed	0.63	13.17	0.15	3.78	0.10	9.46	0.14
	6	WATTS ADJUSTABLE ACCUTROL RD-100-A1	Fully Closed	0.63						
WS-04	7	WATTS ADJUSTABLE ACCUTROL RD-100-A1	Fully Closed	0.63	3.14	0.15	0.21	0.06	1.09	0.11
	8	WATTS ADJUSTABLE ACCUTROL RD-100-A1	Fully Closed	0.63						
WS-05	9	WATTS ADJUSTABLE ACCUTROL RD-100-A1	Fully Closed	0.63	6.64	0.15	1.32	0.09	3.76	0.13
	10	WATTS ADJUSTABLE ACCUTROL RD-100-A1	Fully Closed	0.63						

LEGEND:

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- PROPOSED HIGH POINT ELEVATION
- PROPOSED SWALE ELEVATION
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- PROPOSED TOP OF CURB ELEVATION
- PROPOSED EXPOSED BOTTOM OF RETAINING WALL
- PROPOSED TOP OF RETAINING WALL
- PROPOSED TOP OF PLANTER WALL
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- PROPOSED SANITARY SEWER
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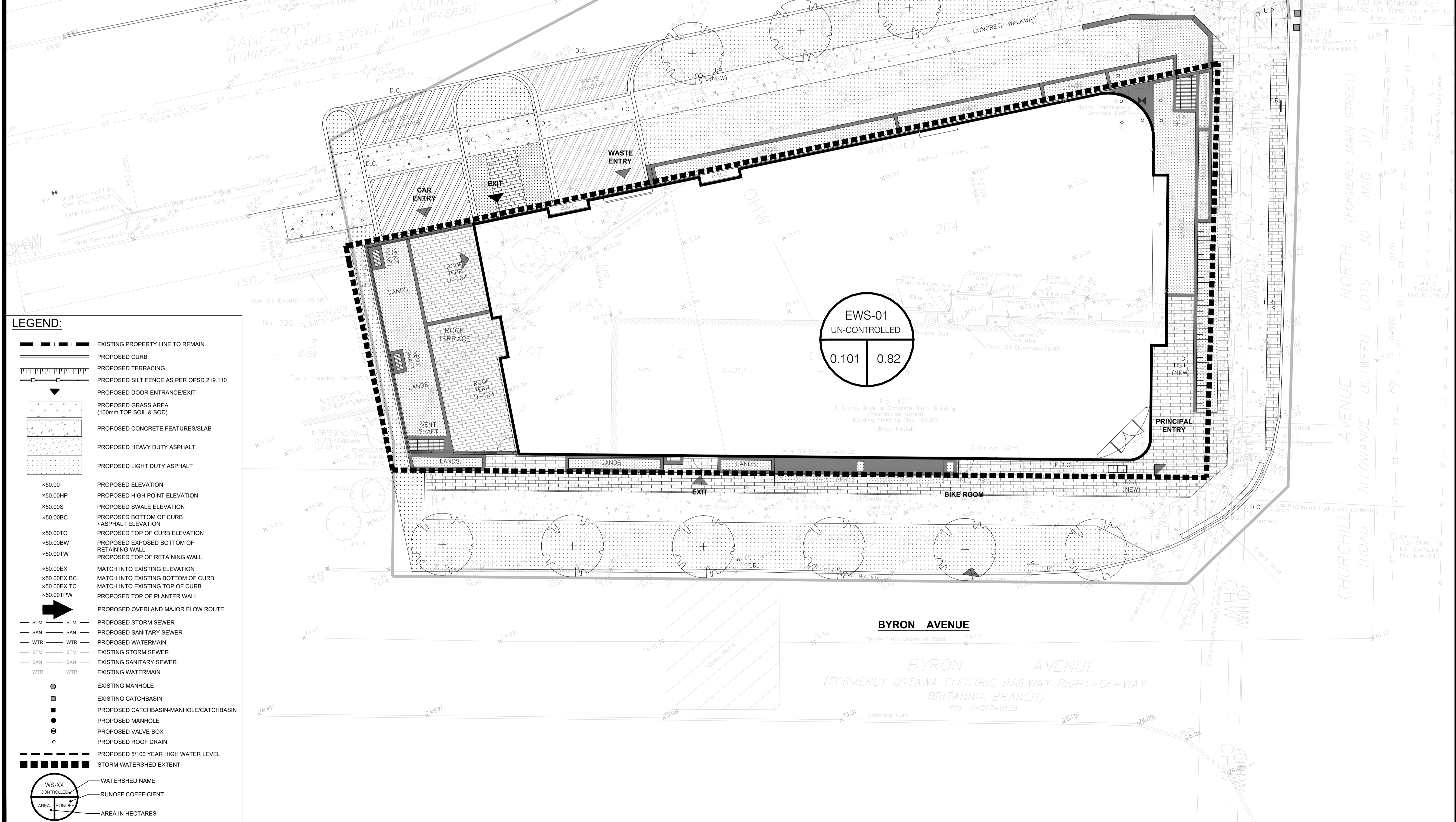
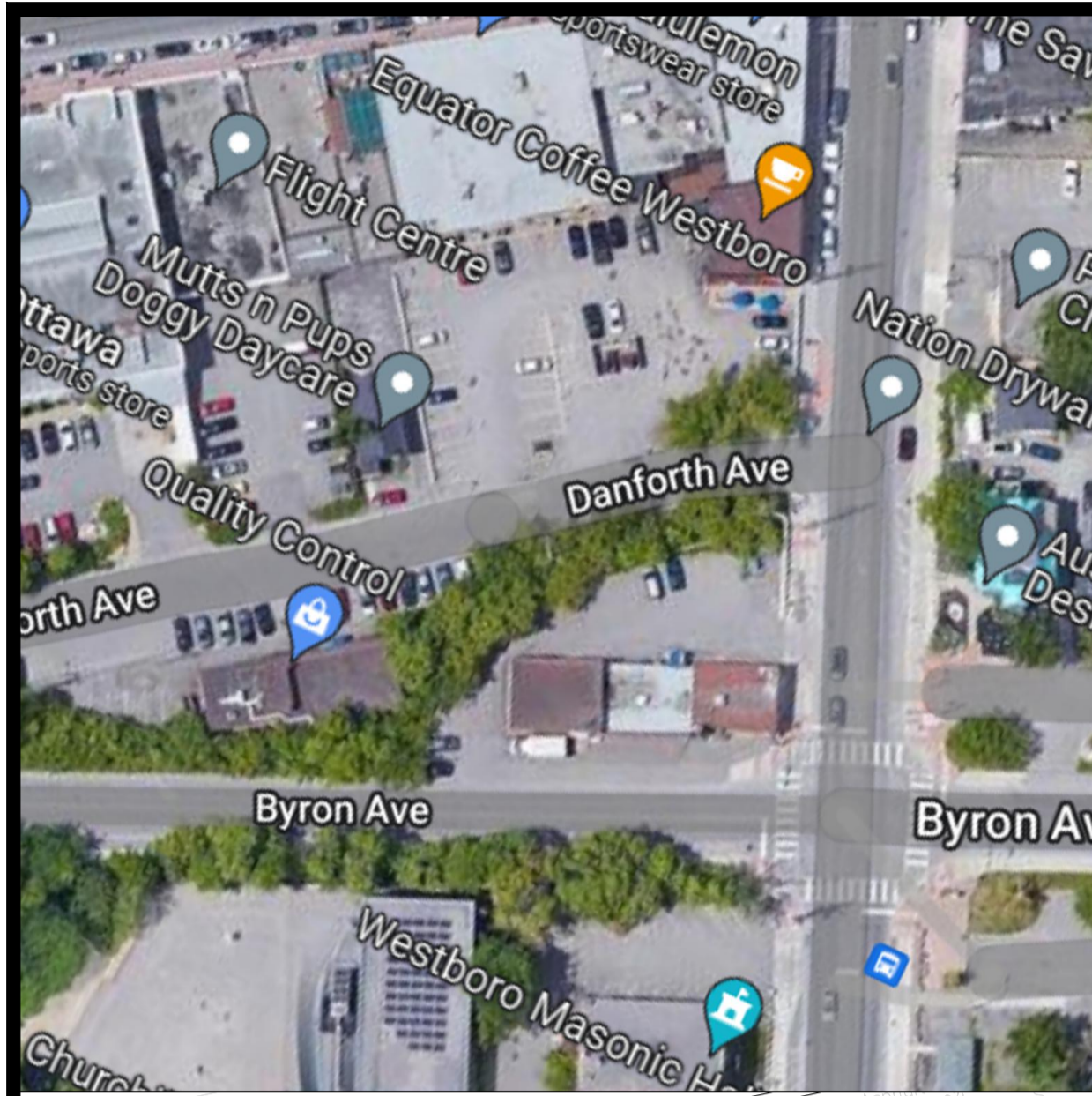
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PROJECT: **PROPOSED 7-STORY CONDO RE-DEVELOPMENT 424 CHURCHILL AVE OTTAWA, ON**

DRAWING TITLE: **STORMWATER MANAGEMENT PLAN**

PROJECT NO: 220224 DATE: APRIL, 2023

C601



LEGEND:

- EXISTING PROPERTY LINE TO REMAIN
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- PROPOSED LIGHT DUTY ASPHALT
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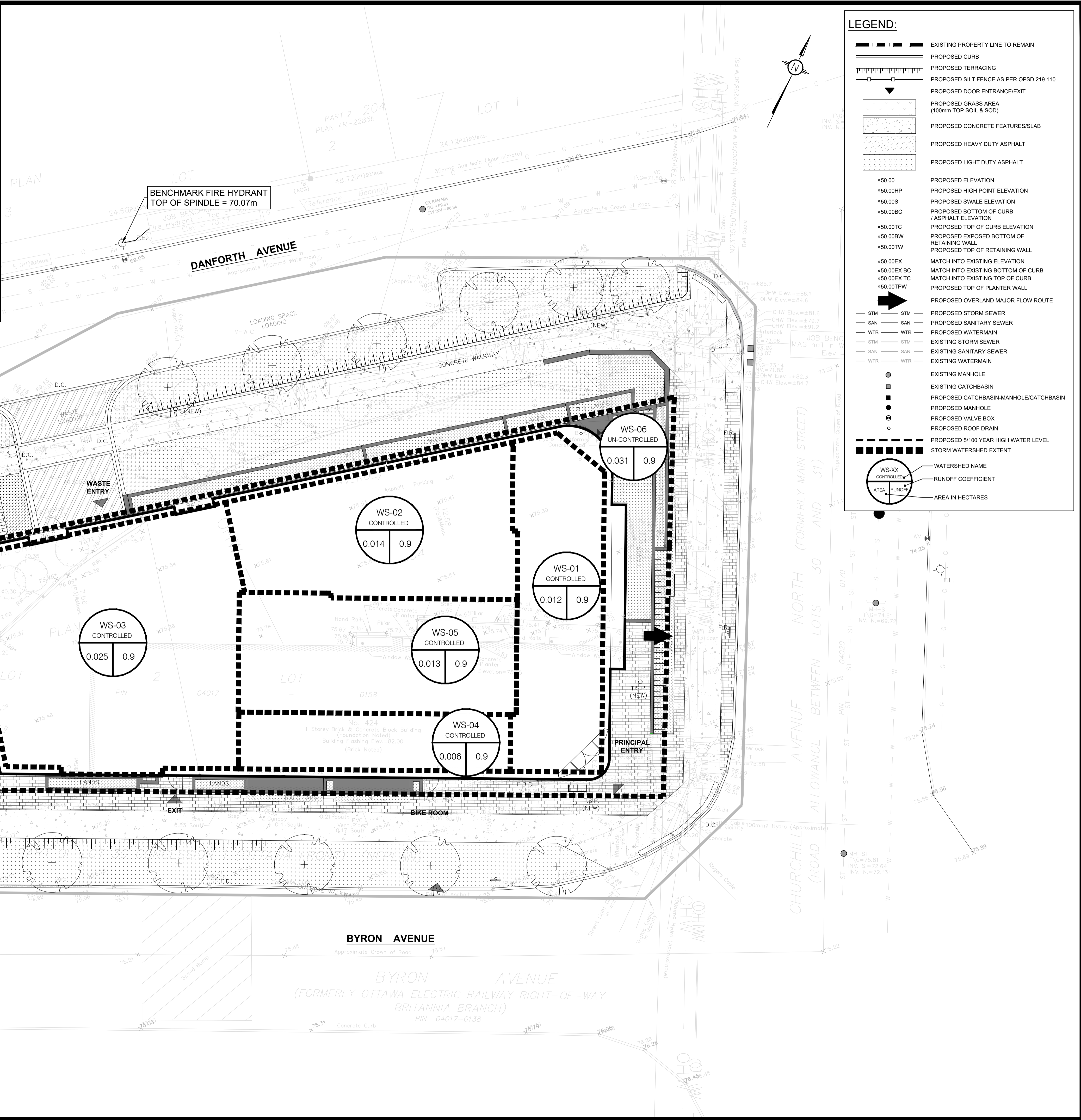
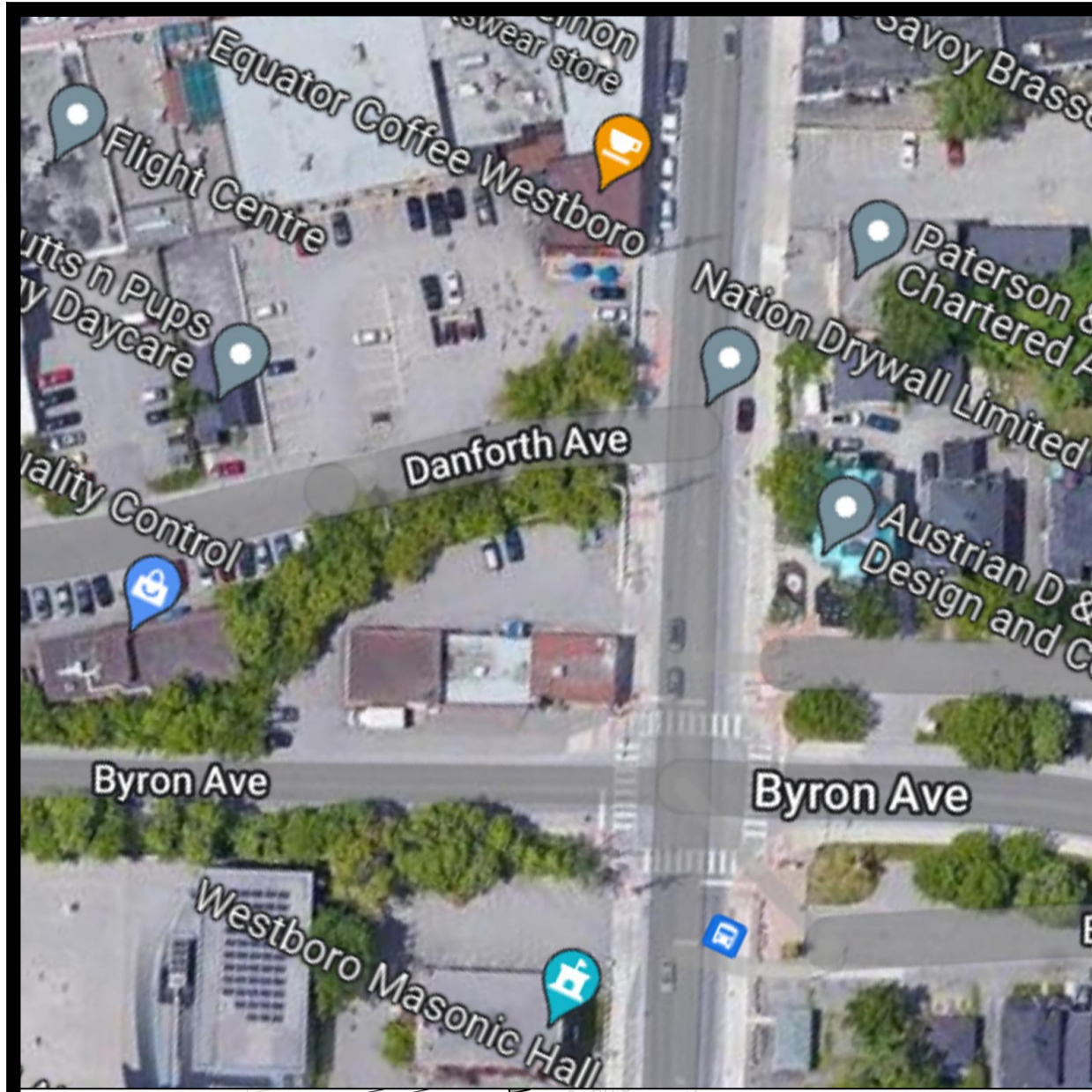
CLIENT: **GSI PROPERTIES**

DESIGNED BY: T.H. DRAWN BY: T.H. APPROVED BY: V.J.

PROJECT: **PROPOSED 7-STORY CONDO RE-DEVELOPMENT 424 CHURCHILL AVE OTTAWA, ON**

DRAWING TITLE: **PRE-DEVELOPMENT WATERSHED PLAN**

PROJECT NO: 220224 DATE: APRIL, 2023 **C701**



LEGEND:

- EXISTING PROPERTY LINE TO REMAIN
- == PROPOSED CURB
- PROPOSED TERRACING
- PROPOSED SILT FENCE AS PER OPSD 219.110
- PROPOSED DOOR ENTRANCE/EXIT
- PROPOSED GRASS AREA (100mm TOP SOIL & SOD)
- PROPOSED CONCRETE FEATURES/SLAB
- PROPOSED HEAVY DUTY ASPHALT
- PROPOSED LIGHT DUTY ASPHALT
- *50.00 PROPOSED ELEVATION
- *50.00HP PROPOSED HIGH POINT ELEVATION
- *50.00S PROPOSED SWALE ELEVATION
- *50.00BC PROPOSED BOTTOM OF CURB / ASPHALT ELEVATION
- *50.00TC PROPOSED TOP OF CURB ELEVATION
- *50.00BW PROPOSED EXPOSED BOTTOM OF RETAINING WALL
- *50.00TW PROPOSED TOP OF RETAINING WALL
- *50.00EX MATCH INTO EXISTING ELEVATION
- *50.00EX BC MATCH INTO EXISTING BOTTOM OF CURB
- *50.00EX TC MATCH INTO EXISTING TOP OF CURB
- *50.00PW PROPOSED TOP OF PLANTER WALL
- PROPOSED OVERLAND MAJOR FLOW ROUTE
- STM PROPOSED STORM SEWER
- SAN PROPOSED SANITARY SEWER
- WTR PROPOSED WATERMAIN
- STM EXISTING STORM SEWER
- SAN EXISTING SANITARY SEWER
- WTR EXISTING WATERMAIN
- EXISTING MANHOLE
- EXISTING CATCHBASIN
- PROPOSED CATCHBASIN-MANHOLE/CATCHBASIN
- PROPOSED MANHOLE
- PROPOSED VALVE BOX
- PROPOSED ROOF DRAIN
- PROPOSED 5/100 YEAR HIGH WATER LEVEL
- STORM WATERSHED EXTENT
- WS-XX WATERSHED NAME
- RUNOFF COEFFICIENT
- AREA IN HECTARES

USE AND INTERPRETATION OF DRAWINGS

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION ARE PART OF THE CONTRACT DOCUMENTS AND DESCRIBE USE AND INTENT OF THE DRAWING. THE CONTRACT DOCUMENTS INCLUDE NOT ONLY THE DRAWINGS, BUT ALSO THE OWNER-CONTRACTOR AGREEMENTS, CONDITIONS OF THE CONTRACT, THE SPECIFICATIONS, ADDENDA, AND MODIFICATIONS ISSUED AFTER EXECUTION OF THE CONTRACT. THESE CONTRACT DOCUMENTS ARE COMPLEMENTARY, AND WHAT IS REQUIRED BY ANY ONE SHALL BE BINDING AS REQUIRED BY ALL. WORK NOT COMPLETELY DELINEATED HEREON SHALL BE CONSTRUCTED OF THE SAME MATERIALS AND DETAILED SIMILARLY AS WORK SHOWN MORE COMPLETELY ELSEWHERE IN THE CONTRACT DOCUMENTS.

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UNAUTHORIZED CHANGES:

IN THE EVENT THE CLIENT, THE CLIENT'S CONTRACTORS OR SUBCONTRACTORS, OR ANYONE FOR WHOM THE CLIENT IS LEGALLY LIABLE MAKES OR PERMITS TO BE MADE ANY CHANGES TO ANY REPORTS, PLANS, SPECIFICATIONS OR OTHER CONSTRUCTION DOCUMENTS PREPARED BY LRL ASSOCIATES LTD. (LRL) WITHOUT OBTAINING LRL'S PRIOR WRITTEN CONSENT, THE CLIENT SHALL ASSUME FULL RESPONSIBILITY FOR THE RESULTS OF SUCH CHANGES. THEREFORE THE CLIENT AGREES TO WAIVE ANY CLAIM AGAINST LRL AND TO RELEASE LRL FROM ANY LIABILITY ARISING DIRECTLY OR INDIRECTLY FROM SUCH UNAUTHORIZED CHANGES.

IN ADDITION, THE CLIENT AGREES TO THE FULLEST EXTENT PERMITTED BY LAW, TO INDEMNIFY AND HOLD HARMLESS LRL FROM ANY DAMAGES, LIABILITIES OR COSTS, INCLUDING REASONABLE ATTORNEY'S FEES AND COSTS OF DEFENSE, ARISING FROM SUCH CHANGES.

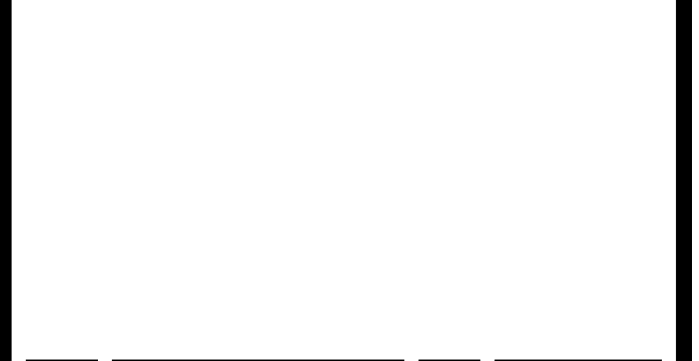
GENERAL NOTES:

EXISTING SERVICES AND UTILITIES SHOWN ON THESE DRAWINGS ARE TAKEN FROM THE BEST AVAILABLE RECORDS, BUT MAY NOT BE COMPLETE OR TO DATE. CONTRACTOR SHALL VERIFY PRIOR TO ANY LOCATION AND ELEVATION OF PIPES AND CHECK WITH THE UTILITY COMPANIES BEFORE DIGGING OR PERFORMING WORK.

CONTRACTOR IS ADVISED TO COLLECT INFORMATION ON SOIL CONDITIONS BEFORE START OF CONSTRUCTION.

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CONTRACTOR TO VERIFY ALL DIMENSIONS AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES BEFORE WORK COMMENCES. DO NOT SCALE DRAWINGS.



EXISTING GRADES AT NEIGHBORING PROPERTY TO COORDINATE WITH EXISTING BUILDING FINISHES

TERRACE LOCATED ON LEVEL 2 (AMENITIES FLOOR - NOT ON GROUND LEVEL). REFER TO ARCH DRAWINGS. DRAINAGE TO BE ACCOMMODATED INTERNALLY VIA THE BUILDING MECHANICAL SYSTEM. *OUT OF CIVIL SCOPE

No.	REVISIONS	BY	DATE
04	RE-ISSUED FOR APPROVAL	S.V.	16 JULY 2024
03	RE-ISSUED FOR APPROVAL	S.V.	03 MAY 2024
02	RE-ISSUED FOR APPROVAL	T.H.	14 APR 2023
01	ISSUED FOR APPROVAL	T.H.	11 OCT 2022



NOT AUTHENTIC UNLESS SIGNED AND DATED



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ENGINEERING | INGENIERIE
5430 Canotek Road | Ottawa, ON, K1J 9G2
www.lrl.ca | (613) 842-3434

CLIENT: **GSI PROPERTIES**

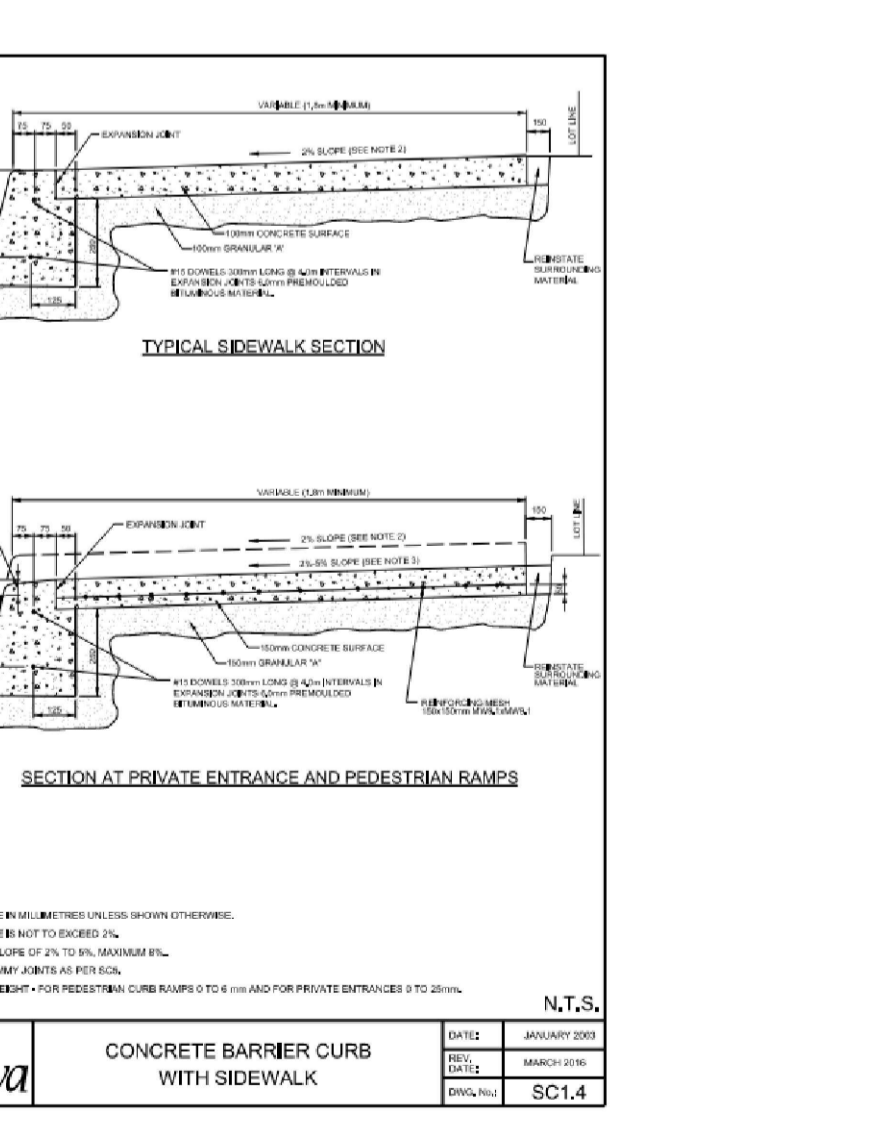
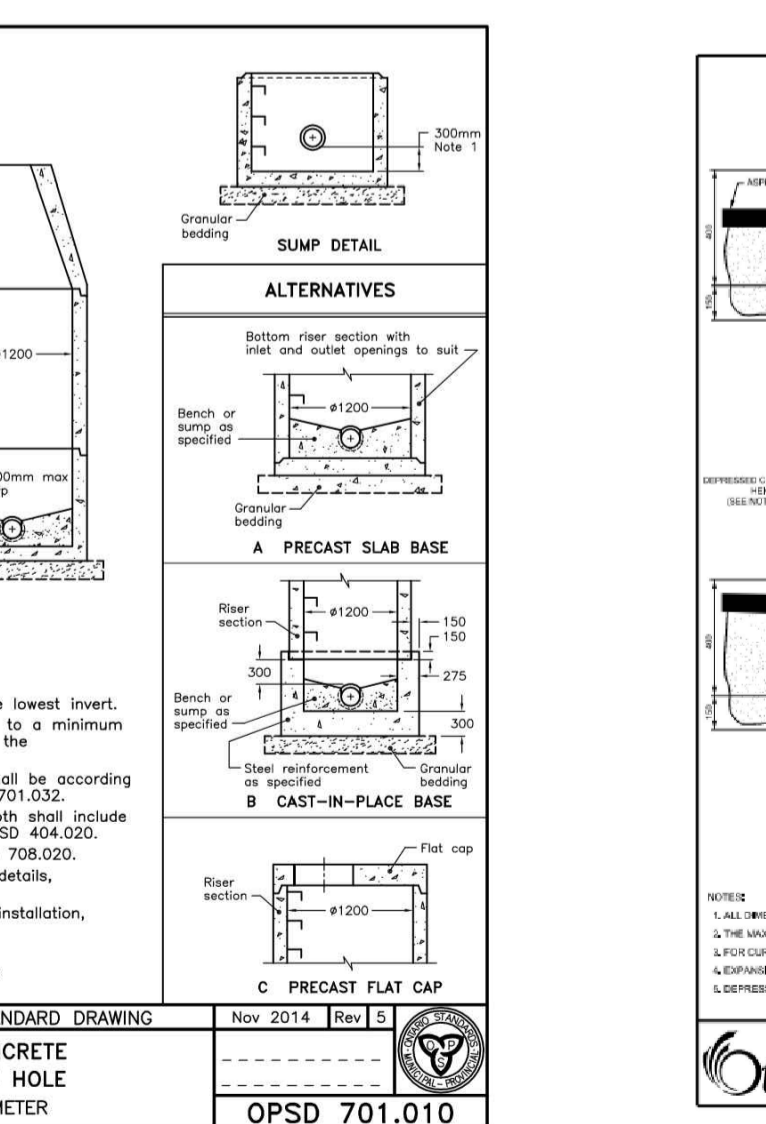
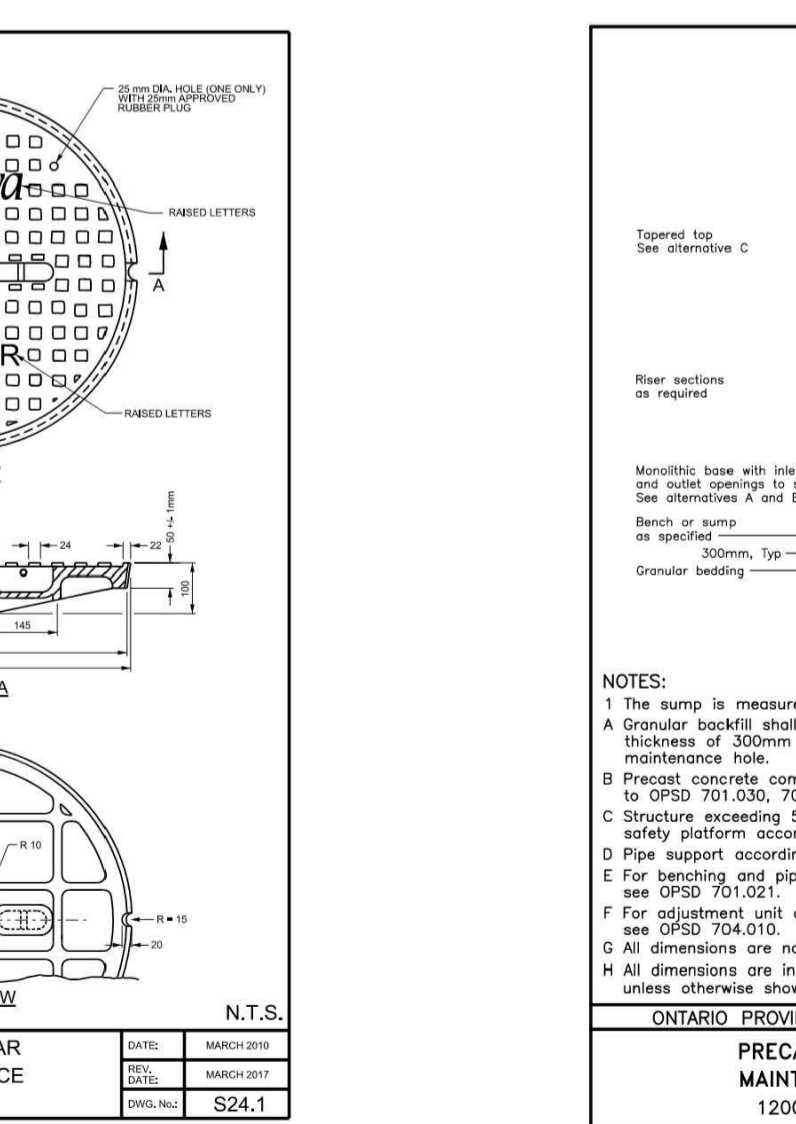
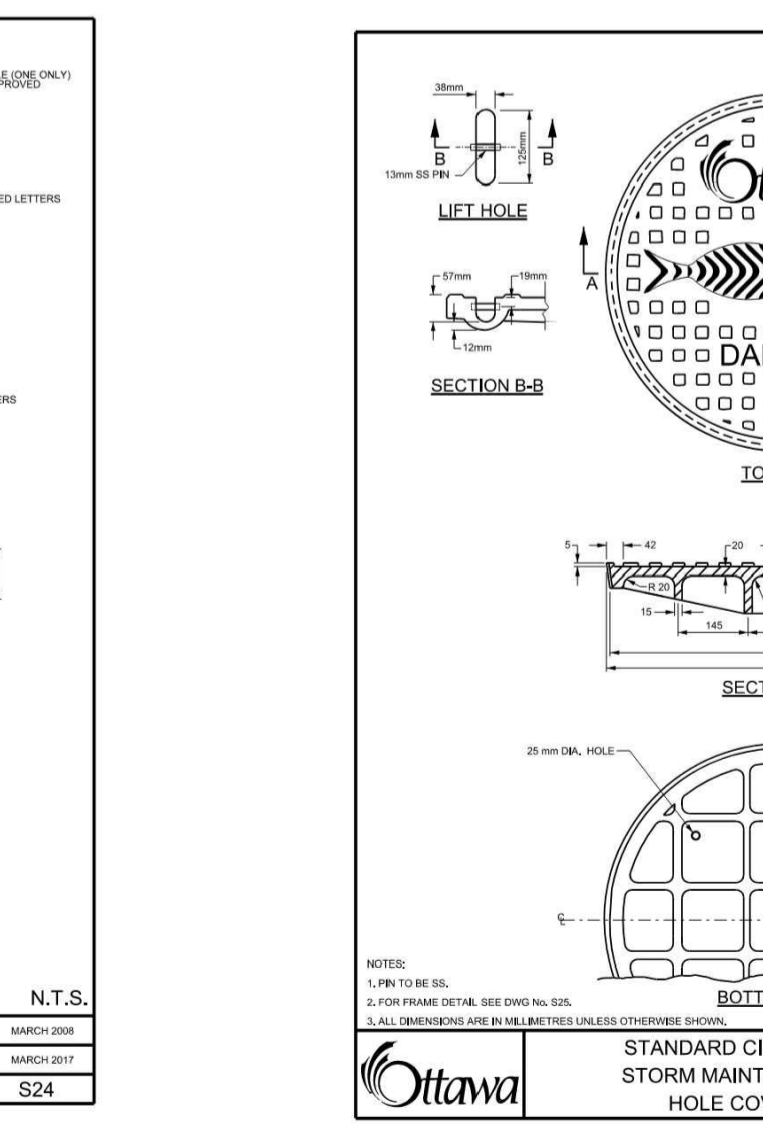
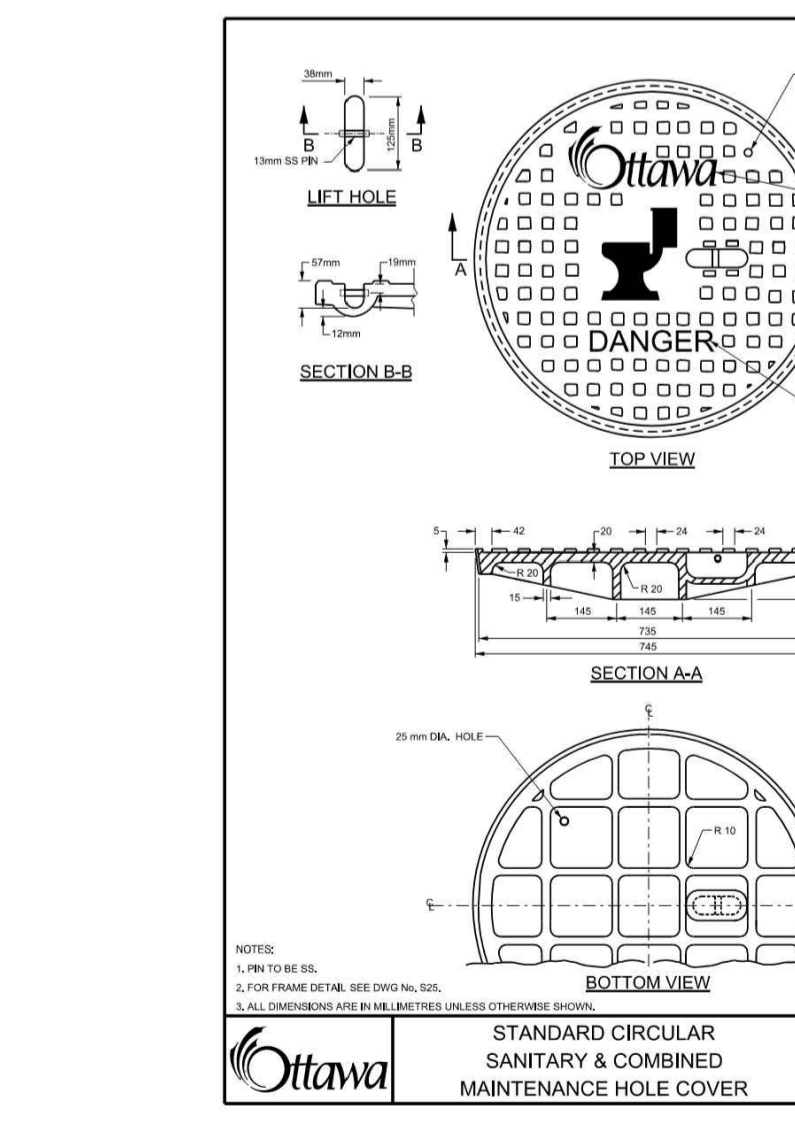
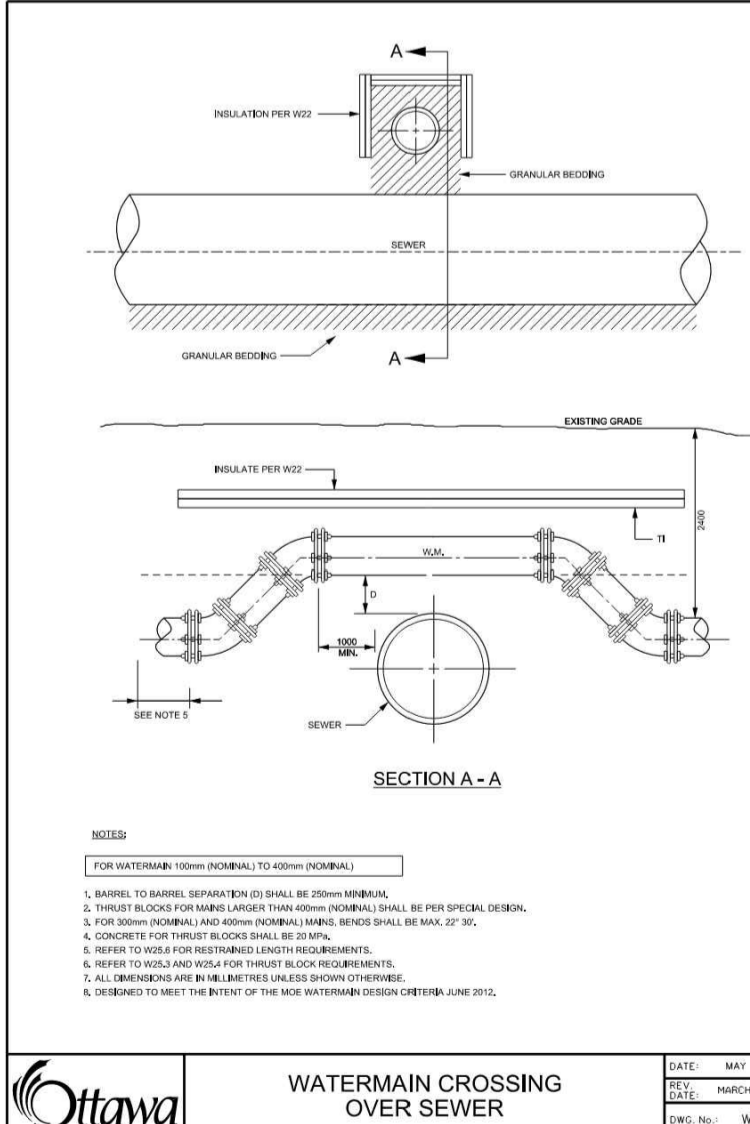
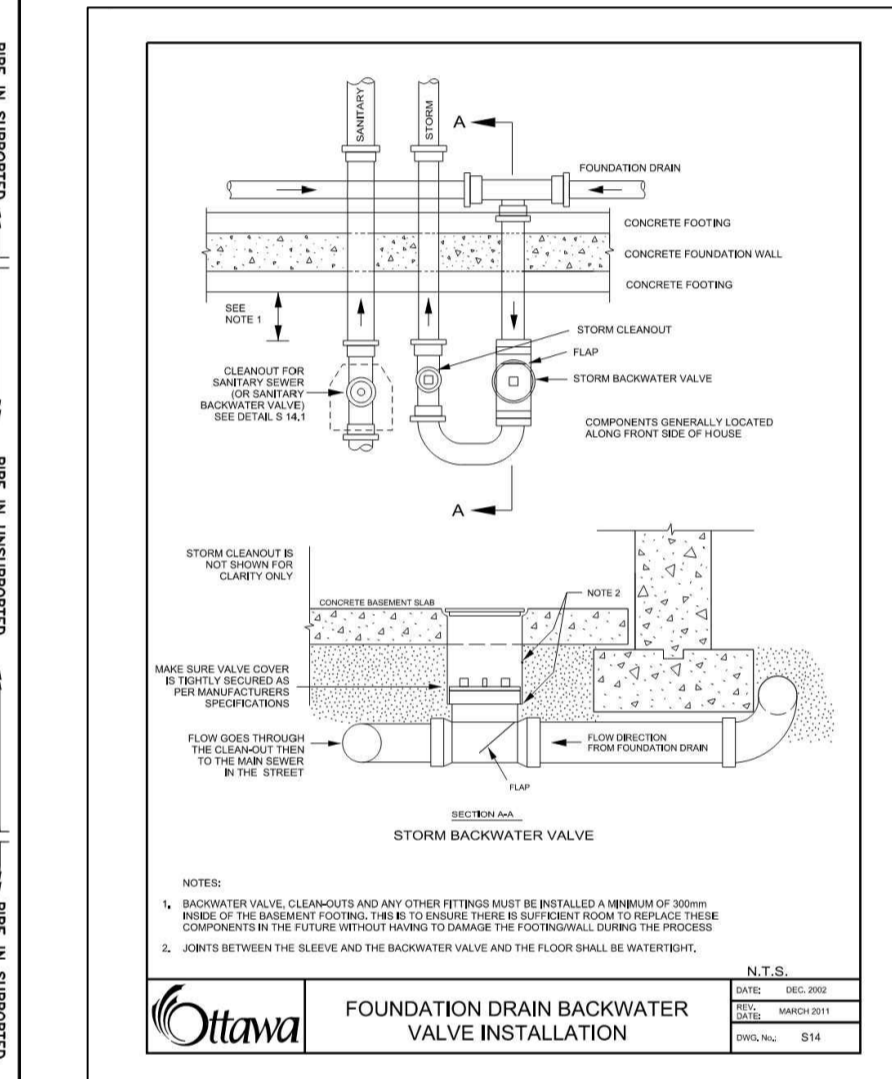
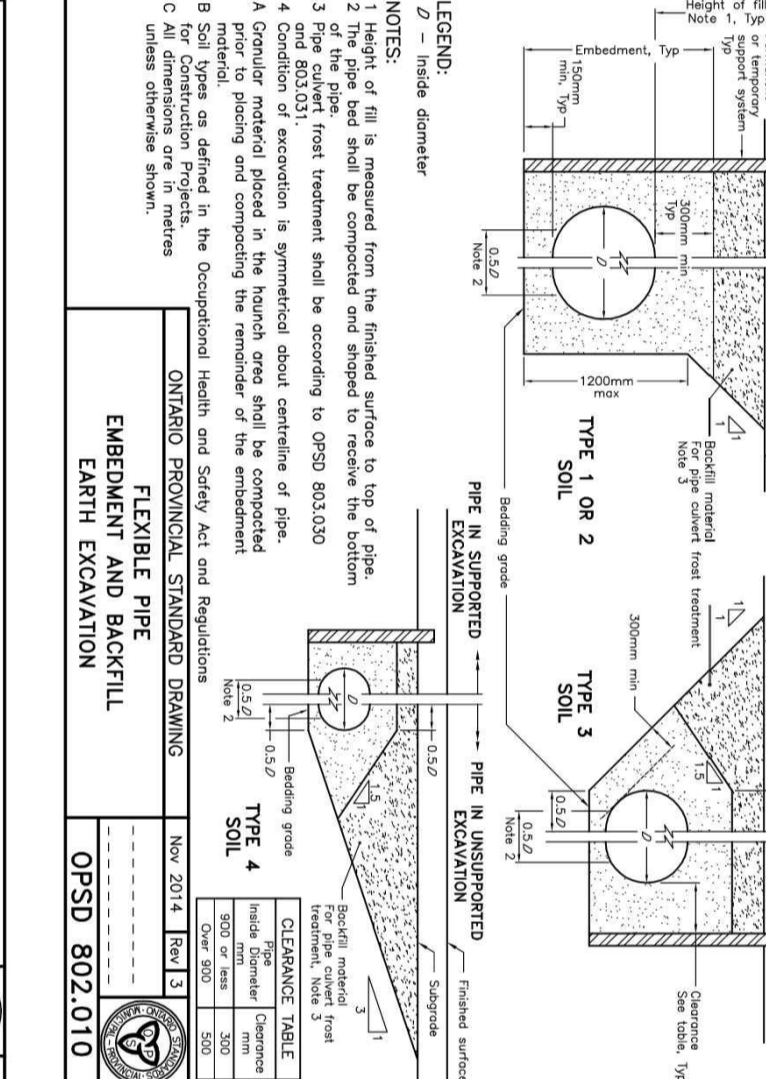
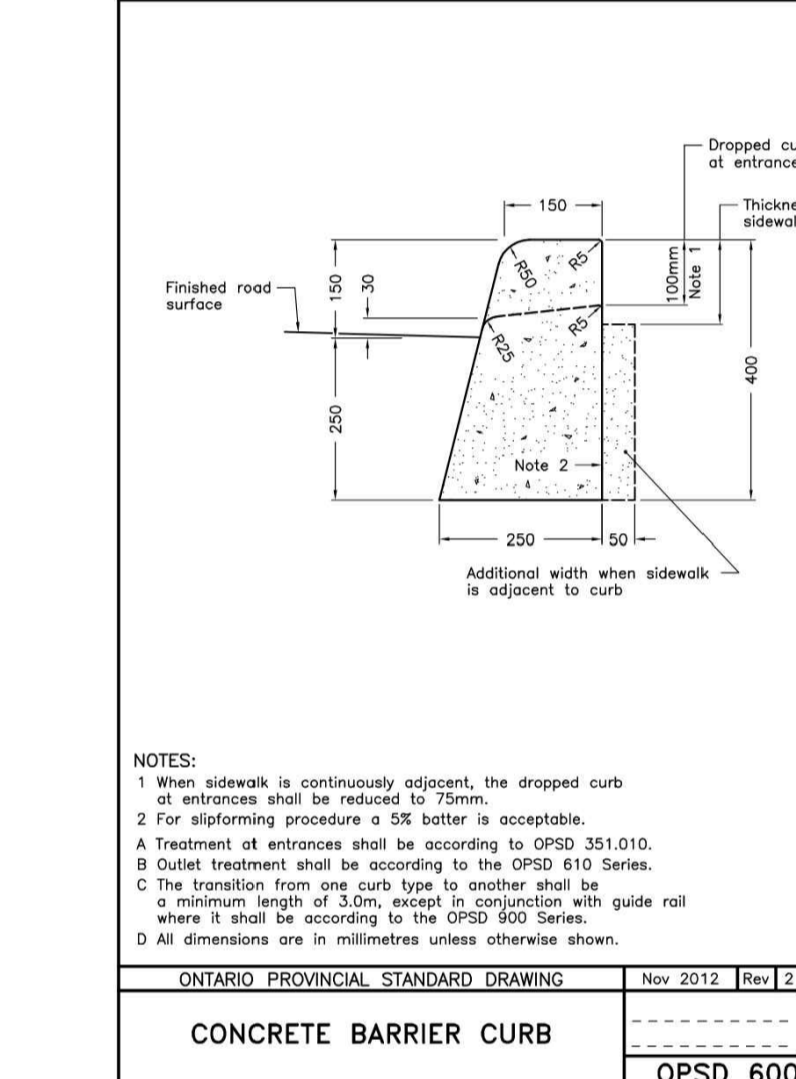
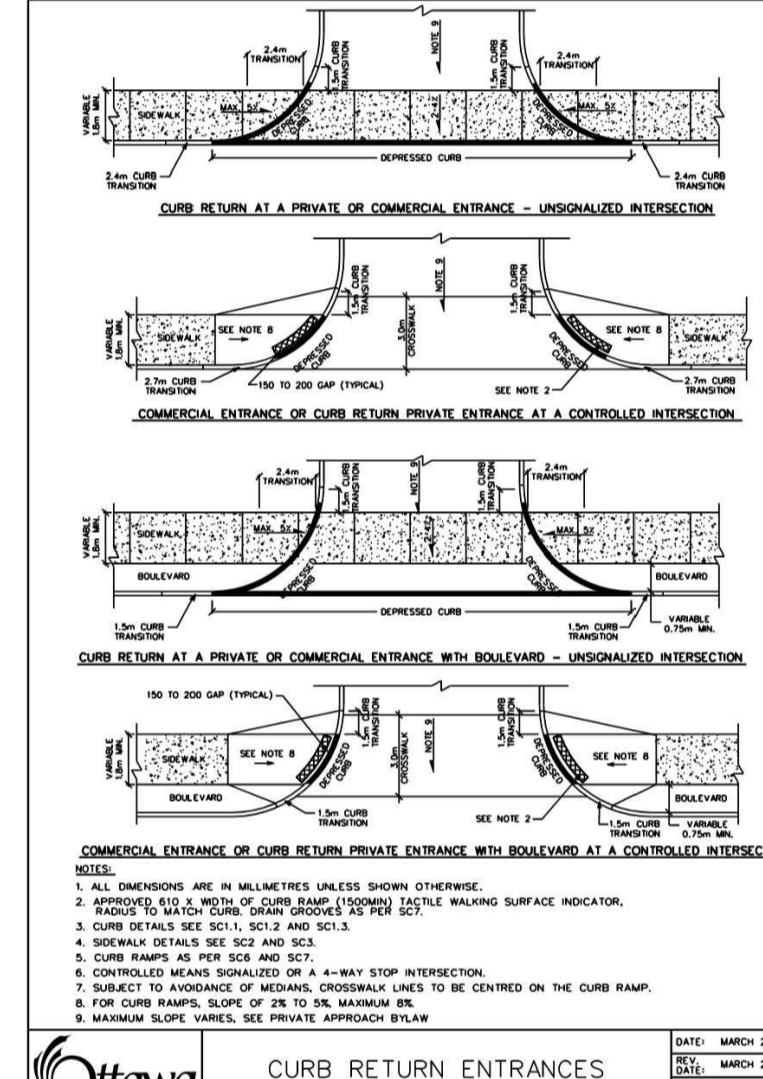
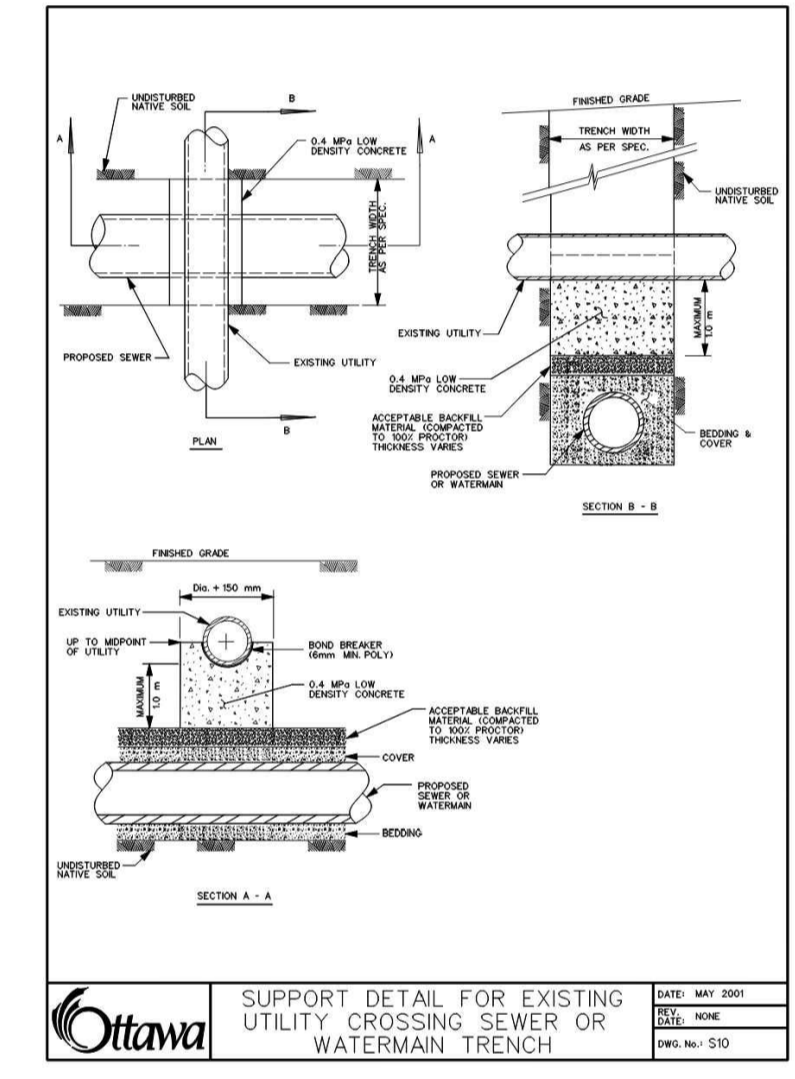
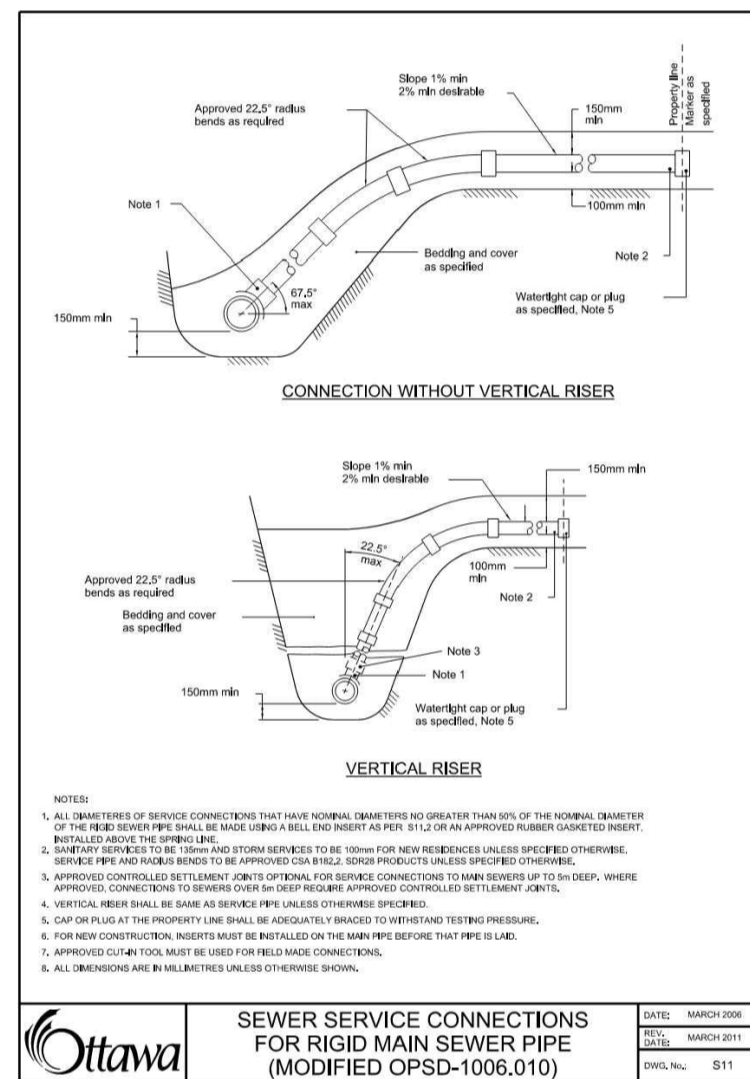
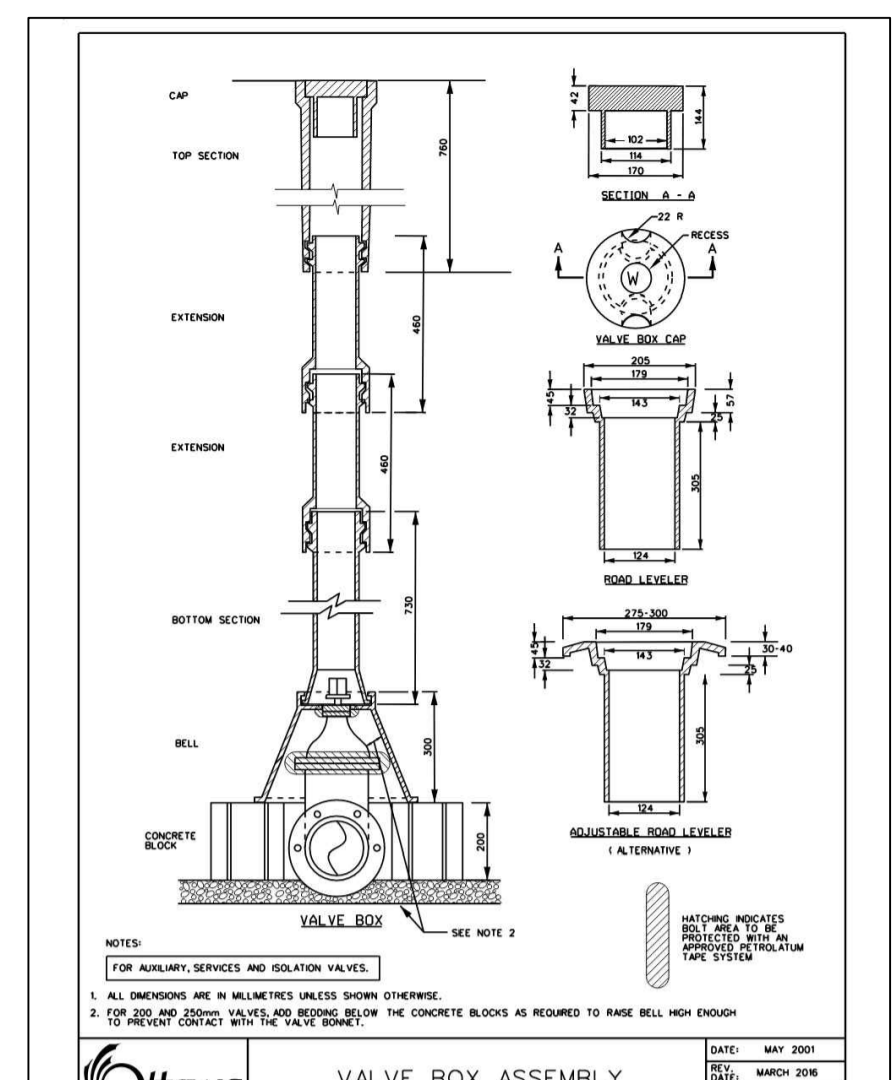
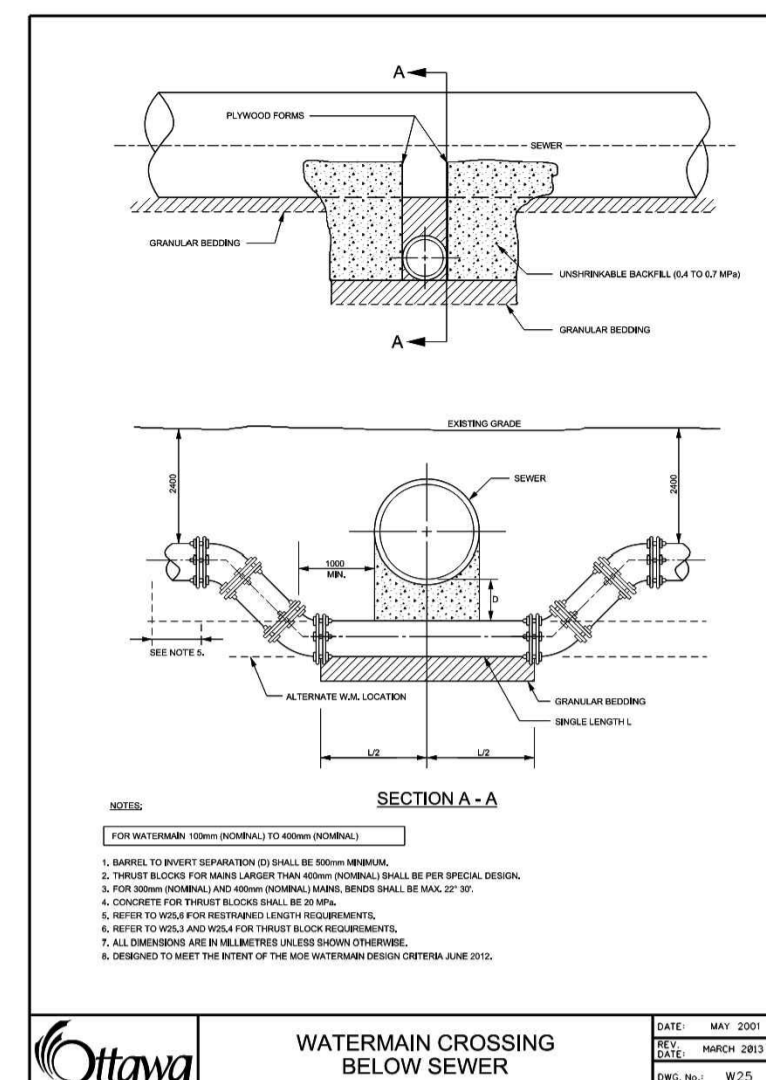
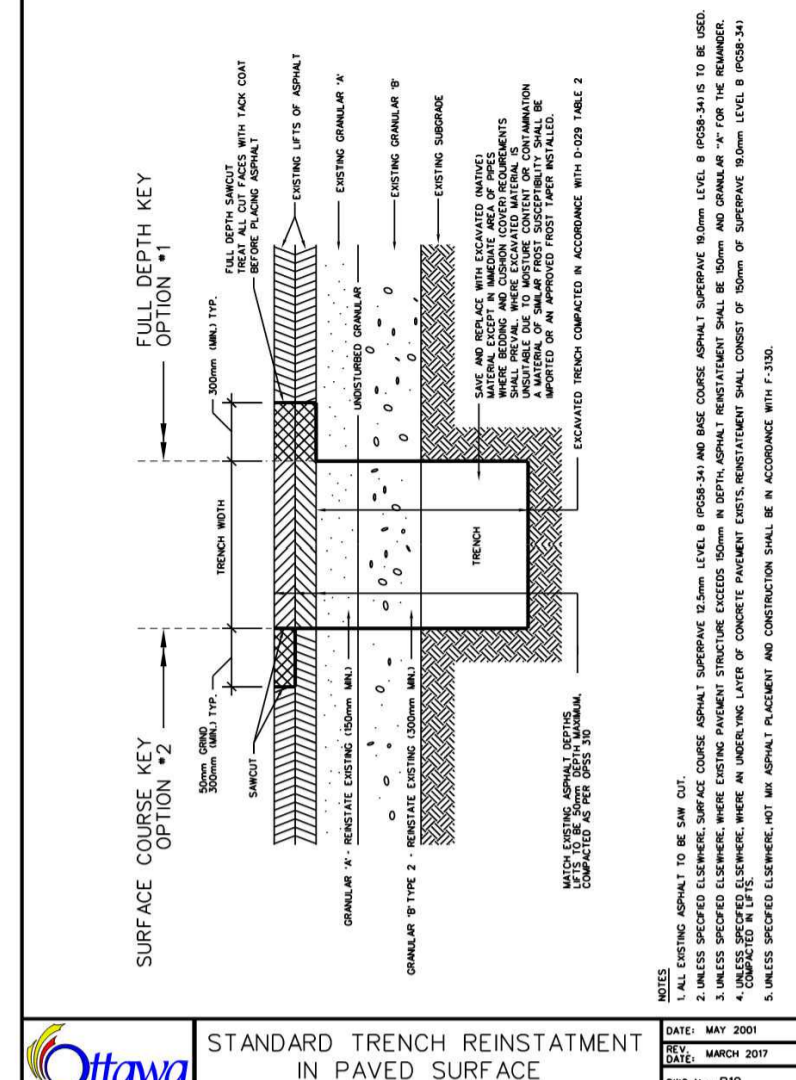
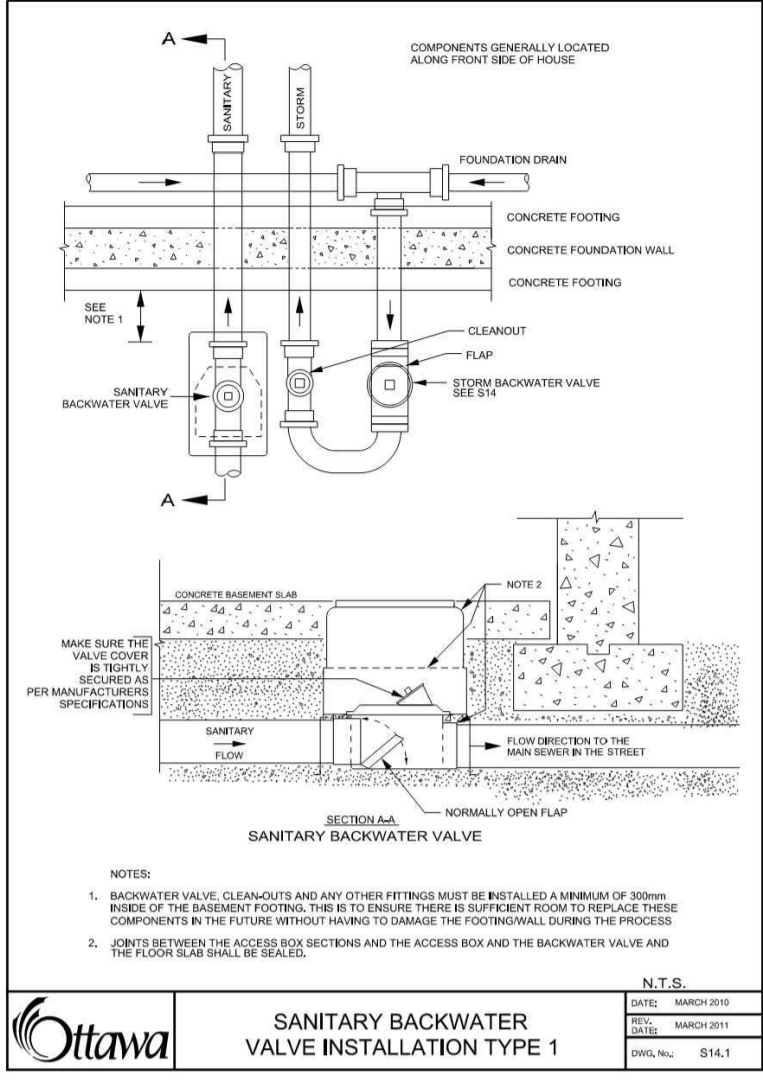
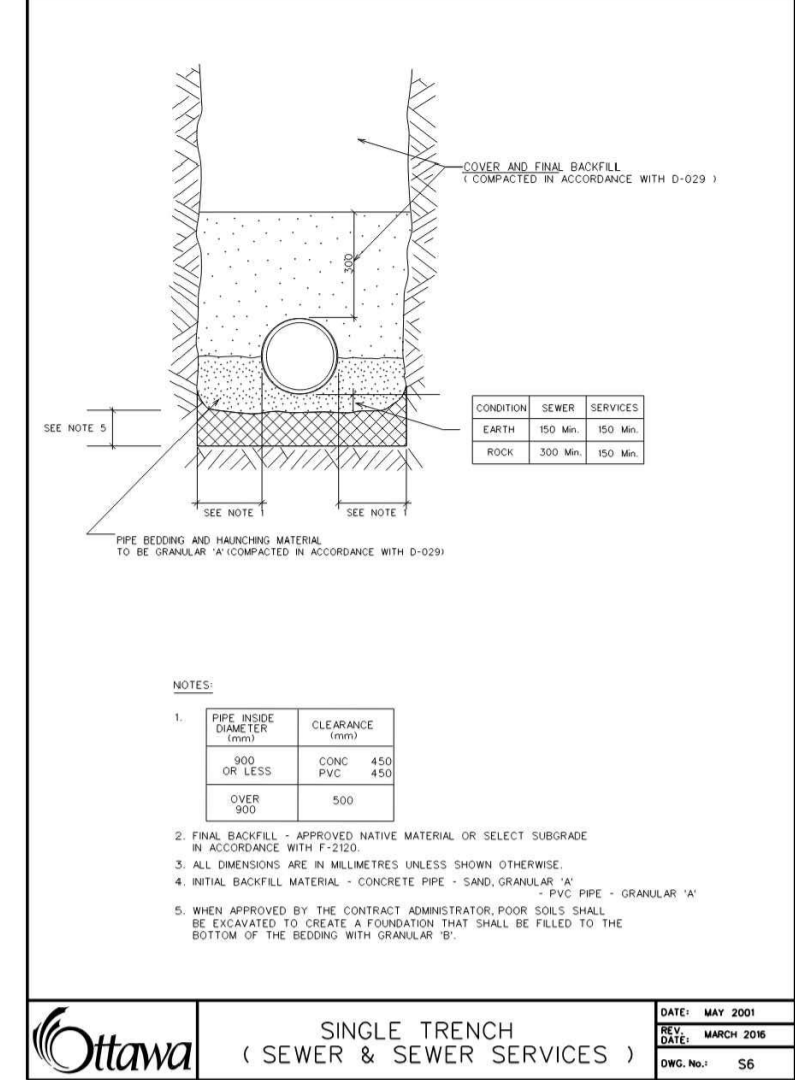
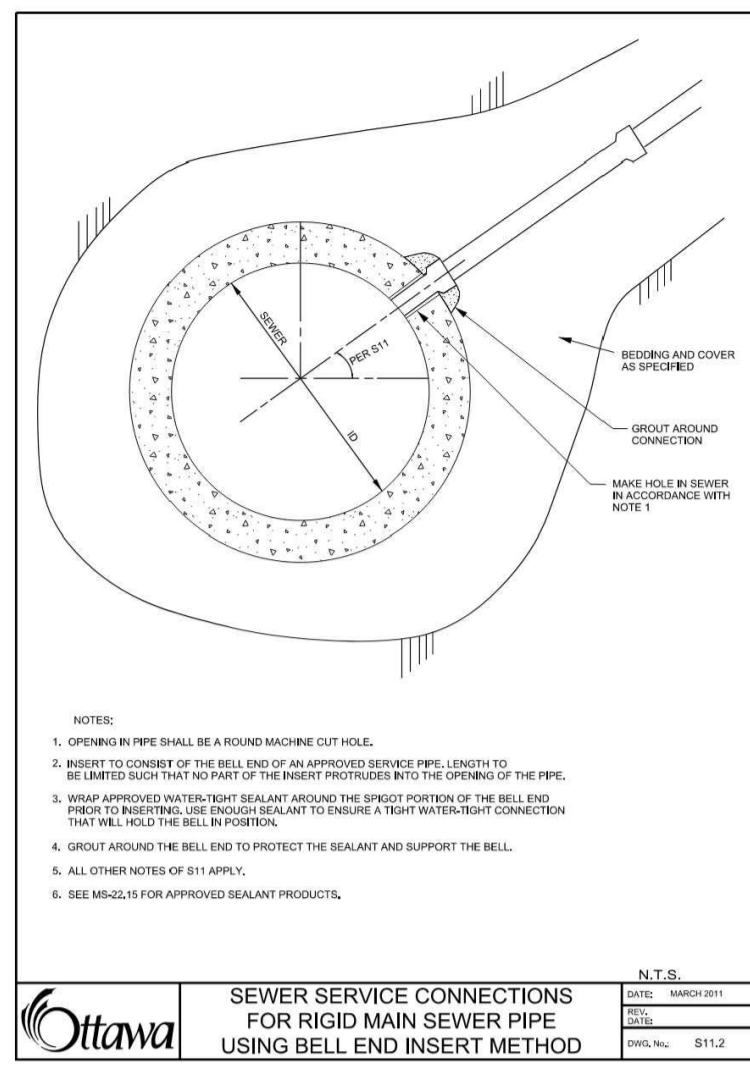
DESIGNED BY: T.H. DRAWN BY: T.H. APPROVED BY: V.J.

PROJECT: **PROPOSED 7-STORY CONDO RE-DEVELOPMENT 424 CHURCHILL AVE OTTAWA, ON**

DRAWING TITLE: **POST-DEVELOPMENT WATERSHED PLAN**

PROJECT NO. 220224
DATE: APRIL, 2023

C702



USE AND INTERPRETATION OF DRAWINGS

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CONTRACTOR TO VERIFY ALL DIMENSIONS AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES BEFORE WORK COMMENCES. DO NOT SIGN UNAUTHORIZED WORK.

No.	REVISIONS	BY	DATE
04	RE-ISSUED FOR APPROVAL	S.V.	16 JULY 2024
03	RE-ISSUED FOR APPROVAL	S.V.	03 MAY 2024
02	RE-ISSUED FOR APPROVAL	T.H.	14 APR 2023
01	ISSUED FOR APPROVAL	T.H.	11 OCT 2022

No. REVISIONS BY DATE

PROFESSIONAL ENGINEER
V. JOHNSON
 100510576
 07-18-2024
 PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

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 ENGINEERING | INGENIERIE
 5430 Canotek Road | Ottawa, ON, K1J 9G2
 www.lrl.ca | (613) 842-3434

CLIENT: **GSI PROPERTIES**

DESIGNED BY: T.H. DRAWN BY: T.H. APPROVED BY: V.J.

PROJECT: **PROPOSED 7-STORY CONDO RE-DEVELOPMENT 424 CHURCHILL AVE OTTAWA, ON**

DRAWING TITLE: **CONSTRUCTION DETAIL PLAN**

PROJECT NO: 220224
 DATE: APRIL, 2023

C901

#16789

APPENDIX F
Proposed Site Plan
Legal Survey
As-builts



SYMBOL & MATERIAL LEGEND :

- | | | | | | | |
|-----------------------------------------------|----------------------------------------------------|-----------------------------------------|--------------------------------------------|--------------------------------------------------|--------------------------------------|------------------------------------------------|
| BUILDING ENTRANCE | F.D.C. FIRE DEPT. CONNECTION, REFER TO MECHANICAL. | F.H. FIRE HYDRANT, REFER TO CIVIL. | TREE, REFER TO LANDSCAPE ARCHITECT | LANDSCAPE MATERIAL, REFER TO LANDSCAPE ARCHITECT | POURED CONCRETE | YELLOW DIAGONAL ROAD PAINT |
| ELEVATION MARKER, ### mm ABOVE FINISHED FLOOR | F.R. FIRE ROUTE SIGN, REFER TO CIVIL. | U.P. HYDRO UTILITY POLE, REFER TO HYDRO | T.S.P. TRAFFIC SIGNAL POLE, REFER TO CIVIL | GRASS, REFER TO LANDSCAPE ARCHITECT | PAVERS, REFER TO LANDSCAPE ARCHITECT | CONCRETE WALKWAY, REFER TO LANDSCAPE ARCHITECT |

CLIENT / OWNER :
GSI SLOUGH STREET PROPERTIES INC.
5145 SELECT AVE.
TORONTO, ON M1V 5M8
416-292-9920

LANDSCAPE ARCHITECT :
IBI GROUP
410 ALBERT STREET, SUITE 101
WATERLOO, ON N2L 3V3
519-585-2285

CONSULTING PLANNER :
FOIERN
396 COOPER STREET, SUITE 300
OTTAWA, ON K2P 2H7
613-730-5709

SURVEYOR :
ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
14 CONCORSE GATE, SUITE 500
OTTAWA, ON K2E 2T6
613-727-0850

ARCHITECT :
OPEN PLAN ARCHITECTS INC.
2305 HILLARY AVENUE,
OTTAWA, ON K1H 7J2
613-883-5090

NOISE, VIBRATION & WIND ENGINEER :
GRADIENT WIND ENGINEERING
127 WALGREEN ROAD,
OTTAWA, ON K0A 1L0
613-836-0934

STRUCTURAL ENGINEER :
D + M STRUCTURAL
333 PRESTON STREET, SUITE 110
OTTAWA, ON K2P 2H7
613-730-5709

TRANSPORTATION ENGINEER :
CASTLEGLLEN CONSULTANTS INC.
2460 LANCASTER ROAD,
OTTAWA, ON K1B 4S5
613-731-4022

MECHANICAL, ELECTRICAL & CIVIL ENGINEER :
LRL ENGINEERING
5430 CANOTEK ROAD,
OTTAWA, ON K1S 5N4
613-651-9490

rev / issue	description	date
02	ISSUED FOR CITY SITE PLAN COMMENTS	07 MAR. 2022
01	ISSUED FOR OPA, ZBA & SPC	20 OCT. 2022

THE ARCHITECT WAIVES ANY AND ALL RESPONSIBILITY AND LIABILITY FOR PROBLEMS WHICH ARISE FROM FAILURE TO FOLLOW THESE PLANS, SPECIFICATIONS, AND THE DESIGN INTENT THEY CONVEY, OR FOR PROBLEMS WHICH ARISE FROM OTHERS' FAILURE TO OBTAIN AND/OR FOLLOW THE ARCHITECT'S GUIDANCE WITH RESPECT TO ANY ERRORS, OMISSIONS, INCONSISTENCIES, AMBIGUITIES OR CONFLICTS WHICH ARE ALLEGED.

IT IS THE RESPONSIBILITY OF THE APPROPRIATE CONTRACTOR TO CHECK AND VERIFY ALL DIMENSIONS ON SITE AND PROMPTLY REPORT ALL ERRORS AND/OR OMISSIONS TO THE CONSULTANT BEFORE WORK COMMENCES.

ALL WORK IS TO FOLLOW THE OBC 2012 AND ANY OTHER APPLICABLE CODES AND REGULATIONS.

DO NOT SCALE DRAWINGS.

THESE DRAWINGS ARE NOT TO BE USED FOR CONSTRUCTION UNLESS A BUILDING PERMIT IN RESPECT OF THIS PROJECT HAS BEEN GRANTED BY AUTHORITIES AND THEY ARE ISSUED FOR CONSTRUCTION.

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professional stamp

project north

Kristopher D. Benes, OAA, MRAIC, LEED AP

OPA open plan architects inc.
architecture | interiors | concepts

2305 HILLARY AVE. | OTTAWA | ON | K1H 7J2
613.883.5090 | info@openplan.ca

project

**424 CHURCHILL AVE N.,
APARTMENT BUILDING**

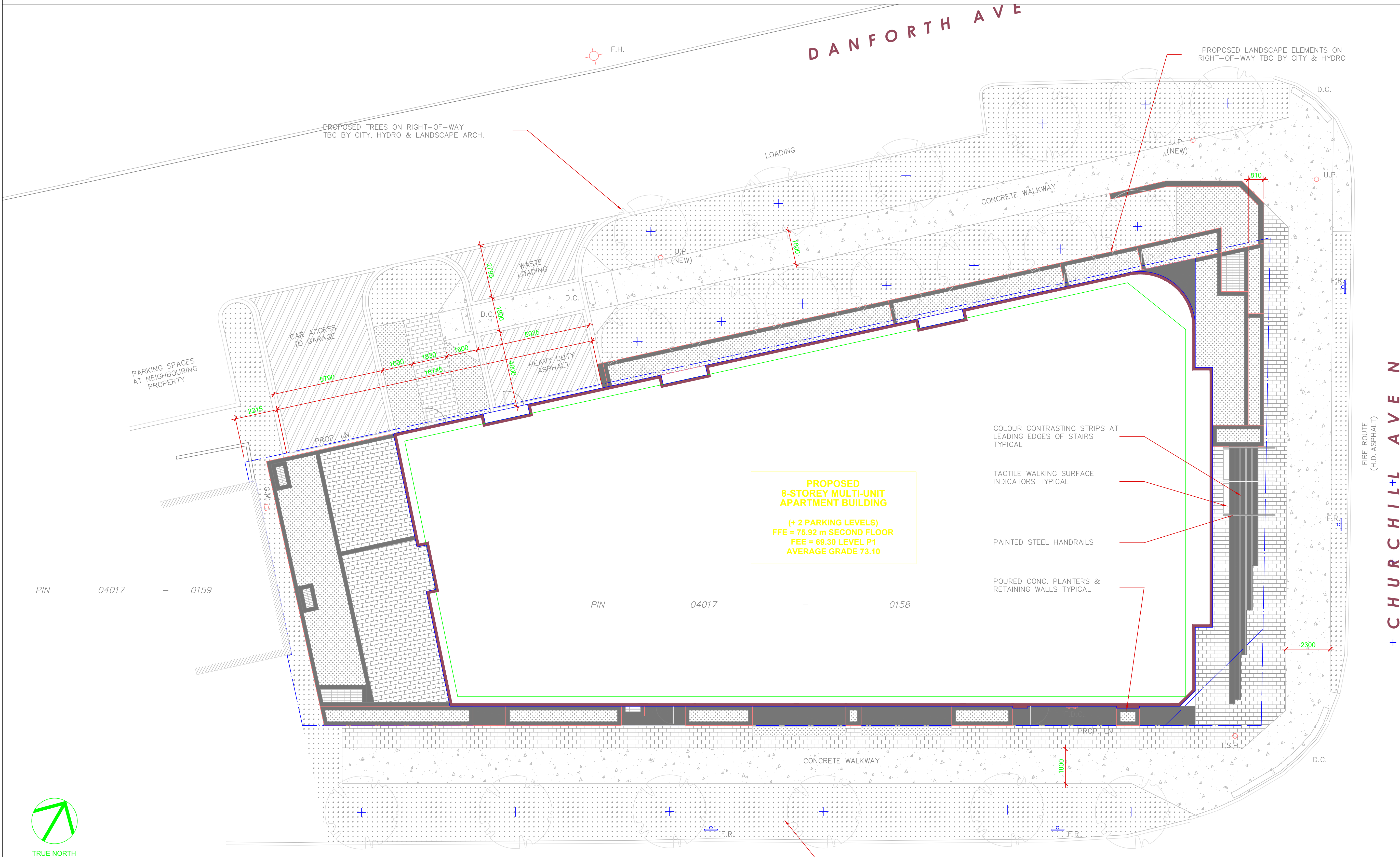
drawing

**SITE PLAN -
WALKWAYS & LANDSCAPING**

drawn	KDB	date	2022-JAN-06
approved	KDB	revision	0
project no.	2109	scale	1:100
drawing no.			

A003

18881



TRUE NORTH

SCALE: 1:100

SURVEY INFORMATION TAKEN FROM SURVEY PREPARED BY ANNIS O'SULLIVAN VOLLEBEKK LTD., DATED DECEMBER 9, 2021, (AMENDED JULY 12, 2022) PROJECT NO. 17926, REFERENCE NO. 22329-21

1 SITE PLAN
A003 1:100

+ CHURCHILL AVE N

FIRE ROUTE (H.D. ASPHALT)

BYRON AVE

DANFORTH AVE

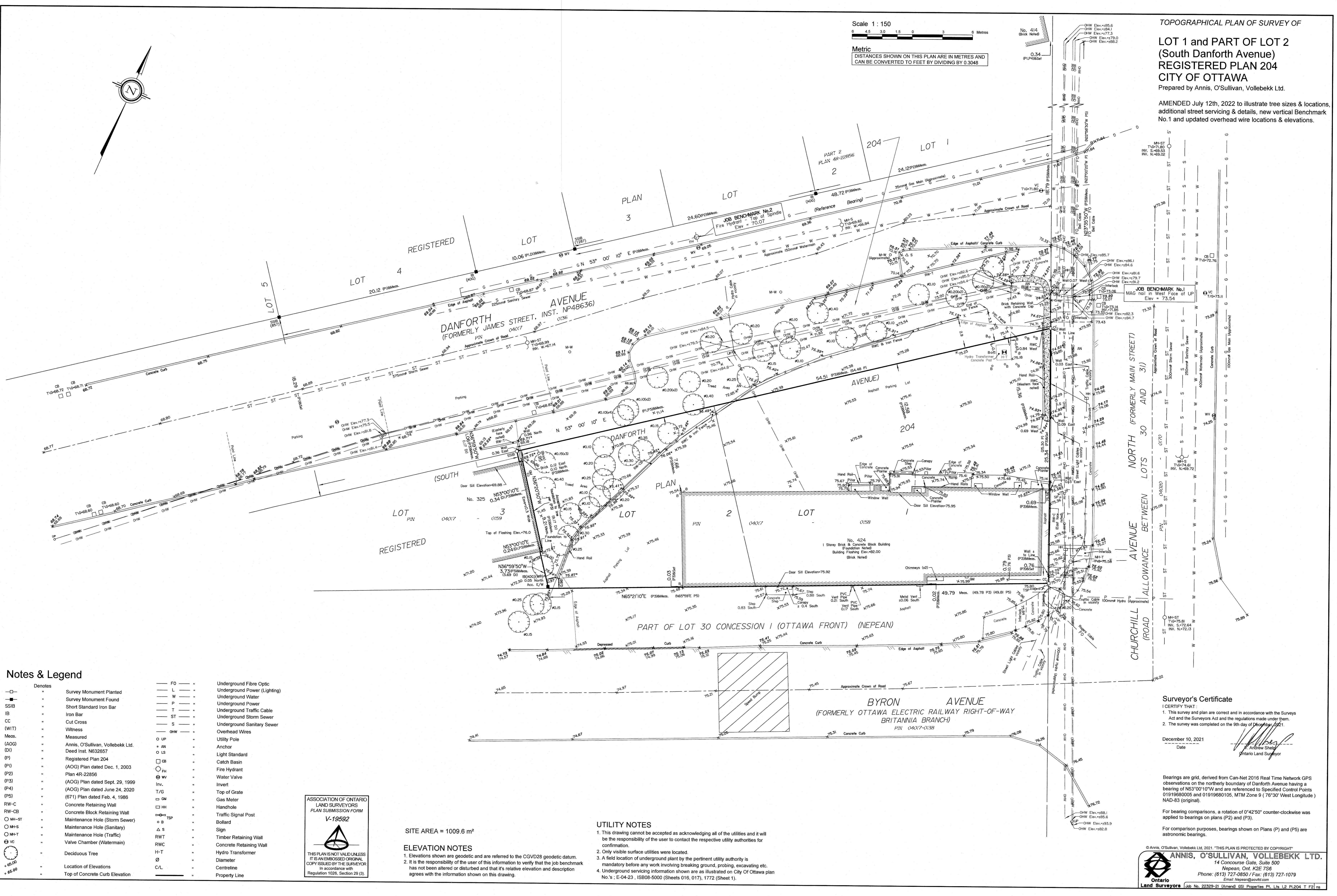
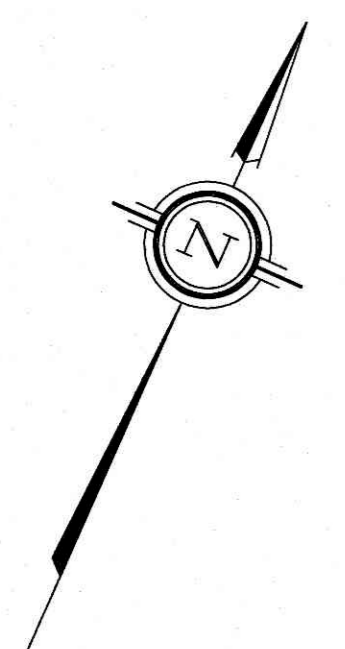
D07-12-22-0152

LOT 1 and PART OF LOT 2 (South Danforth Avenue) REGISTERED PLAN 204 CITY OF OTTAWA

Prepared by Annis, O'Sullivan, Vollebek Ltd.

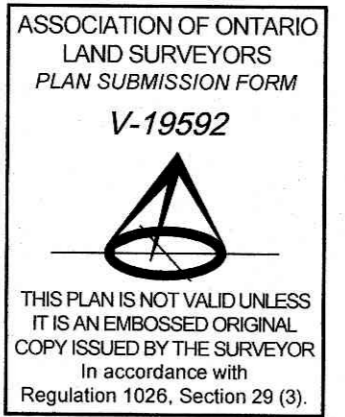
AMENDED July 12th, 2022 to illustrate tree sizes & locations, additional street servicing & details, new vertical Benchmark No. 1 and updated overhead wire locations & elevations.

Scale 1:150 Metric DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048



- Notes & Legend
Denotes
Survey Monument Planted
Survey Monument Found
Short Standard Iron Bar
Iron Bar
Cut Cross
Witness
Measured
Annis, O'Sullivan, Vollebek Ltd.
Registered Plan 204
(AOG) Plan dated Dec. 1, 2003
Plan 4R-22856
(AOG) Plan dated Sept. 29, 1999
(AOG) Plan dated June 24, 2020
(671) Plan dated Feb. 4, 1986
Concrete Retaining Wall
Concrete Block Retaining Wall
Maintenance Hole (Storm Sewer)
Maintenance Hole (Sanitary)
Maintenance Hole (Traffic)
Valve Chamber (Watermain)
Deciduous Tree
Location of Elevations
Top of Concrete Curb Elevation

- FG - Underground Fibre Optic
L - Underground Power (Lighting)
W - Underground Water
P - Underground Power
T - Underground Traffic Cable
ST - Underground Storm Sewer
S - Underground Sanitary Sewer
OHW - Overhead Wires
UP - Utility Pole
AN - Anchor
LS - Light Standard
CB - Catch Basin
FH - Fire Hydrant
WV - Water Valve
Inv. - Invert
T/G - Top of Grate
GM - Gas Meter
HH - Handhole
TSP - Traffic Signal Post
B - Bollard
S - Sign
RWT - Timber Retaining Wall
RWC - Concrete Retaining Wall
H-T - Hydro Transformer
D - Diameter
C/L - Centreline
Property Line



SITE AREA = 1009.6 m²

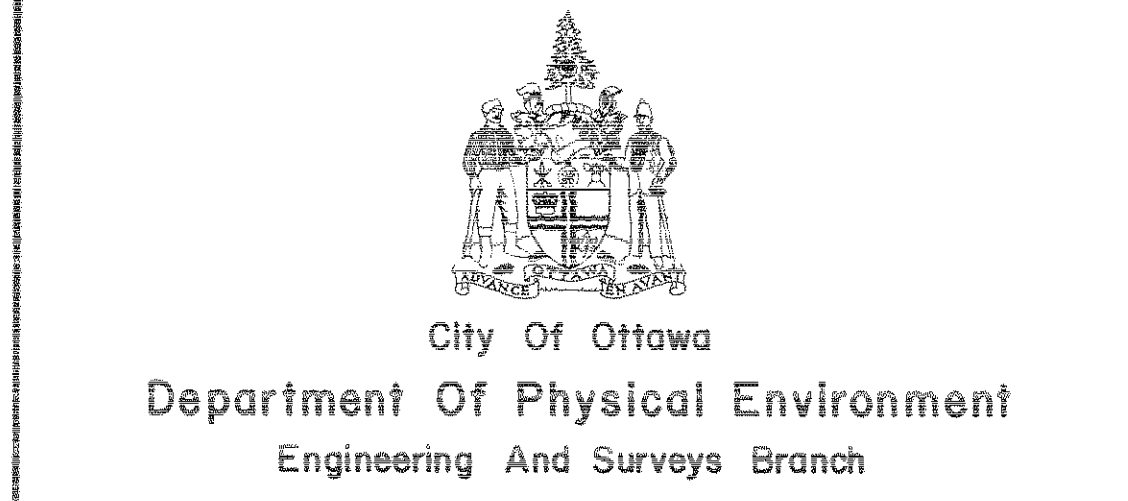
ELEVATION NOTES
1. Elevations shown are geodetic and are referred to the CGVD28 geodetic datum.
2. It is the responsibility of the user of this information to verify that the job benchmark has not been altered or disturbed and that its relative elevation and description agrees with the information shown on this drawing.

UTILITY NOTES
1. This drawing cannot be accepted as acknowledging all of the utilities and it will be the responsibility of the user to contact the respective utility authorities for confirmation.
2. Only visible surface utilities were located.
3. A field location of underground plant by the pertinent utility authority is mandatory before any work involving breaking ground, probing, excavating etc.
4. Underground servicing information shown are as illustrated on City of Ottawa plan No.'s: E-04-23, ISB08-5000 (Sheets 016, 017), 1772 (Sheet 1).

Surveyor's Certificate
I CERTIFY THAT:
1. This survey and plan are correct and in accordance with the Surveys Act and the Surveyors Act and the regulations made under them.
2. The survey was completed on the 9th day of December, 2021.
December 10, 2021
Date
Andrew Sheld
Ontario Land Surveyor

ANIS, O'SULLIVAN, VOLLEBEK LTD.
14 Concourse Gate, Suite 500
Nepean, Ont. K2E 7S6
Phone: (613) 727-0850 / Fax: (613) 727-1079
Email: nepean@anniso.com

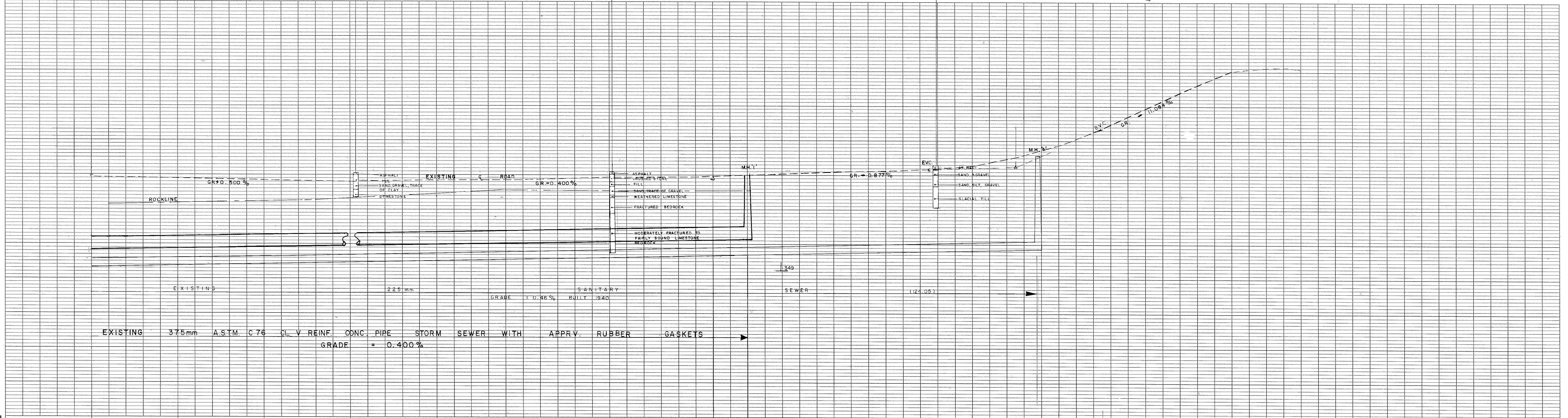
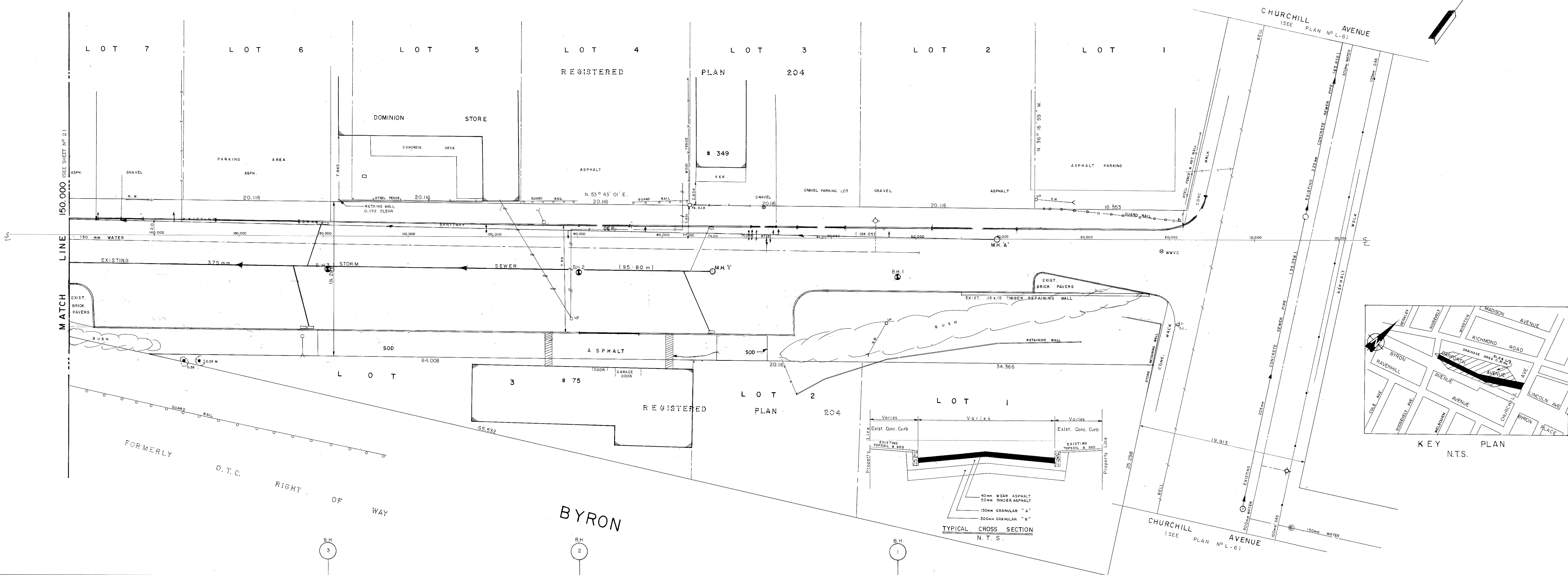
DANFORTH AVENUE



Notes:
 - Utilities shown are taken from best available records. Contractor is requested to check with all utility companies before digging.
 - Soil information shown is not guaranteed and contractors are advised to collect additional soil information as deemed necessary.
 - Reference bench mark: N-12 Fire Station, Churchill Ave.
 - Note: Change 0.00 Imperial in Book 3840 has been altered to 10.00 meters on Plan 1772 also in book 3840.

Notes (Sewer Construction Only)
 - A minimum of 450 mm vertical clearance to be maintained between sewers and watermains where practical.
 - Borehole soil descriptions are not based on sieve analysis but on visual inspection only, except where otherwise noted.
 - Soil information taken from GOLDER Associates May 1993.
 - Date of television inspection: **March 5, 1994**
 - This plan supersedes (in whole or in part) plan 100-425.
 - Actual rock line recorded during construction of existing Storm Sewer.
 - Registered plan no. 204

- Proposed storm and sanitary sewers may be constructed in a common trench provided that a minimum horizontal distance of 460mm is maintained between outside barrels of pipe.



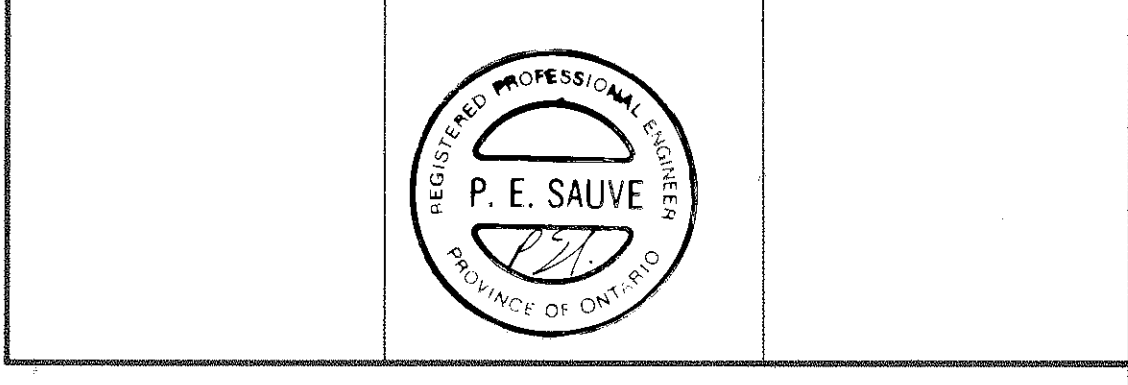
Legend:

EXISTING	PROPOSED
STORM SEWER	--- ---
SANITARY SEWER	--- ---
STREET LINE	--- ---
LOT LINE	--- ---
ROADS & DRIVEWAYS	--- ---
Curb	--- ---
Asphalt or Concrete	--- ---
Surface Treated	--- ---
WALKS	--- ---
Concrete or Asphalt	--- ---
Grass/Gravel or Dirt	--- ---
DEPRESSED ACCESS	--- ---
On Curb	--- ---
On Sidewalk	--- ---
WATERMAIN	--- ---
GASMAIN & VALVE	--- ---
BELL	--- ---
HYDRANT	--- ---
FIRE ALARM	--- ---
CABLEVISION	--- ---
STEAM LINE	--- ---
HYDRANT	--- ---
WATER VALVE	--- ---
STAND PIPE	--- ---
WATER VALVE CHAMBER	--- ---
SEWER TRAFFIC HYDRO BELL MANHOLE/STORM BELL/STREET LIGHT	--- ---
TRAFFIC HANDHOLE	--- ---
GUARD RAIL	--- ---
RETAINING WALL	--- ---
FENCE	--- ---
HYDRO POLE	--- ---
HYDRO POLE & LIGHT	--- ---
BELL POLE	--- ---
TRAFFIC LIGHT	--- ---
LIGHT STANDARD	--- ---
TRAFFIC SIGN	--- ---
STREET SIGN	--- ---
CULVERT & DITCH	--- ---
STANDARD CATCH BASIN & LEAD	--- ---
HEAVY DUTY CATCH BASIN & LEAD	--- ---
CATCH BASIN TO BE REMOVED & REPLACED WITH STANDARD C.B.	--- ---
HEAVY DUTY CATCH BASIN TO BE REMOVED & REPLACED WITH HEAVY DUTY CATCH BASIN	--- ---
HOUSE or CATCH BASIN CONNECTION TAKEN FROM T.V. INSPECTION	--- ---
HOUSE or CATCH BASIN CONNECTION TAKEN FROM RECORDS	--- ---
RELOCATION	--- ---
REMOVAL	--- ---
SQUARE IRON BAR	--- ---
STANDARD IRON BAR	--- ---
ROUND IRON BAR	--- ---
TREE, SHRUB & HEDGE	--- ---
BOREHOLE	--- ---
ROCK	--- ---

Revisions:

No	Date	Description	Drawn By	Appr'd By
1	JUNE 27/84	Street Alignment	D.M.	P.Sauve

Stations ON S	Existing Surface Elevation	Existing North Gutter	Existing Road	Existing South Gutter	Type & Diameter (sewer)	Inverts Exist & Prop. (sewer)
150.000	68.819	68.819	68.819	68.722		
140.000	68.863	68.863	68.844	68.878		
130.000	68.827	68.827	68.844	68.878		
120.000	68.827	68.827	68.844	68.878		
110.000	68.827	68.827	68.844	68.878		
100.000	68.827	68.827	68.844	68.878		
90.000	68.827	68.827	68.844	68.878		
80.000	68.827	68.827	68.844	68.878		
70.000	68.827	68.827	68.844	68.878		
60.000	68.827	68.827	68.844	68.878		
50.000	68.827	68.827	68.844	68.878		
40.000	68.827	68.827	68.844	68.878		
30.000	68.827	68.827	68.844	68.878		
20.000	68.827	68.827	68.844	68.878		
10.000	68.827	68.827	68.844	68.878		
0.000	68.827	68.827	68.844	68.878		



Designed By: *W.C. MacDonald* Date: *Jan. 83* Structural Check By: *R. St. Germain* Date: *Jan. 83*
 Survey Drawn By: *D.A. McEwan* Date: *Jan. 83* Checked By: *R. St. Germain* Date: *Jan. 83*
 Drafting By: *D.A. McEwan* Date: *Jan. 83* Checked By: *R. St. Germain* Date: *Jan. 83*

Final Measurements:

Construction Type	Inspector	Contractor
ROAD & SEWER	K. ROBERTS	BEAVER ASPH. CONTR.

Work Commenced: OCT. 84 Instrumentman: D. BROWN
 Work Completed: JUNE 85 Field Book #: 4437
 Designer: W.T. CARDO Date: DEC. 12/84
 Drafting Revisions: BLR (T.E.S.) ✓ B.G. Checked By:

Design And Construction Division

C. Sim P. Eng. D.K. Donaldson P. Eng.
 English Director

STORM SEWER CONSTRUCTION AND ROAD RECONSTRUCTION WITH CURBS DANFORTH AVE
 CHURCHILL AVENUE TO CH. 150.000

Control No: 83-21 Survey Book: 3840-4239 Scale: HOR. 1 = 200 VERT. 1 = 50
 Sheet: 1 of 2

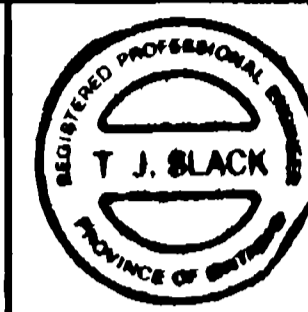


**Regional Municipality
of
Ottawa-Carleton
Works Department**

R O PICKARD
Works Commissioner

Engineer in Charge of
Design & Construction

Date
15/6/84



Project Office: *Matthew Slack, P. Eng.* Date: *June 15, 1984*

Drawn by: M H M Date: JUNE/84

Approved by: Date:

Notes
"WATERMANS AND SERVICE CONNECTIONS TO RECEIVE FROST PROTECTION AS REQUIRED, PER R.M.O.C. STANDARDS AND SPECIFICATIONS"

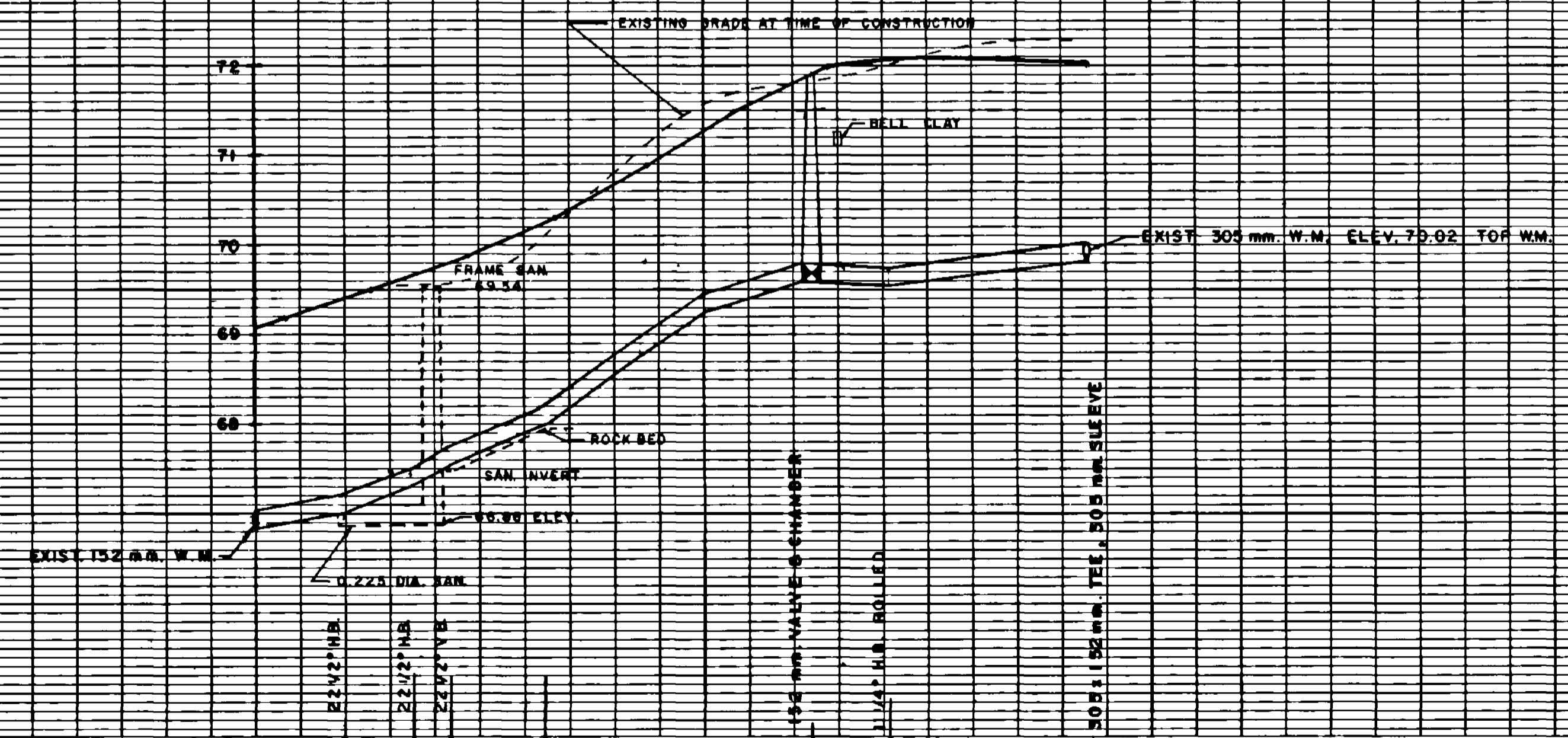
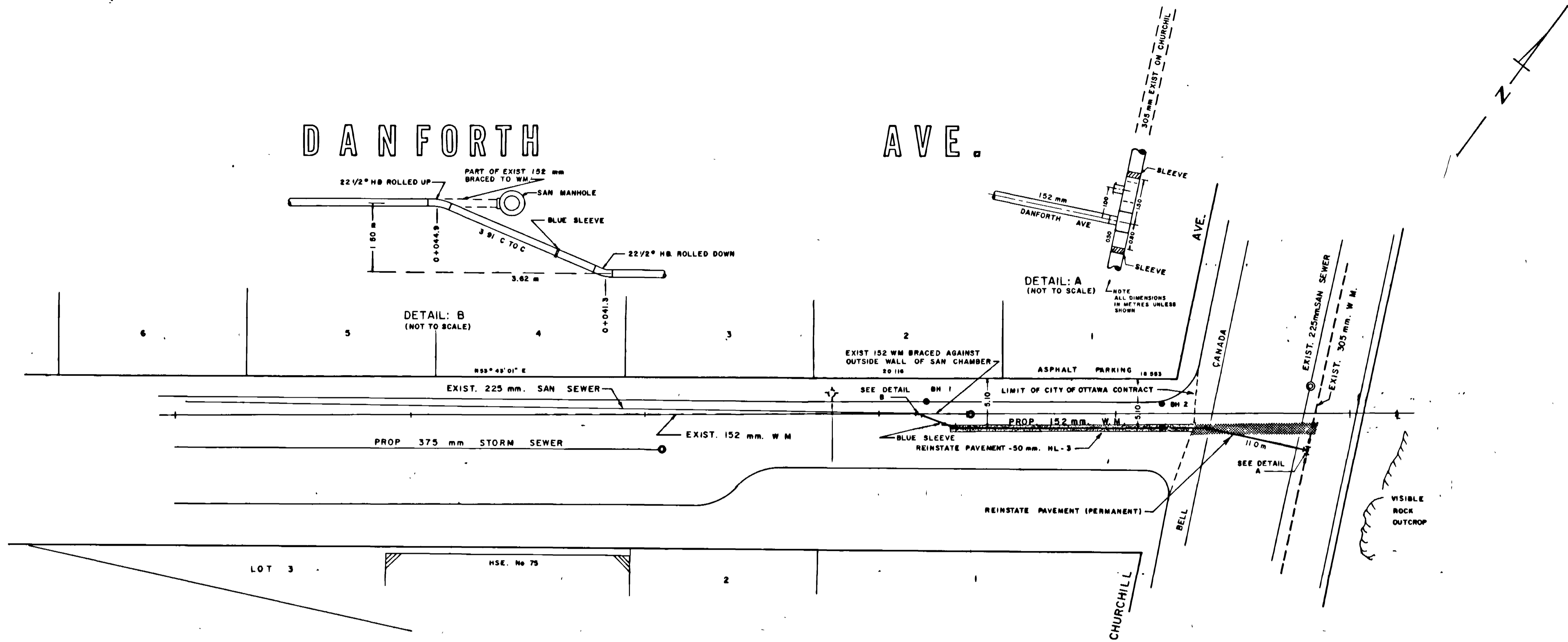
Scales
HOR: 1 - 250
VERT: 1 - 50

REVISIONS
"AS BUILT" FROM FIELD BOOK NO 660 & FIELD PRINT *OK* JAN./85 R.M.

Project Title
**DANFORTH AVE,
CHURCHILL AVE. - to
50 m. WEST.**

Drawing No.: **3117** Sheet

DANFORTH AVE.



+048	69.29	PROPOSED E OF ROAD
+044.9	67.20	TOP OF WATERMAIN
+043	67.48	STATIONS
+041.3	67.66	
+039.10	67.7	
+038	68.17	
+034	70.38	
+033	70.93	
+028.3	69.44	
+025	69.79	
+023	71.49	
+019.0	69.74	
+018	72.04	
+014.5	70.02	
0.00		

TITLE FRAME: 70mm x 53mm City of Ottawa 2008

**CHURCHILL AVENUE
REHABILITATION
SCOTT STREET TO BYRON AVENUE**



**CHURCHILL
PLAN AND PROFILE
10+300 TO 10+450**

Contract No. ISB08-5000 Dwg. No. 016
Sheet 16 of 55

Asset No. _____
Asset Group: ISB

Des: NTO Chkd: ERD
Dwn: RCH Chkd: DHI

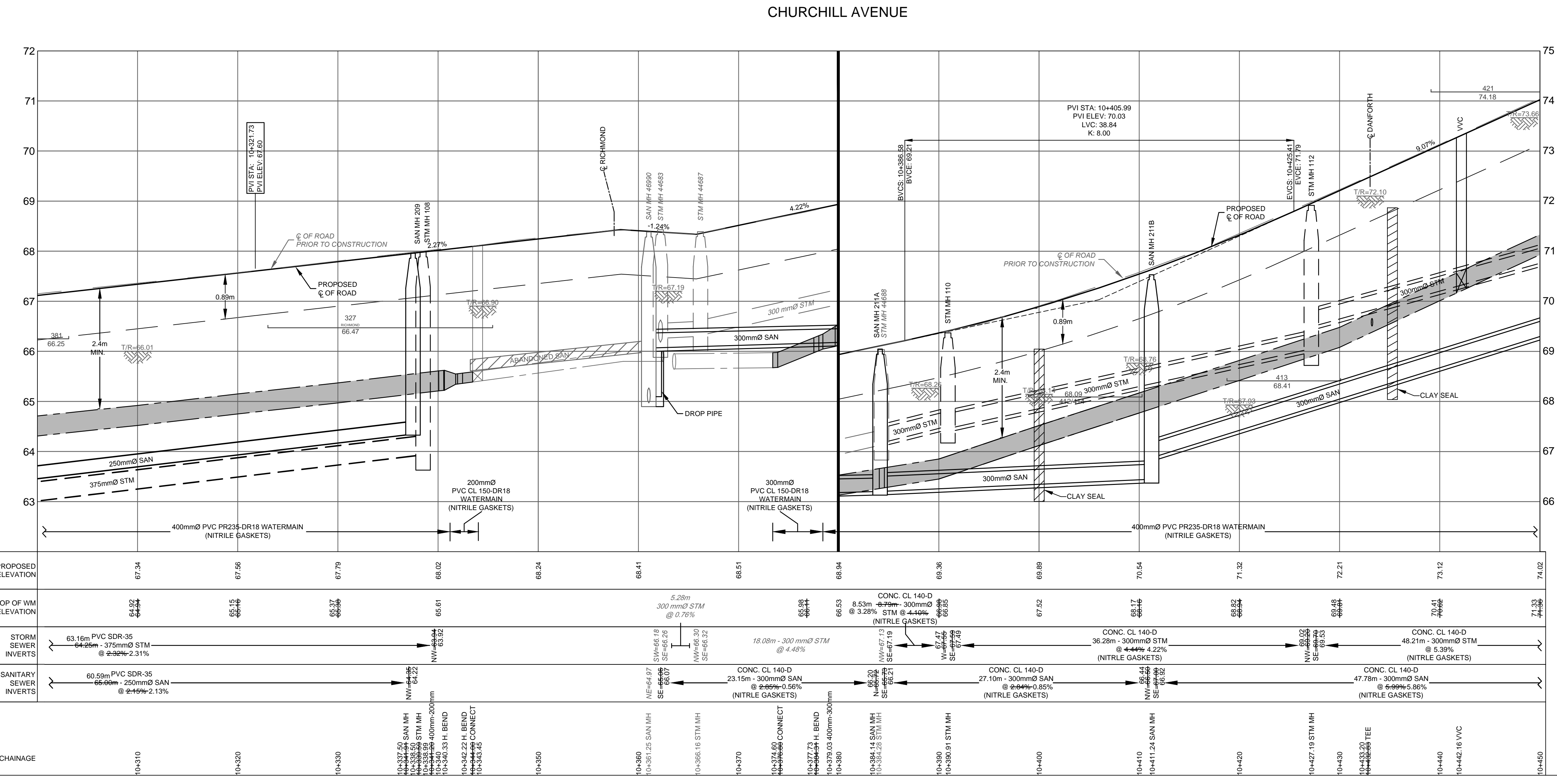
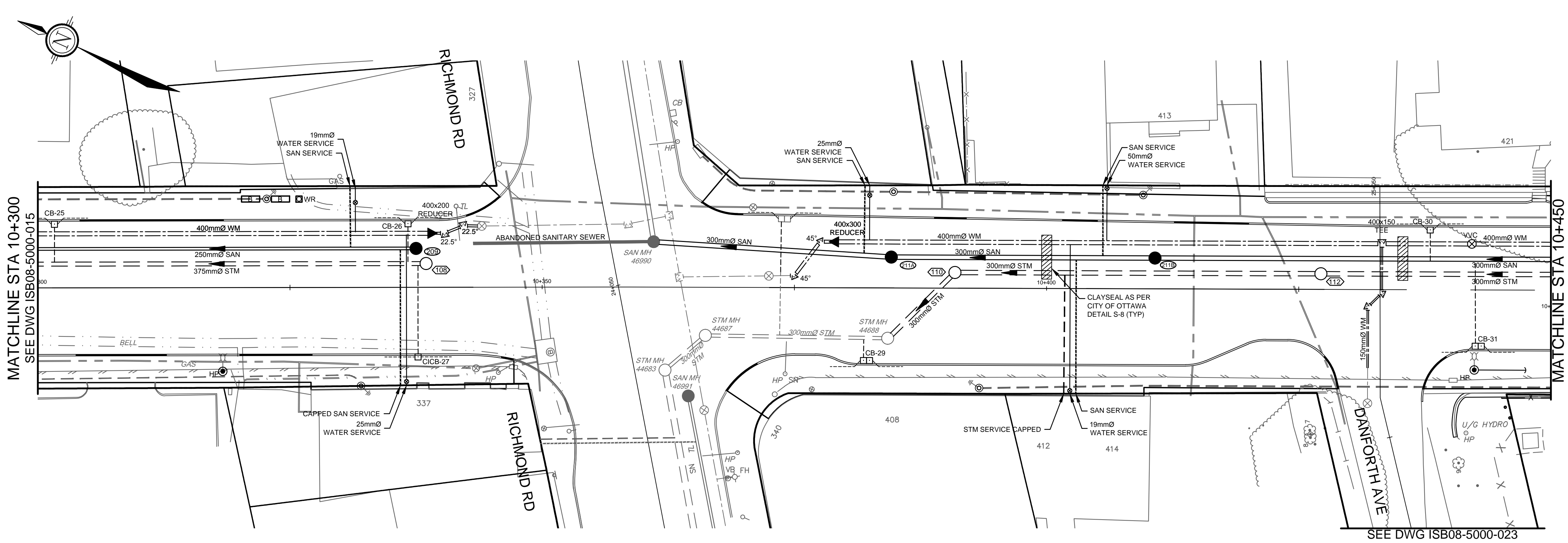
Utility Circ. No.: _____
Const. Inspector: _____

Scale: HORIZONTAL 1:50
VERTICAL 1:20

NOTE:
The location of utilities is approximate only, the exact location should be determined by consulting the municipal authorities and utility companies concerned. The contractor shall prove the location of utilities and shall be responsible for adequate protection from damage.



No.	Description	By	Date
1.	ISSUED FOR PRELIMINARY DESIGN CIRCULATION	ERD	07/10/09
2.	ISSUED FOR MOE APPROVAL	ERD	07/24/09
3.	ISSUED FOR TENDER	ERD	11/06/09
4.	ISSUED FOR DESIGN CIRCULATION	ERD	11/06/09
5.	ISSUED FOR CONSTRUCTION	ERD	03/09/10
6.	REVISED PROFILE	ERD	08/19/10
7.	AS-BUILT	ERD	04/12/12



CATCH BASIN DATA

NO.	STATION	OFFSET	COVER	STRUCTURE	ELEVATION	
					GUTTER	LOW INV.
CB 25	10+301.65	6.80 LT	S19	OPSD 705 010	67.02	65.62
CB 26	10+336.71	6.80 LT	S19	OPSD 705 010	67.81	66.41
CB 27	10+337.69	6.80 RT	S22/S23	OPSD 705 010	67.89	66.49
CB 28	10+373.95	7.11 LT	S19	OPSD 705 020	68.59	67.19
CB 29	10+382.17	7.50 RT	S19	OPSD 705 020	68.96	67.56
CB 30	10+438.02	6.22 LT	S19	OPSD 705 010	72.8	71.4
CB 31	10+442.81	5.88 RT	S19	OPSD 705 020	73.25	71.85

OFFSETS ARE FROM CONTROL LINE TO FACE OF CURB FOR ALL CATCH BASINS

CATCH BASIN CONNECTION

LOCATION	DIA. (mm)	TYPE	LENGTH (m)	INVERT ELEVATIONS	
				UPSTR.	DOWNSTR.
CB 25 - PIPE	200	PVC SDR35	3.80	65.62	63.44
CB 26 - PIPE	200	PVC SDR35	3.80	66.41	64.25
CB 27 - PIPE	200	PVC SDR35	9.35	66.49	64.25
CB 28 - PIPE	200	PVC SDR35	11.53	67.19	66.97
CB 29 - PIPE	200	PVC SDR35	2.09	67.56	67.34
CB 30 - PIPE	200	PVC SDR35	4.22	71.40	70.58
CB 31 - PIPE	200	PVC SDR35	6.98	71.85	70.84

* DOWNSTREAM ELEVATIONS SHOWN ARE AT THE OVERT OF THE STORM SEWER (MIN. GRADE 1% FOR ALL STORM SEWER CONNECTIONS)

SANITARY MAINTENANCE HOLE DATA

NO.	STATION	OFFSET	COVER	STRUCTURE	ELEVATION	
					T/GRADE	LOW INV.
SAN MH209	10+337.50	3.85 LT	S24	OPSD 701 010	67.98	64.36
SAN MH211A	10+384.14	3.05 LT	S24	OPSD 701 010	69.05	66.72
SAN MH211B	10+411.24	3.05 LT	S24	OPSD 701 010	70.53	66.56

OFFSETS ARE FROM CONTROL LINE TO CENTRE OF STRUCTURE
STATIONS AND T/GRADE ELEVATIONS ARE FROM THE CENTRE OF STRUCTURE
* FRAME TO BE SELF-LEVELING BY MEULLER AJ745 OR BIBBY C54M

STORM MAINTENANCE HOLE DATA

NO.	STATION	OFFSET	COVER	STRUCTURE	ELEVATION	
					T/GRADE	LOW INV.
STM MH108	10+338.50	2.35 LT	S24.1	OPSD 701 010	67.96	63.94
STM MH110	10+390.91	1.55 LT	S24.1	OPSD 701 010	69.37	67.55
STM MH112	10+427.19	1.55 LT	S24.1	OPSD 701 010	71.91	69.29

OFFSETS ARE FROM CONTROL LINE TO CENTRE OF STRUCTURE
STATIONS AND T/GRADE ELEVATIONS ARE FROM THE CENTRE OF STRUCTURE
* FRAME TO BE SELF-LEVELING BY MEULLER AJ745 OR BIBBY C54M

SANITARY SEWER DATA

SEWER	FROM	TO	DIA.	LENGTH (m)	TYPE	INVERT ELEVATIONS	
						UP STR.	DOWN STR.
SAN 209	SAN 207	250	65.66	65.66	PVC SDR-35	64.36	62.96
SAN 211A	EX. MH	300	23.15	67.72	CONC CL 140-D	67.72	65.06
SAN 211B	SAN 211A	300	27.10	66.59	CONC CL 140-D	66.59	65.73
SAN 213	SAN 211B	300	47.78	68.72	CONC CL 140-D	68.72	67.06

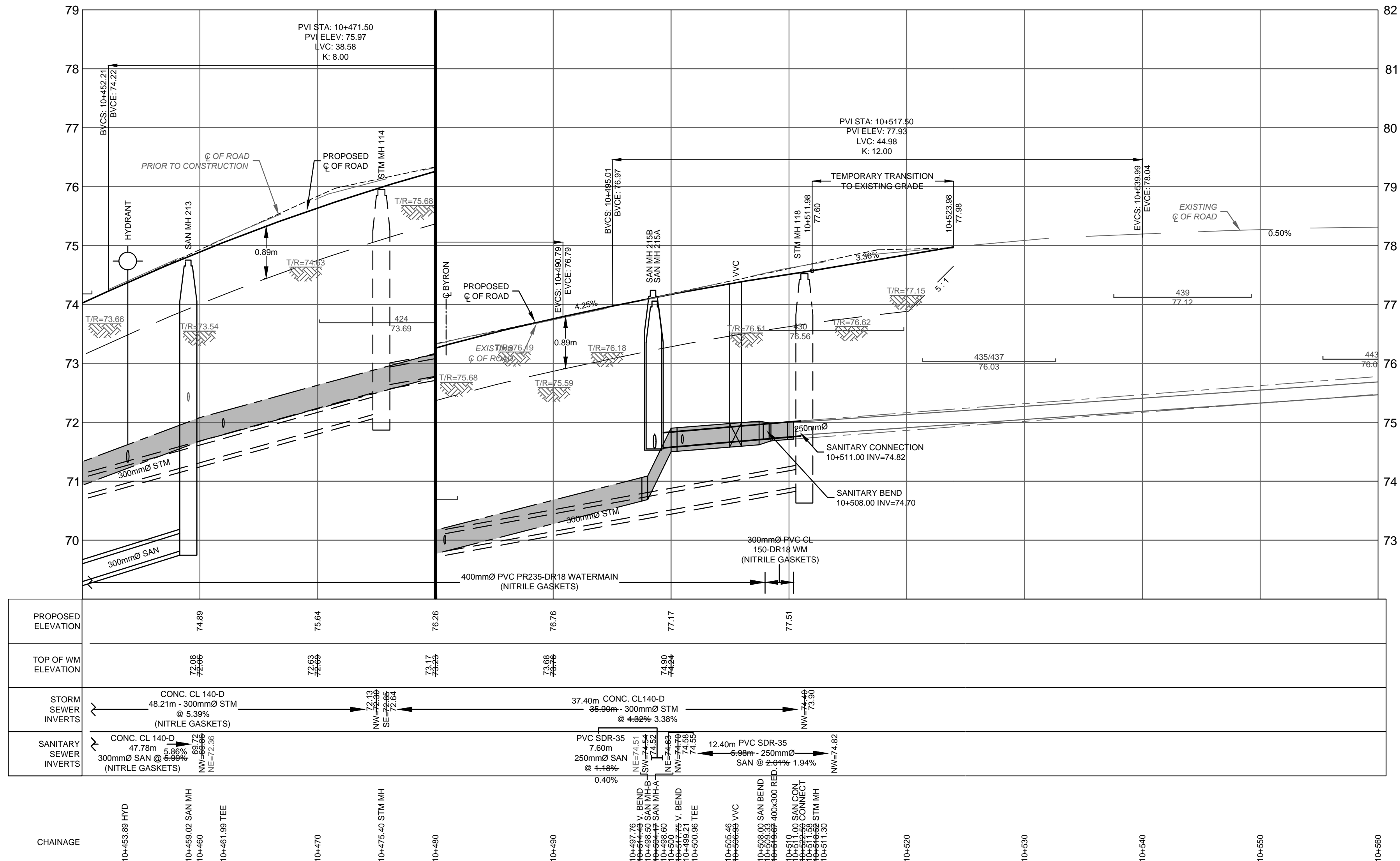
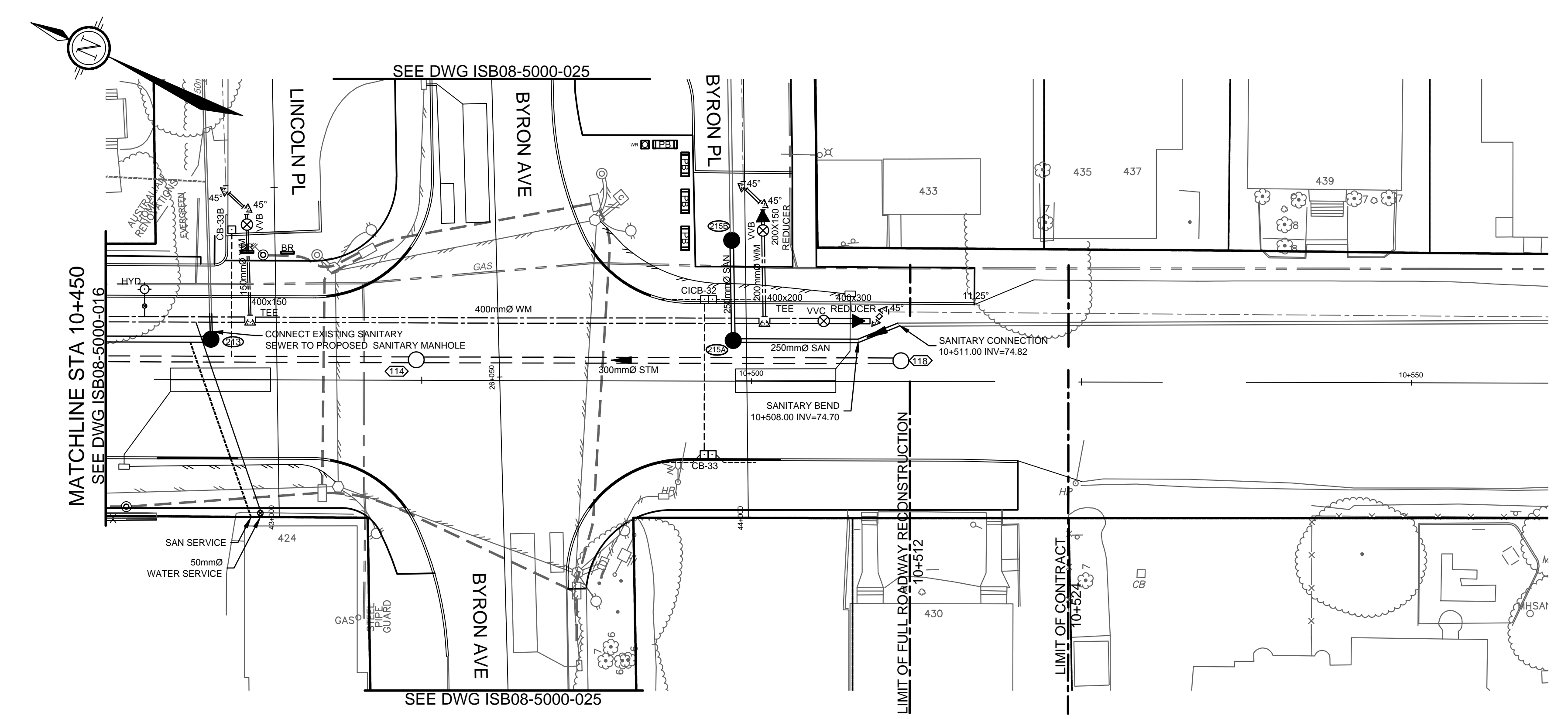
STORM SEWER DATA

SEWER	FROM	TO	DIA.	LENGTH (m)	TYPE	INVERT ELEVATIONS	
						UP STR.	DOWN STR.
STM 108	STM 106	375	64.26	64.26	PVC SDR-35	62.45	62.45
STM 110	EX. MH	300	67.56	67.56	CONC CL 140-D	67.56	67.19
STM 112	STM 110	300	69.29	69.29	CONC CL 140-D	69.29	67.49
STM 114	STM 112	300	72.12	72.12	CONC CL 140-D	72.12	69.53

BUILDING SERVICE DATA

ADDRESS	EXISTING			PROPOSED		
	STORM	SANITARY	COMBINED	STORM	SANITARY	COMBINED
408 CHURCHILL			X			X
412/414 CHURCH	X			X		X
413 CHURCHILL		X			X	
421 CHURCHILL					X	
(SAN TO INCLDN)	X					
327 RICHMOND		X			X	
(SAN TO CHURCHILL)						
332 RICHMOND	EXISTING SERVICING CONDITIONS TO BE DETERMINED IN THE FIELD					
337 RICHMOND	X	X		X	X	

408 CHURCHILL - SERVICING IMPROVEMENTS ARE NOT PROPOSED
413 CHURCHILL - NOT AFFECTED BY RECONSTRUCTION
337 RICHMOND - NOT AFFECTED BY RECONSTRUCTION



**CHURCHILL AVENUE
REHABILITATION
SCOTT STREET TO BYRON AVENUE**

**CHURCHILL
PLAN AND PROFILE
10+450 TO 10+600**

Contract No. ISB08-5000 Dwg. No. 017
Sheet 17 of 55

Asset No. _____
Asset Group: ISB

Des: NTQ Chk'd: ERD
Dwn: RCH Chk'd: DHI

Utility Circ. No.: _____
Const. Inspector: _____

Scale: HORIZONTAL 1:10
VERTICAL 1:2

NOTE:
The location of utilities is approximate only, the exact location should be determined by consulting the municipal authorities and utility companies concerned. The contractor shall prove the location of utilities and shall be responsible for adequate protection from damage.

No.	Description	By	Date
1.	ISSUED FOR PRELIMINARY DESIGN CIRCULATION	ERD	07/10/09
2.	ISSUED FOR MOE APPROVAL	ERD	07/24/09
3.	ISSUED FOR TENDER	ERD	11/06/09
4.	ISSUED FOR DESIGN CIRCULATION	ERD	11/06/09
5.	ISSUED FOR CONSTRUCTION	ERD	03/09/10
6.	AS-BUILT	ERD	04/12/12

NO.	STATION	OFFSET	COVER	STRUCTURE	ELEVATION	
					GUTTER	LOW INV.
CB 32	10+496.72	5.88 LT	S22/S23	OPSD 705.020	76.93	75.53
CB 33	10+496.72	5.88 RT	S19	OPSD 705.020	76.93	75.53

OFFSETS ARE FROM CONTROL LINE TO FACE OF CURB FOR ALL CATCH BASINS

LOCATION	DIA. (mm)	TYPE	LENGTH (m)	INVERT ELEVATIONS	
				UPSTR.	DOWNSTR.
CB 32 - PIPE	200	PVC SDR35	4.70	75.53	73.92
CB 33 - PIPE	200	PVC SDR35	7.00	75.53	73.92

* DOWNSTREAM ELEVATIONS SHOWN ARE AT THE OBVERT OF THE STORM SEWER (MIN. GRADE 1% FOR ALL STORM SEWER CONNECTIONS)

NO.	STATION	OFFSET	COVER	STRUCTURE	ELEVATION	
					T/GRATE	LOW INV.
SAN MH213	10+459.02	3.05 LT	S24	OPSD 701.010	74.75	69.72
SAN MH215B	10+498.47	10.67 LT	S24	OPSD 701.010	77.24	74.51
SAN MH215A	10+494.17	3.07 LT	S24	OPSD 701.010	77.27	74.63
SAN MH11A	10+515.00	3.97 LT	S24	OPSD 701.010	77.72	74.82
SAN MH11B	10+521.40	4.38 LT	S24	OPSD 701.010	77.88	74.90

OFFSETS ARE FROM CONTROL LINE TO CENTRE OF STRUCTURE
STATIONS AND T/GRATE ELEVATIONS ARE FROM THE CENTRE OF STRUCTURE
* FRAME TO BE SELF-LEVELLING BY MUELLER AJ745 OR BIBBY C54M
T/GRATE ELEVATION TO BE SET IN FIELD TO MATCH SURFACE ELEVATION IN TEMPORARY TRANSITION AREA

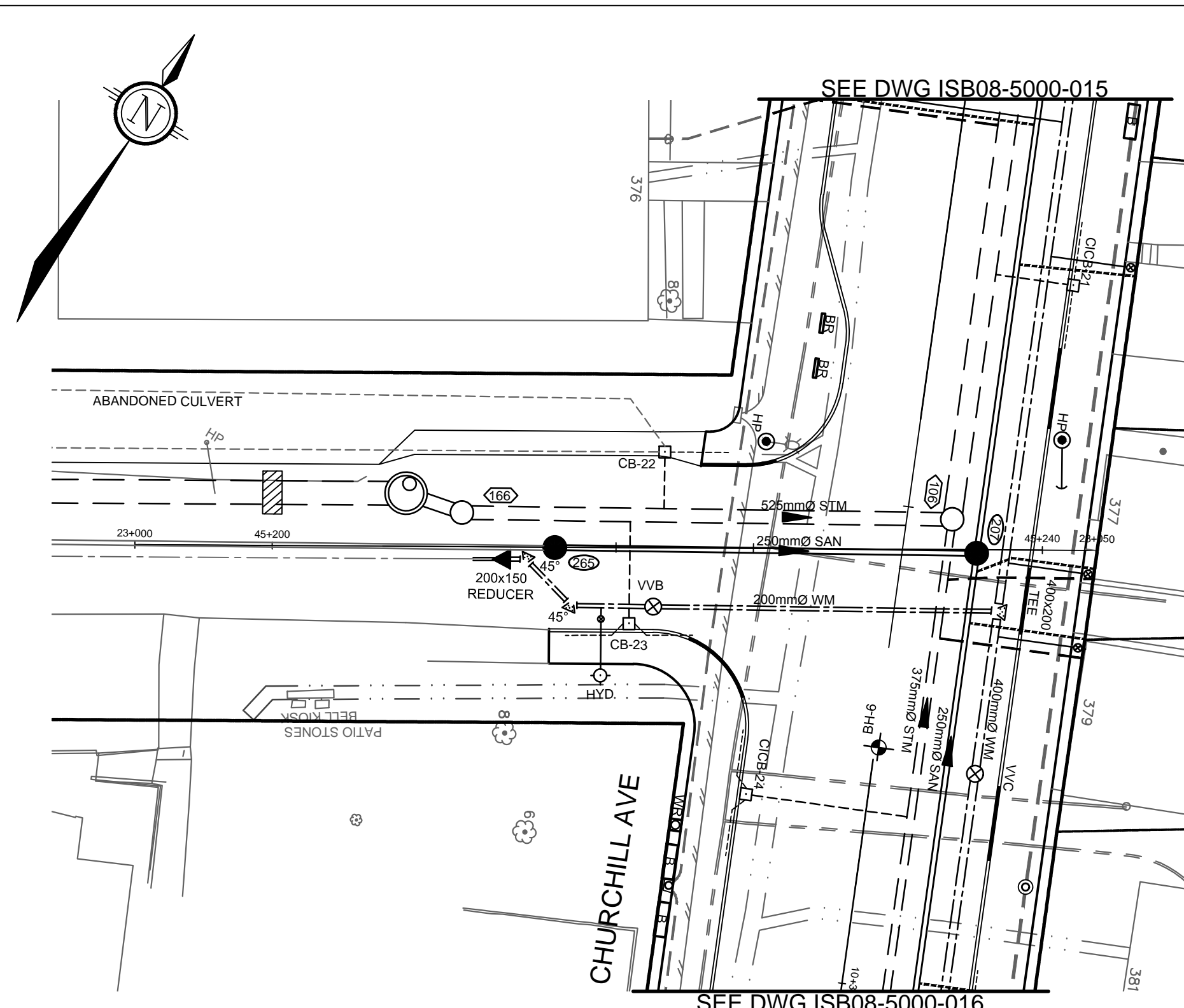
NO.	STATION	OFFSET	COVER	STRUCTURE	ELEVATION	
					T/GRATE	LOW INV.
STM MH114	10+475.40	1.55 LT	S24.1	OPSD 701.010	75.95	72.12
STM MH118	10+519.50	1.57 LT	S24.1	OPSD 701.010	77.71	73.90

OFFSETS ARE FROM CONTROL LINE TO CENTRE OF STRUCTURE
STATIONS AND T/GRATE ELEVATIONS ARE FROM THE CENTRE OF STRUCTURE
* FRAME TO BE SELF-LEVELLING BY MUELLER AJ745 OR BIBBY C54M
T/GRATE ELEVATION TO BE SET IN FIELD TO MATCH SURFACE ELEVATION IN TEMPORARY TRANSITION AREA

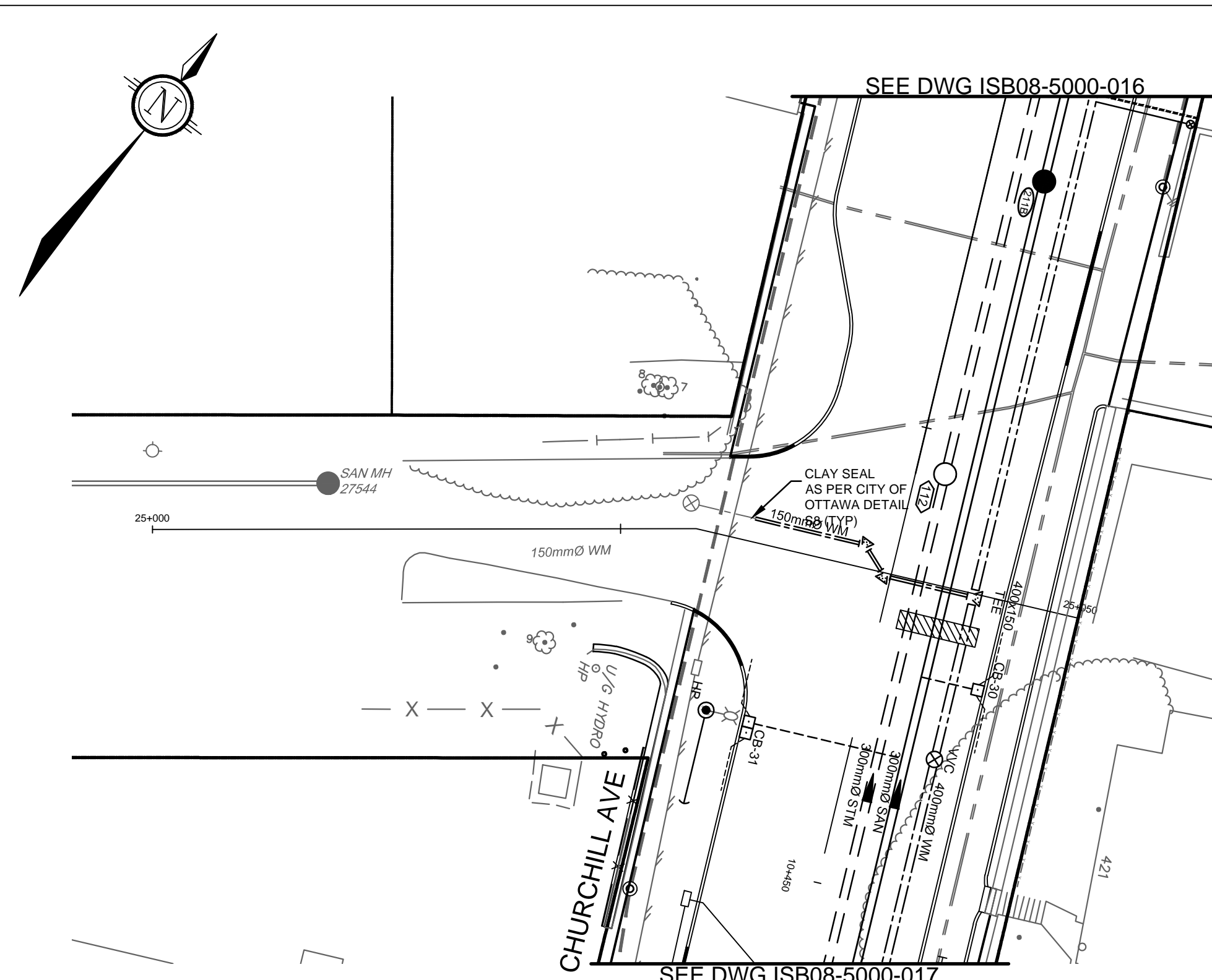
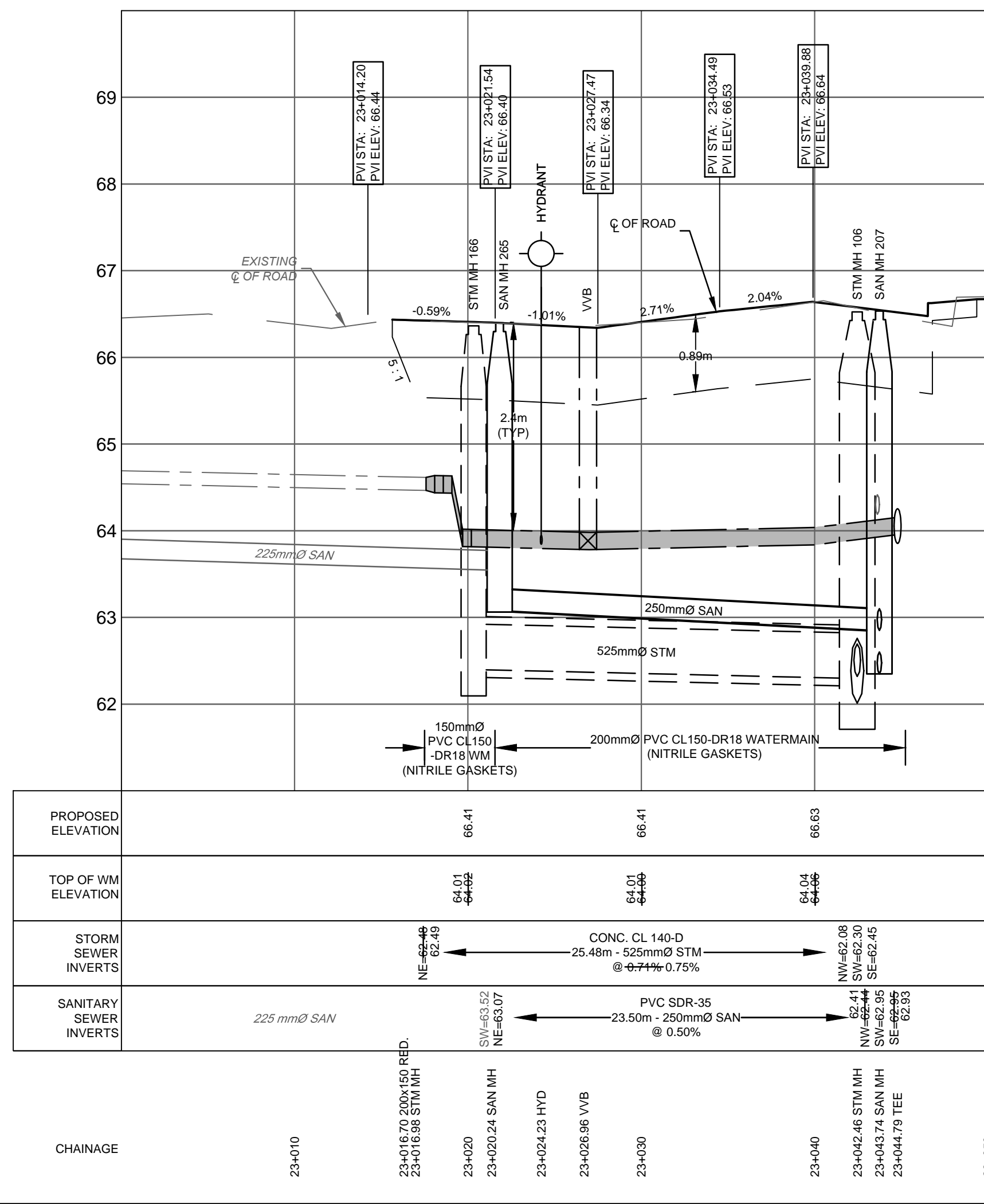
SEWER	FROM	TO	DIA.	LENGTH	TYPE	INVERT ELEVATIONS	
						UP STR.	DOWN STR.
SAN 213	SAN 211B	300	47.78	CONC CL 140-D	74.89	69.92	
SAN 215A	SAN 215B	250	9.50	PVC SDR-35	74.83	74.54	
TEMP SAN A	SAN 215A	250	14.46	PVC SDR-35	74.82	74.66	
TEMP SAN B	TEMP SAN A	250	5.99	PVC SDR-35	74.90	74.83	

SEWER	FROM	TO	DIA.	LENGTH (m)	TYPE	INVERT ELEVATIONS	
						UP STR.	DOWN STR.
STM 114	STM 112	300	48.21	CONC CL 140-D	75.95	69.53	
STM 118	STM 114	300	43.40	CONC CL 140-D	77.71	72.63	

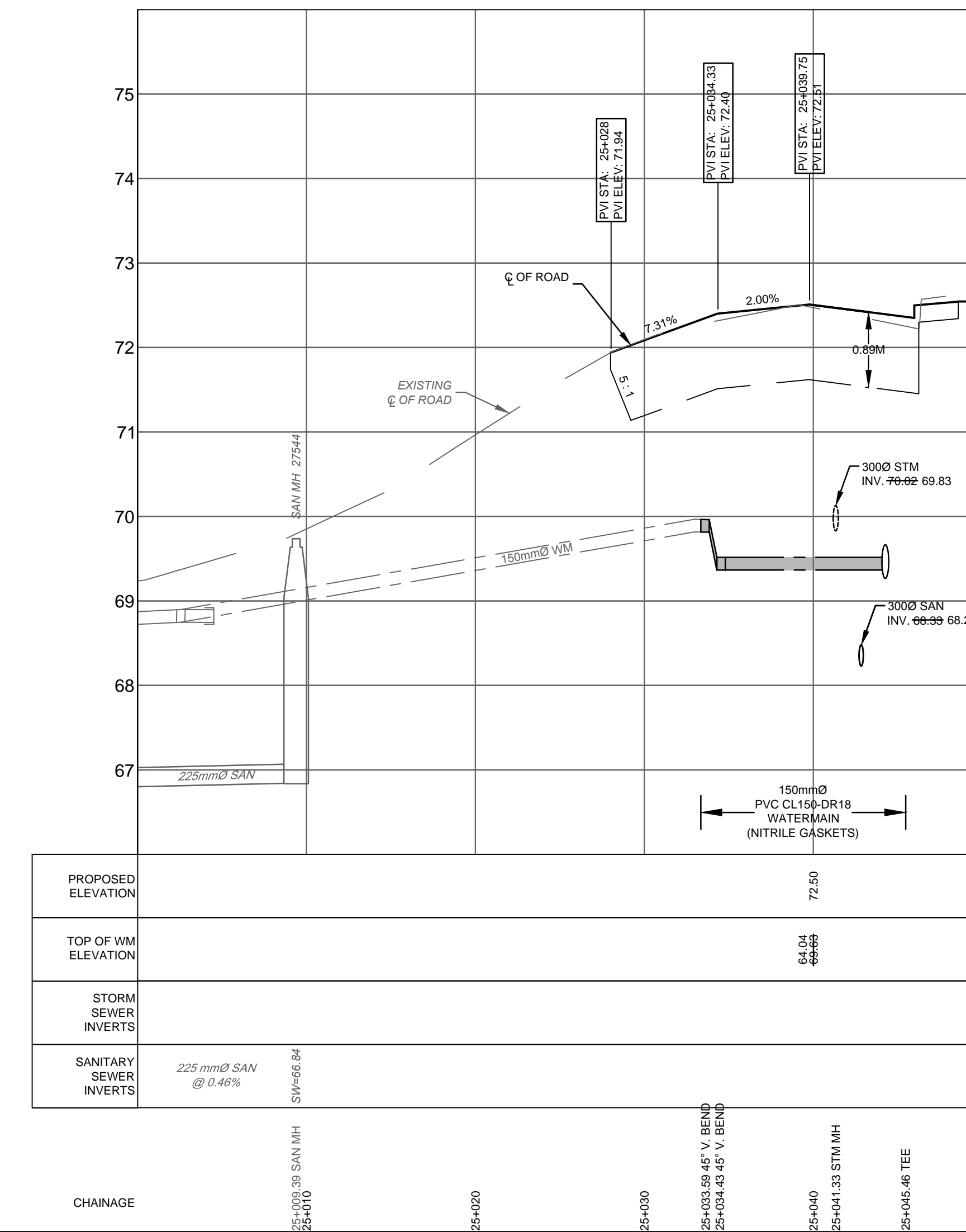
ADDRESS	EXISTING		PROPOSED	
	STORM	SANITARY	STORM	SANITARY
424 CHURCHILL		X		X
430 CHURCHILL	X			X



MADISON AVENUE



DANFORTH AVENUE



**CHURCHILL AVENUE
REHABILITATION
SCOTT STREET TO BYRON AVENUE**

**PLAN AND PROFILE
MADISON 23+000 TO 23+050
DANFORTH 25+000 TO 25+050**

Contract No. ISB08-5000 Dwg. No. 023
Sheet 23 of 55

Asset No. _____
Asset Group: ISB

Des: NTQ Chk'd: ERD
Dwn: RCH Chk'd: DHI

Utility Circ. No.: _____
Const. Inspector: _____

Scale: HORIZONTAL 1:50
VERTICAL 1:20

NOTE:
The location of utilities is approximate only, the exact location should be determined by consulting the municipal authorities and utility companies concerned. The contractor shall prove the location of utilities and shall be responsible for adequate protection from damage.

No.	Description	By	Date
1.	ISSUED FOR PRELIMINARY DESIGN CIRCULATION	ERD	07/10/09
2.	ISSUED FOR MOE APPROVAL	ERD	07/24/09
3.	ISSUED FOR TENDER	ERD	11/06/09
4.	ISSUED FOR DESIGN CIRCULATION	ERD	11/06/09
5.	ISSUED FOR CONSTRUCTION	ERD	03/09/10
6.	ADDED CB23 / REVISED PROFILE	ERD	08/19/10
7.	AS-BUILT	ERD	04/12/12

NO.	STATION	OFFSET	COVER	STRUCTURE	ELEVATION	
					GUTTER	LOW INV.
CB 22	23+027.50	5.00 LT	S19	OPSD 705.010	68.20	64.8
CB 23	23+025.71	4.25 RT	S19	OPSD 705.010	68.47	65.07

OFFSET IS FROM CONTROL LINE TO CENTRE OF CATCHBASIN

LOCATION	DIA. (mm)	TYPE	LENGTH (m)	INVERT ELEVATIONS	
				UPSTR.	DOWNSTR.
CICB 22 - PFE	200	PVC SDR35	3.20	64.94	62.95
CICB 23 - PFE	200	PVC SDR35	5.65	65.21	62.93

* DOWNSTREAM ELEVATIONS SHOWN ARE AT THE OBVERT OF THE STORM SEWER (MIN. GRADE 1% FOR ALL STORM SEWER CONNECTIONS)

NO.	STATION	OFFSET	COVER	STRUCTURE	ELEVATION	
					T/GRATE	LOW INV.
SAN MH 265	23+020.24	0.01 RT	*S24	OPSD 701.010	66.41	63.07

OFFSETS ARE FROM CONTROL LINE TO CENTRE OF STRUCTURE
STATIONS AND T/GRATE ELEVATIONS ARE FROM THE CENTRE OF STRUCTURE
* FRAME TO BE SELF-LEVELING BY MUELLER A1745 OR BIBBY C54M

NO.	STATION	OFFSET	COVER	STRUCTURE	ELEVATION	
					T/GRATE	LOW INV.
STM MH 166	23+016.98	1.77 LT	*S24.1	OPSD 701.010	66.39	62.48

OFFSETS ARE FROM CONTROL LINE TO CENTRE OF STRUCTURE
STATIONS AND T/GRATE ELEVATIONS ARE FROM THE CENTRE OF STRUCTURE
* FRAME TO BE SELF-LEVELING BY MUELLER A1745 OR BIBBY C54M

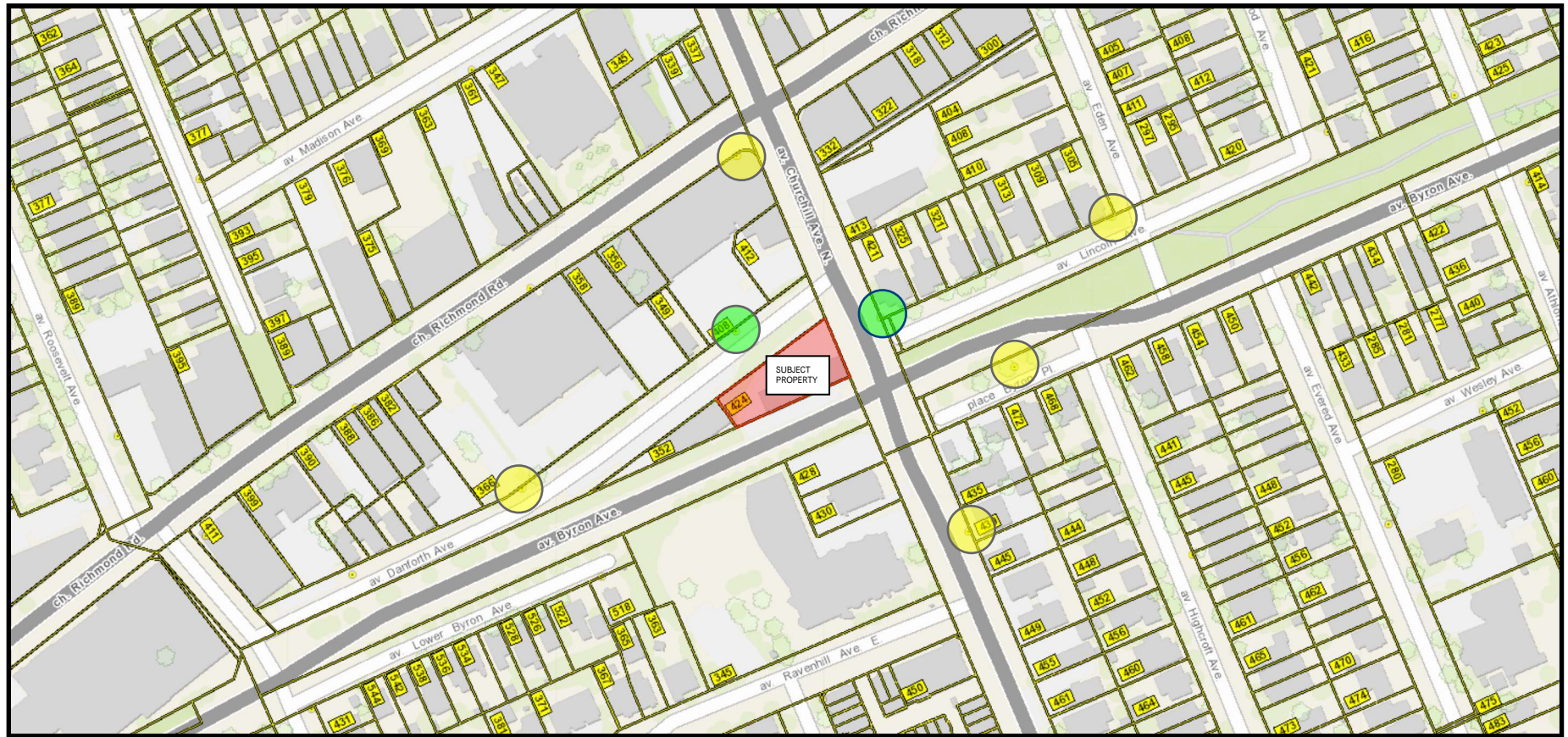
SEWER	FROM	TO	DIA.	LENGTH	TYPE	INVERT ELEVATIONS	
						UP STR.	DOWN STR.
SAN 265	SAN 207	250	23.50	PVC SDR-35	63.07	62.95	

SEWER	FROM	TO	DIA.	LENGTH (m)	TYPE	INVERT ELEVATIONS	
						UP STR.	DOWN STR.
STM 166	STM 106	525	25.48	CONC CL 140-D	62.48	62.30	

APPENDIX G
Fire Hydrant Coverage



FIRE HYDRANT FIGURE



LEGEND



-  Hydrants within 75m
-  Hydrants within 150m

Table 18.5.4.3 Maximum Fire Hydrant Fire Flow Capacity

Distance to Building ^a		Maximum Capacity ^b	
(ft)	(m)	(gpm)	(L/min)
≤ 250	≤ 76	1500	5678
> 250 and ≤ 500	> 76 and ≤ 152	1000	3785
> 500 and ≤ 1000	> 152 and ≤ 305	750	2839

^aMeasured in accordance with 18.5.1.4 and 18.5.1.5.
^bMinimum 20 psi (139.9 kPa) residual pressure.