REPORT
PROJECT: 137404.6.04.03

DESIGN BRIEF
1515 EARL ARMSTRONG PLAZA
RIVERSIDE SOUTH

Prepared for URBANDALE CORPORATION
by IBI GROUP

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1 INTRODUCTION

1.1 Scope

The purpose of this Design Brief is to provide stakeholder regulators with the project background together with the design philosophy and criteria for municipal roadway and site plan approvals. This report will provide logical framework to assist reviewers with evaluation of the design of the development.

1.2 Background

The Riverside South Community, formerly known as South Urban Community (SUC), is a part of the former City of Gloucester. The Council of the City of Gloucester adopted the first Official Plan for the community in September 1990. The original concept plan for the community served as the basis for both a Gloucester and a Regional OPA. A Master Drainage Plan (MDP) for the community was formulated in June 1992 based on the preliminary land use plan prepared by J. Bousfields and Associates Ltd. in December 1991.

The South Urban Community became a part of the City of Ottawa through amalgamation in 2001 and the new Official Plan of the City of Ottawa designated the areas as “General Urban Area” and “Employment Area” with some adjustments to the urban boundaries. In 2003, the City of Ottawa initiated a Community Design Plan (CDP) for the Riverside South area. The basis of the CDP is the land use plan for the community, which has evolved over the time and has changed significantly since the original plan prepared in early 1990’s.

The South Urban Community River Ridge Master Infrastructure Plan (SUC RR MIP) prepared by Ainley Graham and Associates in 1994 presented a preferred servicing strategy for potable water, sanitary and storm infrastructure in the Riverside South community. The Riverside South Infrastructure Servicing Study Update (ISSU) was issued in 2008 as an update to the SUC RR MIP, to account for modifications to the MDP and CDP since 1994.

There have been significant revisions to the CDP, MDP and City of Ottawa Design Guidelines since 2008 so in December 2022 IBI Group helped the City of Ottawa complete an update to the 2008 ISSU for a portion of the Riverside Community called the Mosquito Creek Area. The 2022 Riverside South Community Infrastructure Servicing Study Update Phase 1 – Mosquito Creek Study Area report recognized the current CDP which considers changes in land use planning and development densities in accordance with Official Plan objectives. For reference a copy of the Riverside South Community Design Plan – Land use Plan is included in **Appendix A**. The infrastructure analyses also accounted for existing sewer and infrastructure and the stormwater management pond within the study area.

1.3 Previous Studies

Since the South Urban Community and Riverside South Community have been planned and developed for over twenty-five years, there have been numerous background studies dealing with major municipal infrastructure. The following reports, however, were referenced prior to completing this assessment:

1. **Assessment of Adequacy of Public Services 1515 Earl Armstrong Plaza, Riverside South (IBI Group May 2022).** This report reviews and makes recommendations for water supply, wastewater collection.
2. **Riverside South Community Infrastructure Servicing Study Update Phase 1 Mosquito Creek Study Area – by IBI, Group December 2, 2022.** The report provides a macro level servicing plan of the Riverside South Community area.

3. **Servicing Brief (Revised for Commercial Block "A") Riverside South Phase 4 Residential Development prepared by J.L. Richards, August 4, 2009** The report provides details on water supply, major and minor storm systems and sanitary sewers for the Phase 4 site north of the subject site.

1.4 Subject Property

The current draft plan of subdivision for the subject property is shown on **Figure 1.2.** The site consists of 4 parts, Part 4 is a municipal road right of way connecting Earl Armstrong to Limebank Road while Parts 2, 3 and 4 will be commercial sites. The site plan is shown on **Figure 1.3** and the total site area is six hectares.

1.5 Existing Infrastructure

Figure 1.4 shows the location of existing infrastructure in the vicinity of the Riverside South Phase 4 development. A 250 mm sanitary sewer stub is provided north of the site which is tributary to sanitary sewers on Dusty Miller Crescent which is the sanitary outlet for the subject site. A 200 mm watermain stub is provided at the same location which is connected to the Phase 4 watermain network. A 400 mm watermain is located on Earl Armstrong Road. Stormwater Pond 2 is located north of the site, a 2700 mm storm sewer from Limebank Road and 1500 mm storm sewer from Phase 4 both outlet to the pond.

1.6 Pre-Consultation

There was a pre-consultation meeting with the City of Ottawa on January 29, 2020. The meeting notes can be found in **Appendix A**. The following are some of the topics reviewed and discussed:

- Zoning information
- Official plan
- Infrastructure

1.7 Geotechnical Considerations

The subject lands are covered under the following geotechnical investigation report has been prepared by Paterson Group.

- Report No. PG5304-1-Rev1. Geotechnical Investigation Proposed Commercial Plaza Riverside South Residential Development, 1515 Earl Armstrong Road, Ottawa, Ontario, April 26, 2022.

In general, the subsurface profile includes topsoil, underlain by silty clay crust with bedrock 10 to 15 meters below surface. The topography of the site is essentially flat generally sloping to the northeast with elevations between 93 and 92. A grade raise restriction of 1.5 meters within 5 meters of buildings is provided with a grade raise limit for roads is 2 meters.

2 WATER SUPPLY

2.1 Existing Conditions

As noted in Section 1.5 there is an existing 400 mm watermain on Earl Armstrong Road. A 200mm watermain is located north of the site adjacent to Lot 152 Dusty Miller Crescent that was stubbed to service this site, a future watermain is planned on Limebank Road that will connect to the development and is not part of this report. **Figure 1.4** shows the location of the existing watermains.

2.2 Design Criteria

2.2.1 Water Demands

Water demands have been calculated for the site based on per unit population density and consumption rates taken from Tables 4.1 and 4.2 of the City of Ottawa Design Guidelines – Water Distribution and are summarized as follows:

- Single Family — 3.4 person per unit
- Townhouse and Semi-Detached — 2.7 person per unit
- Average Apartment — 1.8 person per unit
- Residential Average Day Demand — 280 l/cap/day
- Residential Peak Daily Demand — 700 l/cap/day
- Residential Peak Hour Demand — 1,540 l/cap/day
- Retail Average Day Demand — 2,500 l/1,000m^2/day
- Retail Peak Daily Demand — 3,750 l/1,000m^2/day
- Retail Peak Hour Demand — 6,750 l/1,000m^2/day

A water demand was calculated using a retail (shopping centre) rate for the commercial and office building.

- Average Day — 0.39 l/s
- Maximum Day — 0.55 l/s
- Peak Hour — 1.01 l/s

2.2.2 System Pressure

The Ottawa Design Guidelines – Water Distribution (WDG001), July 2010, City of Ottawa, Clause 4.2.2 states that the preferred practice for design of a new distribution system is to have normal operating pressures range between 345 kPa (50 psi) and 552 kPa (80 psi) under maximum daily flow conditions. Other pressure criteria identified in Clause 4.2.2 of the guidelines are as follows:

Minimum Pressure	Minimum system pressure under peak hour demand conditions shall not be less than 276 kPa (40 psi)
Fire Flow	During the period of maximum day demand, the system pressure shall not be less than 140 kPa (20 psi) during a fire flow event.
Maximum Pressure	Maximum pressure at any point in the distribution system shall not exceed 689 kPa (100 psi). In accordance with the Ontario Building/Plumbing Code, the maximum pressure should not exceed 552 kPa (80 psi). Pressure reduction controls will be required for buildings

where it is not possible/feasible to maintain the system pressure below 552 kPa.

2.2.3 Fire Flow Rates

Fire flow calculations have been provided using the methodology in the "Water Supply for Public Fire Protection" 2020 by the Fire Underwriters Survey (FUS) Calculations have been done for the three largest buildings shown which are sprinklered (Building I, L and F) and for Building A and K which are unsprinklered. Results of the calculation results in a fire flow of 8,000 l/min for Building I, 6,000 l/min building L, 4,000 l/min Building F and 5,000 l/min for Building A and K. A fire flow rate of 8,000 l/min (133.3 l/s) is used in the fire flow analysis, a copy of the FUS calculations is included in Appendix B.

2.2.4 Boundary Conditions

The City of Ottawa has provided two boundary conditions at the watermain connection locations at Earl Armstrong (Connection 1) and at Dusty Miller (Connection 2). Boundary conditions are provided for the existing pressure zone and for the SUC Zone Reconstruction. A copy of the boundary condition is included in Appendix B and summarized as follows for the two adjacent locations.

	CONNECTION 1 EXISTING ZONE	CONNECTION 1 SUC ZONE	CONNECTION 2 - EXISTING ZONE	CONNECTION 2 SUC ZONE
Max HGL (Basic Day)	132.3 m	148.7 m	132.2 m	148.7 m
Peak Hour	125.0 m	145.7 m	125.0 m	145.7 m
Max Day + Fire (9,000 l/min Fire Flow)	125.9 m	144.7 m	116.2 m	134.9 m

2.2.5 Hydraulic Model

A computer model has been created for the subject site using the InfoWater 12.4 program. The model includes the hydraulic boundary conditions at the connections to existing watermains.

2.3 Proposed Water Plan

2.3.1 Watermain Layout

A watermain is extended from the Earl Armstrong watermain connection along the Part 4 road which is a public road. A connection to the Dusty Miller Crescent watermain is made through Part 2. There are two watermain loops from the Part 4 road to service Parts 1, 2 and 3 which are commercial sites. The watermain on the Part 4 road is stubbed at the east limit for a future watermain connection on Limebank Road.

2.3.2 Modeling Results

The hydraulic model was run under basic day, maximum day with fire flows and under peak hour conditions. Water pipes are sized to provide sufficient pressure and to deliver the required fire flows.

Results of the hydraulic model are included in **Appendix B,** and summarized as follows:

Scenario	**Existing Zone**	**SUC Zone Reconfiguration**
Basic Day (Max HGL) Pressure Range	381.7 to 394.2 kPa	542.4 to 555.6 kPa
Peak Hour Pressure Range	310.2 to 323.4 kPa	513.5 to 526.0 kPa
Max Day + 9,000 l/min Fire Flow		
Minimum Design Flow	128.8 l/s	217.3 l/s

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

Maximum Pressure	The majority of nodes under existing conditions have basic day pressures under 552 kPa, under the SUC Zone Reconfiguration. There are several nodes that exceed 552 kPa requiring pressure reducing control for Buildings “I” and “L”. Pressure reducing valves are to be located in the buildings downstream of the meter.
Minimum Pressure	All nodes under both scenarios exceed the minimum value of 276 kPa (40 psi).
Fire Flow	All nodes under both pressure zone scenarios have design flows which exceed the 8,000 l/min (133.3 l/s) required fire flow per Section 2.2.3 with one exemption. Node FH 4 under the existing conditions has a design fire flow of 128.8 l/s which increases to 217.3 l/s under the SUC Zone Reconfiguration. Node FH 4 is adjacent to Building “H” and “F” which has a fire flow requirement of 66.7 l/s (4,000 l/min) per Section 2.2.3 so that the fire flow requirement is met.

3 SANITARY SEWERS

3.1 Existing Conditions

As noted in Section 1.5, there is an existing 250 mm sanitary sewer stub adjacent to Lot 152 Dusty Miller Crescent. The sanitary stub is connected to the sanitary sewer on Dusty Miller Crescent.

3.2 Riverside South Phase 4 (2008 JLR)

In the Riverside South phase 4 Servicing Brief, a sanitary drainage area plan and sanitary sewer design sheet is provided. The sanitary drawing area plan (Drawing D2-SAN) shows an area of 6.25 hectares of Commercial Development tributary to the Dusty Miller sewer. In the design sheet a commercial area of 6.49 hectares at a rate of 50,000 l/s/ha is assigned to the sewer. A copy of the sewer design sheet and drainage area plan for Phase 4 by JL Richards is included in **Appendix C**.

3.3 Design Criteria

The estimated wastewater flows from the subject site are based on the revised City of Ottawa design criteria. Among other items, these include:

- Average residential flow = 280 l/c/d
- Peak residential flow factor = (Harmon Formula) x 0.80
- Average commercial flow = 28,000 l/s/ha
- Average institutional flow = 28,000 l/s/ha
- Peak ICI flow factor = 1.5 if ICI area is ≤ 20% total area
  1.0 if ICI area is > 20% total area
- Inflow and Infiltration Rate = 0.33 l/s/ha
- Minimum Full Flow Velocity = 0.60 m/s
- Maximum Full Flow Velocity = 3.0 m/s
- Minimum Pipe Size = 200 mm diameter

In accordance with the City of Ottawa Sewer Design Guidelines Table 4.2, the following density rates are estimated for the subject site:

- Single units = 3.4
- Semi units = 2.7
- Townhouse and back to back units = 2.7
- Apartment units = 1.8

3.4 Recommended Sanitary Plan

Sanitary sewers are proposed on Street No. 1 which is a public right of way that outlets to the Dusty Miller stub. A number of sewers are proposed on Parts 2, 3 and 4 to service the commercial buildings.

No external sanitary flows entering the subject lands. All sewers are 200 mm in diameter with the peak sanitary flow of 4.01 l/s which is less than the 7.45 l/s included in the Phase 4 design per Section 3.2. A copy of the sanitary sewer design sheet and sanitary drainage area plan is included in **Appendix C**.

During construction, a temporary inlet control device (ICD) will be placed in MH 108A which is the first MH upstream of the outlet to prevent excessive groundwater from entering the existing system during construction. The ICD will remain in place until preliminary acceptance at which time it will be removed. Calculations are included in **Appendix C** in which the size of the ICD is based on the allotted flow for Phase 4 with the hydraulic head set at finished grade.

4 STORMWATER MANAGEMENT

4.1 Existing Conditions

Storm runoff from the property is tributary to Pond 2 north of the site. As stated in Section 1.5 there is a 1500 mm storm sewer from Phase 4 and a 2700 mm storm sewer on Limebank Road which outlets to Pond 2.

4.2 Riverside South Phase 4 (2008 JLR)

In the Riverside South Phase 4 Servicing Brief, the Storm Drainage Area Plan (Drawing No. D2-ST) shows 6.25 hectares of the commercial site tributary to the 2700 mm storm sewer east of Pond No. 2 which is from Limebank Road. In the Phase 4 storm sewer design sheet, the 1500 mm storm sewer outlet from Phase 4 has a residual capacity of 596.3 l/s for a 5 year flow outletting to Pond 2. A copy of the storm sewer design sheet and drainage area plan for Phase 4 by JL Richards is included in **Appendix D**.

4.3 Minor Storm Sewer Design Criteria

The minor system storm sewers for the subject site are proposed to be sized based on the rational method, applying standards of both the City of Ottawa and MECP. Some of the key criteria for this site include the following:

- Sewer Sizing: Rational Method
- Design Return Period: 1:2 year (local streets)
  1:5 year (collector streets)
- Initial Time of Concentration 10 minutes
- Manning's: 0.013
- Minimum Velocity: 0.80 m/s
- Maximum Velocity: 3.00 m/s

PIPE DIAMETER (MM)	SLOPE (%)
250	0.43
300	0.34
375	0.25
450	0.20
525	0.16
600	0.13
675	0.11
750 and larger	0.1

Runoff Coefficients are calculated using a C = 0.2 for soft surfaces and a C = 0.9 for hard surfaces. A copy of the calculation is included in **Appendix D**.

4.4 Recommended Minor Storm Plan

Storm sewers are proposed on Street No. 1, a public right of way, outletting to the existing 1500 mm diameter storm sewer which is the outlet for Phase 4 to Pond 2. A number of storm sewers are proposed on Parts 2, 3 and 4 which drain the commercial sites. There are no external flows entering the subject lands. A copy of the storm sewer design sheet and storm drainage area plan are included in **Appendix D**.

Similar to the sanitary, temporary ICDs will be placed in the first upstream MH from the outlet. Temporary ICDs are proposed on MH 108 and MH 57 with sizing calculations included in **Appendix C**.

4.5 Site Plan Drainage

As a result of the stormwater management analysis conducted for 1515 Earl Armstrong Plaza, the subject site will be limited to a release rate established using the criteria described in **Table 4-1**. Allowances from the SWM model are as follows:

Table 4-1 Summary of minor system capture

DRAINAGE AREA ID	MINOR SYSTEM CAPTURE (L/S) DURING 100 YEAR 3 HOUR CHICAGO STORM
2-CC_Part 1	514.00
2-CC_Part 2	264.00
2-CC_Part 3	341.00

This limitation will be achieved through a combination of subsurface detention via inlet control devices (ICDs) and surface storage.

The subject site is divided into two distinct systems: Parts 1, 2, and 3 form the Site Plan portion of this proposal, three private commercial blocks which are being treated as one system for the purposes of this submission with a total release rate of (514 l/s + 264 l/s + 341 l/s) 1119 l/s.

Flows generated that are in excess of the site's allowable release rate will be stored on site in strategic surface storage areas or by the use of roof top storage and gradually released into the minor system so as not to exceed the site's allocation.

The maximum surface retention depth located within the developed areas will be limited to 300mm during a 1:100-year event. Overland flow routes will be provided in the grading to permit emergency overland flow, in excess of the 100-year event, from the site.

At certain locations within the site plan, the opportunity to store runoff is limited due to grading constraints and building geometry. These locations are generally located at the perimeter of the site where it is necessary to tie into public boulevards and adjacent properties or in areas where ponding stormwater is undesirable. These "uncontrolled" areas – 0.34 hectares in total, have an average C value of 0.42. One catchbasin, CB 111, will also not have a restricted flowrate to prevent excess ponding. Buildings B and H will have their roof drains flow into their respective building's storm service unrestricted. It should also be noted that the loading ramp has been carried with a 100-year flow to eliminate any water accumulating within the depressed ramp.

The site grading and ponding has been designed to control water generated during the 1:100-year event, with no overflow leaving the site. Please refer to the SWM calculations in **Appendix D.**

4.5.1 On-Site Detention

Any excess storm water up to the 100-year event is to be stored on-site in order to not surcharge the downstream municipal storm sewer system. Detention will be provided in parking areas and building rooftops, where feasible. As previously noted, the volume of storage is dependent on the characteristics of each individual drainage area and the ICDs were chosen accordingly. It should be noted that 0.30m of vertical separation has been provided from all maximum ponding elevations to lowest building openings.

Additionally, ICDs have been sized to ensure there is no ponding anywhere onsite during the 2-year storm event.

Based on the flow allowance at the various inlet locations, a combination of various sizes of inlet control devices (ICDs) were chosen in the design. The design of the inlet control devices is unique to each drainage area and is determined based on several factors, including hydraulic head and allowable release rate. The inlet control devices were sized according to the manufacturer's design charts. The restrictions will cause the on-site catchbasins and manholes to surcharge, generating surface ponding in the parking and landscaped areas during a 100-year storm event. Ponding locations and elevations are summarized on the Ponding Plan 137404-600, and included in **Appendix D**.

4.5.2 Inlet Controls – Private Site Plan

The allowable release rate for the private commercial property as stated in Section 4.5,

$\mathbf{Q_{allowable}}$ = 1119.00 L/s

As noted in Section 4.5, a small portion of the site will be left to discharge to the surrounding areas at an uncontrolled rate.

Based on a 1:100 year event, the flow from the uncontrolled areas can be determined as:

$\mathbf{Q_{uncontrolled1}}$ = $\mathbf{2.78} \times \mathbf{C_{100yr}} \times \mathbf{i_{100yr}} \times \mathbf{A}$ where:

$\mathbf{C_{100yr}}$ = 100 yr Average runoff coefficient of uncontrolled area = 0.42*1.25 = 0.525

$\mathbf{i_{100yr}}$ = Intensity of 100-year storm event (mm/hr)

= $1735.688 \times (T_c + 6.014)^{0.820}$ = 178.56 mm/hr; where T_c = 10 minutes

A = Uncontrolled Area = 0.34 Ha

Therefore, uncontrolled release rate 1 can be determined as:

$\mathbf{Q_{uncontrolled1}}$ = $\mathbf{2.78} \times \mathbf{C} \times \mathbf{i_{100yr}} \times \mathbf{A}$

= 2.78 x 0.525 x 178.56 x 0.34

= **88.61 L/s**

Also noted in Section 4.5, there are other catchment areas that will not have a restricted flow when entering the stormwater system. Detailed calculations for each area can be found in **Appendix D**. In summary, the total uncontrolled flow for the site plan is 174.48 l/s.

The maximum allowable release rate from the remainder of the site can then be determined as:

$\mathbf{Q_{max\ allowable}}$ = $\mathbf{Q_{restricted} - Q_{uncontrolled}}$

= 1119.00 L/s – 174.48 L/s

= **944.52 L/s**

4.5.2.1 Site Inlet Control

The following table summarizes the on-site storage requirements during both the 1:2-year and 1:100-year events.

Table 4-2 Summary of Site Inlet Controls

DRAINAGE AREA(S)	TRIBUTARY AREA	AVAILABLE STORAGE (M^3)	100-YEAR STORM		2-YEAR STORM	
			RESTRICTED FLOW (L/S)	REQUIRED STORAGE (M^3)	RESTRICTED FLOW (L/S)	REQUIRED STORAGE (M^3)
MH51B	0.64	159.27	160.00	160.10	160.00	21.96
MH57	0.85	191.67	252.00	191.15	252.00	23.87
MH58B	0.43	137.20	68.00	136.49	68.00	23.74
MH62B	0.81	257.60	129.00	256.26	129.00	47.68
MH60B	0.83	198.63	224.00	198.22	224.00	27.11
W Swale	0.08	6.76	6.00	3.27	6.00	0.04
N Swale	0.13	12.86	6.00	9.58	6.00	1.54
Total Surface	**3.77**	**963.99**	**845.00**	**955.06**	**845.00**	**145.94**

The total required storage is met with surface ponds which retain the stormwater and discharge at the restricted flow rate to the sewer system.

4.5.2.2 Roof Inlet Control

The proposed buildings below will have roof inlet controls that help to control the amount of stormwater being released into the system. The restricted flow rates for the proposed buildings are as shown below.

Table 4-3 Summary of Roof Inlet Controls

ICD AREA	TRIBUTARY AREA	100-YEAR STORM		2-YEAR STORM	
		RESTRICTED FLOW (L/S)	REQUIRED STORAGE (M^3)	RESTRICTED FLOW (L/S)	REQUIRED STORAGE (M^3)
BLDG A	0.09	9.00	25.47	9.00	4.98
BLDG C	0.09	9.00	25.47	9.00	4.98
BLDG D	0.05	5.00	14.15	5.00	2.76
BLDG E	0.07	7.00	19.81	7.00	3.87
BLDG F	0.11	11.00	31.13	11.00	6.08
BLDG G	0.08	8.00	22.64	8.00	4.42
BLDG I	0.10	10.00	28.30	10.00	5.53
BLDG J	0.06	6.00	16.98	6.00	3.32
BLDG K	0.08	8.00	22.64	8.00	4.42
BLDG L	0.25	23.00	73.82	23.00	15.03
Total Buildings	**1.00**	**96.00**	**280.44**	**96.00**	**55.39**

4.5.2.3 Overall Release Rate

As demonstrated above, the site uses new inlet control devices to restrict the 100-year storm event to the criteria approved by the City of Ottawa. Restricted stormwater will be contained onsite by utilizing surface ponding and rooftop storage. In the 100-year event, there will be no overflow off-site from restricted areas.

The sum of restrictions on the site, rooftops and uncontrolled flows is (845.00 l/s + 96.00 l/s + 174.48 l/s) 1115.48 l/s, which is less than the allowable release of 1119.00 l/s noted in Section 4.6.

4.6 Stormwater Evaluation

The evaluation described in the following sections has been completed to support the detail design of Street 1 of the subject site.

A fully dynamic PCSWMM model was used to evaluate the dual drainage system for Street 1, namely to confirm the depth and velocity of flow on the street conforms to City guidelines. The recent Mosquito Creek ISSU Phase 1 model has been used as the base and the semi-lumped areas representing 1515 Earl Armstrong were refined to reflect the detail design information for Street 1. The three legal parts reflecting the development blocks are included in the model and are considered to have 100 year on-site storage with 2 year capture (consistent with the analysis completed to support the Adequacy of Public Servicing Report). Please refer to the above sections for greater detail on the detailed storm design for these development blocks.

The PCSWMM schematic to support the modeling is provided in **Appendix E**.

4.6.1 Hydrological Evaluation

Selected modeling routines and input parameters are discussed in the following sections for Street 1. Model files are included in the digital submission.

Storms and Drainage Area Parameters

The main hydrological parameters for Street 1 are presented in **Table 4-5.**

- **Design Storms:** The following storms were applied in the evaluation:
  - 2 and 100 year 3 hour Chicago storm events (10 minute time step), as per the OSDG and the September 2016 Technical Bulletin; corresponding stress test for Climate Change consideration, as per the OSDG;
  - 25 mm 4 hour Chicago storm event for Pond 2 performance
  - 2, 5, 100 year 12 hour SCS Type II storm events and corresponding stress test
  - 100 year 24 hour SCS Type II storm event and corresponding stress test for hydraulic evaluation
- **Area:** Street 1 was divided into sub-drainage areas based on the proposed minor system network of storm sewers and the rational method spreadsheet with some minor modifications for modeling purposes. See the PCSWMM model schematic in **Appendix E** for the catchment areas used in the detail evaluation of Street 1.
- **Imperviousness:** PCSWMM provides an opportunity to specify direct and indirect routing to a pervious or impervious area. For this evaluation, all street segments were assumed to be 100% routed to an impervious surface.
- **Infiltration:** Infiltration losses were selected to be consistent with the OSDG. The Horton values are as follows: Max. infiltration rate = 76.2 mm/h, Min. infiltration rate = 13.2 mm/h, Decay constant = 4.14 1/hr.

- **Subcatchment Width:** The catchment width was based on the conveyance route length of the drainage area and multiplied by two. The multiplier of two was only used if the drainage area had runoff contribution from both sides of the drainage area. This approach is consistent with the OSDG.
- **Slope:** The average surface slope was based upon the average slope for both impervious and pervious area. An average slope of 1% has been used for subcatchment flow routing. It should be noted that the appropriate longitudinal slope of streets was accounted in PCSWMM using a combination of nodes with inverts corresponding to gutter elevations, and links with corresponding road cross-sections
- **Initial Abstraction (Detention Storage):** Detention storage depths of 1.57 mm and 4.67 mm were used for impervious and pervious areas, respectively. These values are consistent with the OSDG.
- **Manning's Roughness:** Manning's roughness coefficients of 0.013 and 0.250 are being applied for impervious and pervious areas, respectively.
- **Baseflow:** No baseflow components were assumed for any of the areas contributing runoff to the minor system within the PCSWMM model.
- **Major System Storage and Routing:** Street 1 is comprised of sawtooth road profiles. For such profiles, flow is attenuated within low points with potential overflow cascading to the next segment downstream. The total volume at each low point, up to the overflow depth, is the maximum static storage. The ponding plan is presented on **Drawing 137404-600**.

  For street segments with ponding, minor system capture is set to fully utilize storage during the 100 year design storm, while minimizing ponding during the 2 year event. Cascading overflow from a low point to a downstream segment utilizes the static storage available plus an additional amount of storage equivalent to the depth required for the flow to cascade over the downstream high point. The attenuation in street sags was evaluated to account for static storage and, if overflow occurs, dynamic storage.

  For street segments with sawtoothing, simulations were based on the constraint that during the 100 year design storm the maximum depth of ponding (including cascading flow where applicable) does not exceed 0.35 m. The surface storages were modeled in PCSWMM using a combination of nodes with inverts corresponding to gutter elevations, and links with corresponding road cross-sections. The evaluation was undertaken assuming dynamic flow conditions. It should be noted that the visual interpretation of street links in the model, is based on illustrating street nodes along the center of the road. However, the invert elevations are modified to correspond to the gutter (CB grill) elevations as indicated above.
- **Minor system capture:** The minor system capture for Street 1 is based on the 2 year storm event and for maximum ponding conditions. ICDs are proposed to protect the minor system from surcharge during infrequent storm events and to utilize on-site storage. The assignment and placement of the ICDs within Street 1 were determined as part of this evaluation.

  The City has requested specific ICD sizes be specified for use on the site. These ICD sizes are documented in City of Ottawa MS-18.4 Inlet Control Devices (ICDs, March 2017). Within the aforementioned document eight (8) ICD sizes are noted. The following table summarizes the ICD sizes assigned to the site including associated flowrate at the maximum allowable ponding depth of 0.35m above top of grate.

Table 4-4: Standard City of Ottawa ICD Sizes

ICD DIAMETER (MM)	ORIFICE AREA (M^2)	MAX FLOW RATE AT MAX PONDING DEPTH OF 0.35 M (L/S)
Vortex	n/a	6
83	0.0054	20.41
94	0.0069	26.18
102	0.0082	30.83
108	0.0092	34.56
127	0.0127	47.80
152	0.0181	68.46
178	0.0249	93.89

The standard ICDs have been assigned to each CB along Street 1. For the evaluation of the site in PCSWMM, a rating curve for each standard ICD has been created. The rating curve emulates the performance of a particular orifice to convey the ICD flow to the minor system. The rating curve is based on an average top of grate (T/G) to the center of CB lead height of 1.3 m for the street segments. The ICD size, head and flow are provided on the CB table presented on **Drawing 137404-010**. Any exemptions to the above noted ICDs assumed are indicated in the CB table presented on **Drawing 137404-010**.

Summary of Modeling Files

The following is a reference list of the PCSWMM files enclosed in digital submission.

- 137404-1515EarlArmstrongPlaza_3H2CHI_V03.pcz – 2 year 3 hour Chicago
- 137404-1515EarlArmstrongPlaza_3H100CHI_V03.pcz – 100 year 3 hour Chicago
- 137404-1515EarlArmstrongPlaza_3H120CHI_V03.pcz – 100 year 3 hour Chicago+20%
- 137404-1515EarlArmstrongPlaza_4H25MM_V03.pcz– 4 hour 25mm
- 137404-1515EarlArmstrongPlaza_12H2SCS_V03.pcz – 2 year 12 hour SCS
- 137404-1515EarlArmstrongPlaza_12H5SCS_V03.pcz – 5 year 12 hour SCS
- 137404-1515EarlArmstrongPlaza_12H100SCS_V03.pcz – 100 year 12 hour SCS
- 137404-1515EarlArmstrongPlaza_12H120SCS_V03.pcz – 100 year 12 hour SCS+20%
- 137404-1515EarlArmstrongPlaza_24H100SCS_V03.pcz – 100 year 24 hour SCS
- 137404-1515EarlArmstrongPlaza_24H120SCS_V03.pcz – 100 year 24 hour SCS+20%

Table 4-5 Hydrological Parameters – Subcatchment Summary Street 1

DRAINAGE AREA ID	AREA (HA)	DOWNSTREAM SEGMENT ID	RECEIVING MH (SEWER NODE)	IMP RATIO	SUBCATCHMENT WIDTH (M)	AVAILABLE STATIC STORAGE (CU-M)(1)
Street Segments						
MH119	0.26	MH102	MH119	0.86	174	8.68
MH102	0.11	MH103	MH102	0.86	113	10.09
MH103	0.16	EASMENT	MH103	0.86	168	76.95
MH105	0.11	EASEMENT	MH105	0.86	98	34.75
MH106	0.15	MH105	MH106	0.86	160	25.97

(1) The available on-site static storage is based on Drawing 137404-600.

4.6.2 Results of Hydrological Evaluation

In PCSWMM, the minor and major systems are simulated at the same time. The results of the major system evaluation are summarized in the following sections.

The assigned size of the inlet control devices (ICDs) for Street 1 was optimized using PCSWMM. ICDs are incorporated in the stormwater management design to protect the minor system from surcharge during infrequent storm events. The ICDs used for Street 1 are provided in the CB table presented on **Drawing 137404-010**.

Table 4-6 Minor Flow Capture for Street 1

DRAINAGE AREA ID	CONTINUOUS/ SAG	ROAD TYPE	MINOR SYSTEM DESIGN TARGET (BASED ON ROAD TYPE)		100 YEAR CAPTURED FLOW (L/S) (3 HOUR CHICAGO STORM)	ICD ORIFICE SIZE (MM DIA.) (TWO ICDs PER DRAINAGE AREA)	
			MINOR SYSTEM DESIGN STORM	GENERATED FLOW ON INDIVIDUAL SEGMENT SIMULATED (L/S)			
MH119	Sag	18m Row, 8.5m asphalt	2	46.9	53.36	102	102
MH102	Sag	18m Row, 8.5m asphalt	2	20.6	34.38	83	83
MH103	Sag	18m Row, 8.5m asphalt	2	29.6	34.84	83	83
MH105	Sag	18m Row, 8.5m asphalt	2	20.4	34.36	83	83
MH106	Sag	18m Row, 8.5m asphalt	2	26.7	35.13	83	83

The available on-site storage and the results of the PCSWMM evaluation for Street 1 are presented in **Table 4-7**. The ponding plan is presented on **Drawing 137404-600.**

Table 4-7 Summary of On-Site Storage during the Target Minor System Design Storm

DRAINAGE AREA ID	CONTINUOUS/SAG	AVAILABLE STATIC STORAGE (CU-M)(1)	AVAILABLE STATIC DEPTH (M)(1)	MAXIMUM DEPTH AT LOW POINT (M) – IF APPLICABLE DURING THE TARGET MINOR SYSTEM DESIGN STORM	OVERFLOW (L/S)
Street 1					
MH119	Sag	8.68	0.15	0	0
MH102	Sag	10.09	0.15	0	0
MH103	Sag	76.95	0.28	0	0
MH105	Sag	34.75	0.23	0	0
MH106	Sag	25.97	0.22	0	0

*(1) Based on **Drawing 137404-600**.*

The results of the on-site detention analysis show that during the restricted inflow rate of the 2 year storm event, there is no ponding on Street 1.

The below two tables summarize the cascading overflows for each subcatchment of Street 1 and the downstream easement for the 100 year 3 hour Chicago storm event and the 100 year Chicago storm increased by 20%, respectively. The cascading overflow is the flow exiting a drainage area when maximum minor system inflow and maximum available ponding has been utilized. The 18 m ROW section, with the corresponding longitudinal profiles, were imported into PCSWMM to determine the depth and velocity of cascading overflow for sawtooth street segments.

It should be noted that for the purposes of modeling, where there are VPI in the road profile, the vertical curves have been flattened to straight line slopes between the two points. This approach is considered conservative with respect to the model.

Table 4-8 Summary of Velocity x Depth during the 100 Year 3 Hour Chicago Storm

DRAINAGE AREA ID	CONTINUOUS/SAG	AVAILABLE STATIC DEPTH (M) (1)	MAXIMUM DEPTH AT LOW POINT (M) – IF APPLICABLE	CASCADING DEPTH (m)(2)	VELOCITY (M/S)	VELOCITY X DEPTH (M^2/S)
Street 1						
MH119	Sag	0.15	0.16	0.01	0.37	0.00
MH102	Sag	0.15	0.09	0.00	0.00	0.00
MH103	Sag	0.28	0.13	0.00	0.00	0.00
MH105	Sag	0.23	0.09	0.00	0.00	0.00
MH106	Sag	0.22	0.15	0.00	0.00	0.00

*(1) The available static depth is based on **Drawing 137404-600.***
(2) Evaluated at most downstream node within drainage area. From PCSWMM output “137404-1515EarlArmstrongPlaza_3H100CHI_V02.pcz” enclosed in digital submission.

Table 4-9 Summary of Velocity x Depth during the 100 Year 3 Hour Chicago Storm Increased by 20%

DRAINAGE AREA ID	CONTINUOUS/SAG	AVAILABLE STATIC DEPTH (M) (1)	MAXIMUM DEPTH AT LOW POINT (M) – IF APPLICABLE	Cascading Depth (m)(2)	VELOCITY (M/S)	VELOCITY X DEPTH (M^2/S)
Street 1						
MH119	Sag	0.15	0.19	0.04	0.52	0.02
MH102	Sag	0.15	0.16	0.01	0.02	0.00
MH103	Sag	0.28	0.20	0.00	0.00	0.00
MH105	Sag	0.23	0.20	0.00	0.00	0.00
MH106	Sag	0.22	0.18	0.00	0.00	0.00

*(1) The available static depth is based on **Drawing 137404-600.***
(2) Evaluated at most downstream node within drainage area. From PCSWMM output "137404-1515EarlArmstrongPlaza_3H120CHI_V02.pcz" enclosed in digital submission.

During the 100 year event, the total ponding depth at all street segments is less than 0.35 m and the product of v x d is less than 0.6 m^2/s, consistent with OSDG.

For the 100 year storm event increased by 20%, the total depth of ponding at all street segments is less than 0.35 m throughout the subject site. The product of v x d is summarized for information purposes.

4.6.3 Results of Hydraulic Evaluation

The hydraulic grade line (HGL) was analyzed using PCSWMM. The results of the evaluation are presented in the below table for Street 1.

The subject site is proposed to tie-in to the downstream end of the existing Phase 4 storm sewer. The downstream 400 m of the existing Phase 4 storm sewer is accounted for in the overall model. The minor system of the 1515 Earl Armstrong site is connected at a Phase 4 storm maintenance hole (MH) identified as EXMHSTM on **Drawing 1367404-001** (detailed design MH646 and identified as MHST48704 on geoOttawa), located immediately west of the Pond 2 inlet structure. The HGL elevations in the Phase 4 storm sewer were reviewed against underside of footing elevations from the Phase 4 detailed design to quantity the impacts of this connection on the Phase 4 sewer. The referenced as-constructed Phase 4 drawings are enclosed in **Appendix E**.

Results are presented for the 100 year 24 hour storm event, the most critical storm event. Results for the 100 year 12 hour SCS Type II storm and the 100 year 3 hour Chicago storm event and the corresponding stress tests are in **Appendix E**. Elevations are compared to available USF elevations or to proposed or existing ground elevations.

Table 4-10 Hydraulic grade line elevations

PCSWMM JUNCTION ID	MH ID	USF, PROPOSED OR EXISTING GROUND ELEVATION (M)	100 YEAR 24 HOUR SCS TYPE II STORM	
			HGL (M)	FREEBOARD (M)
Existing Phase 4				
EXMHSTM	646(1)	91.7 Existing Ground	88.86	2.84
J645	645	90.41 USF	89.04	1.37
J638	638	90.33 USF	89.15	1.18
J639	639	90.46 USF	89.33	1.13
J640	640	90.48 USF	89.39	1.09
N2-10_1	591	90.71 USF	89.61	1.10
Proposed Street 1 & Connection to Phase 4				
2EA-108	MH108	92.34 Proposed Ground	88.91	3.43
2EA-104	MH104	92.44 Proposed Ground	89.02	3.42
2EA-105	MH105	92.53 Proposed Ground	89.43	3.10
2EA-106	MH106	92.46 Proposed Ground	89.59	2.87
2EA-107	MH107	93.04 Proposed Ground	89.94	3.10
2EA-103	MH103	92.60 Proposed Ground	89.27	3.33
2EA-102	MH102	92.72 Proposed Ground	89.49	3.23
2EA-101	MH101	92.64 Proposed Ground	89.59	3.05
2EA-119	MH119	92.69 Proposed Ground	89.71	2.98
2EA-100	MH100	93.20 Proposed Ground	90.09	3.11

(1) MHST48704 on geoOttawa

Through the Phase 4 sewer, the 100 year freeboard to USF elevations is greater than 1.0 m at all locations. It is therefore concluded that introducing the 1515 Earl Armstrong connection does not cause a negative hydraulic impact on the existing Phase 4 sewer.

Along Street 1 and its connection to the Phase 4 sewer, HGL elevations are a minimum of 2.8 m below proposed ground elevations.

The subject site is included within the Pond 2 drainage area. A comparison of the Pond 2 performance is provided in the below table. The comparison has been made to the 2021 MDP Update, which included the subject site as one semi-lumped catchment. The 12 hour SCS Type II storm has been considered, consistent with the pond's detailed design.

Table 4-11 Pond 2 performance

STORM EVENT	2021 MDP UPDATE			CURRENT EVALUATION		
	EXTENDED STORAGE (HA-M)	OUTFLOW (CMS)(1)	WATER LEVEL (M)	EXTENDED STORAGE (HA-M)	OUTFLOW (CMS)(1)	WATER LEVEL (M)
25 mm	2.45	0.51	87.31	2.01	0.42	87.17
2 year 12 hour SCS	3.89	0.85	87.76	3.08	0.66	87.51
5 year 12 hour SCS	4.75	1.79	88.02	4.19	1.12	87.85
100 year 12 hour SCS	7.10	6.78	88.69	6.73	5.44	88.59

(1) includes flow through the outlet pipe, the baseflow pipe and the emergency overflow.

The pond's performance remains consistent with that of the 2021 MDP Update evaluation.

5 SEDIMENT AND EROSION CONTROL PLAN

5.1 General

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

- Until the local storm sewer and storm pond are constructed, groundwater in trenches will be pumped into a filter mechanism prior to release to the environment. After construction of the storm water facility, any construction dewatering will be routed to the nearest storm sewer;
- bulkhead barriers will be installed at the nearest downstream manhole in each sewer which connects to an existing downstream sewer;
- seepage barriers will be constructed in any temporary drainage ditches;
- sediment capture filter socks will remain on open surface structures such as maintenance holes and catchbasins until these structures are commissioned and put into use; and
- silt fence on the site perimeter.

5.2 Trench Dewatering

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

A Permit to Take Water (PTTW) is in place for this project and adjacent projects. The contractor will be required to meet all the requirements of the PTTW.

5.3 Bulkhead Barriers

Although the storm sewers eventually outlet into a sediment forebay, a ½ diameter bulkhead will be constructed over the lower half of the outletting sewers to reduce sediment loadings during construction. These bulkheads will trap any sediment laden flows, thus preventing any construction-related contamination into existing sewers. The bulkheads will be inspected and maintained including periodic sediment removal as needed.

5.4 Seepage Barriers

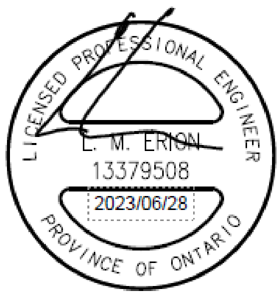
In order to further reduce sediment loading to the stormwater management facility and existing watercourses, seepage barriers will be installed on any surface water courses at appropriate locations that may become evident during construction. These barriers will be Light Duty Straw Bale Barriers per OPSD 219.100 and Heavy Duty Silt Fence Barriers per OPSD 219.130; locations are shown on the Sediment and Erosion Control Plan included in **Appendix F**. They are typically made of layers of straw bales or geotextile fabric staked in place. All seepage barriers will be inspected and maintained as needed.

5.5 Surface Structure Filters

All catchbasins, and to a lesser degree, manholes, convey surface water to sewers. Until streets are asphalted and curbed where required, all manholes will be constructed with sediment capture filter socks located between the structure frame and cover. These will stay in place and be maintained during construction and build until it is appropriate to remove same.

6 CONCLUSIONS AND RECOMMENDATIONS

This report has demonstrated that watermains and storm and sanitary sewers can be extended to service the municipal roadway and commercial site in accordance with the adjacent development and the ISSU. Adherence to the Sediment and Erosion Control Plan during construction will minimize harmful impacts on surface water.



Lance Erion, P. Eng.
Associate

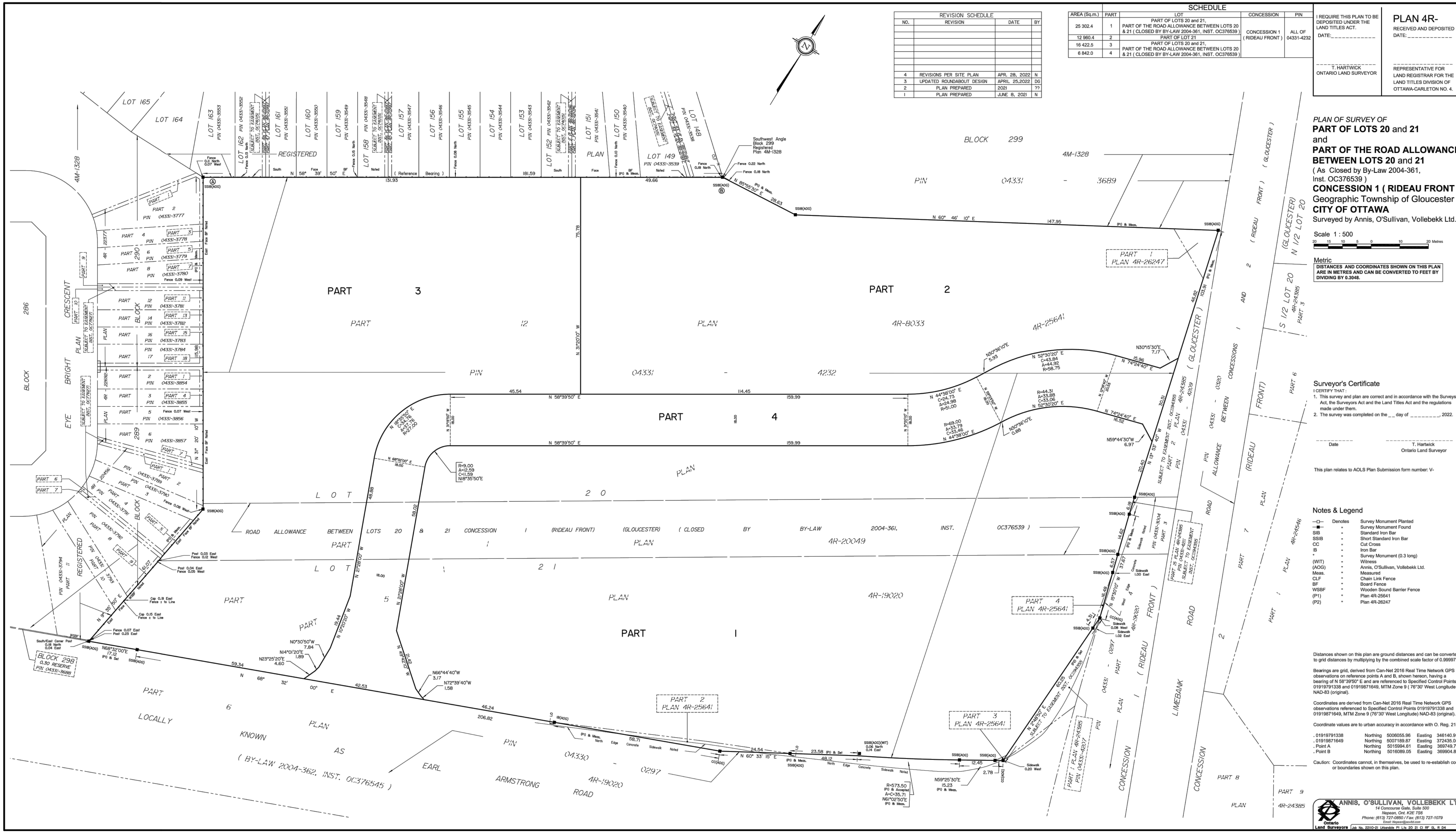
Samantha Labadie, P.Eng.

https://ibigroup.sharepoint.com/sites/Projects2/137404/Internal Documents/6.0_Technical/6.04_Civil/03_Reports/Design Brief/4th Submission/CTR_Design Brief_2023-06-28.docx\

Scale	Project Title	Drawing Title	Sheet No.
N.T.S.	EARL ARMSTRONG/LIMEBANK PLAZA	LOCATION PLAN	FIGURE 1.1

IBI

J:\137404_Earl_Armstro\7.0_Production\7.03_Design\04_Civil_LAND_Adequacy Report\137404-Fig-1.1-Location Plan.dwg Layout Name: FIGURE 1.1 LOCATION PLAN Last Saved By: Chris.Cormier Last Saved At: May. 6, 22



Scale	Project Title	Drawing Title	Sheet No.
NTS	EARL ARMSTRONG/LIMEBANK PLAZA	DRAFT PLAN	FIGURE 1.2

ZONING COMPLIANCE TABLE - PART 1

Project: Earl Armstrong Plaza

Address: 1515 Earl Armstrong Road, Ottawa, ON

Zoning: GM26
Property Identification Number : 04331-4232
Existing Lot Area: 25,302 m2
Site Development Area Frontage: 124 m (along Limebank)
Gross Floor Area (all buildings): 5,312 m2
Legal Description:
Part of Lots 20 and 21 and Part of the Road Allowance between Lots 20 and 21, Concession 1 (Rideau Front), Geographic Township of Gloucester, City of Ottawa

	REQUIRED		PROVIDED	
Minimum Lot Area	no minimum		25,302	m2
Minimum Lot Width	no minimum		varies	m
Minimum Front Yard Setback	3	m	3.5	m
Minimum Corner Side Yard Setback	3	m	3.5 to 6	m
Minimum Interior Side Yard Setback	5	m	n/a	m
Minimum Interior Side Yard Setback abutting Residential	9	m	n/a	m
Minimum Rear Yard Setback abutting a Street	3	m	11.3	m
Minium Rear Yard Setback abutting Residential	9	m	n/a	m
Maximum Floor Space Index	2		21	%
Maximum Building Height	18	m	6	m
Minimum width of landscaping abutting a Street	3	m	3	m
Minimum width of landscaping abutting a Residential zone	6	m	n/a	m
Minimum width of landscaping around a parking lot	3	m	3	m
Parking Requirements				
Parking Spaces for Retail/Personal Services	130			
Parking Spaces for Restaurant Use	105			
Parking Spaces for Restaurant with Drive-thru	37			
Parking Spaces for Daycare Use	0			
Total Parking spaces required (including barrier free parking spaces)	**271**		**281**	
Maximum Parking spaces (Table 103)	**294**			
Minimum queuing spaces for Drive-Thru	11		11	
Barrier-free parking spaces	8		14	
Bike Parking	22		30	
Loading Spaces for Office	0		n/a	
Loading Spaces for Retail	0		0	

ZONING COMPLIANCE TABLE - PART 2

Project: Earl Armstrong Plaza

Address: 1515 Earl Armstrong Road, Ottawa, ON

Zoning: GM26
Property Identification Number : 04331-4232
Existing Lot Area: 12,960 m2
Site Development Area Frontage: 46.7 m (along Limebank)
Gross Floor Area (all buildings): 4,744 m2
Legal Description:
Part of Lots 20 and 21 and Part of the Road Allowance between Lots 20 and 21, Concession 1 (Rideau Front), Geographic Township of Gloucester, City of Ottawa

	REQUIRED		PROVIDED	
Minimum Lot Area	no minimum		12,906	m2
Minimum Lot Width	no minimum		varies	m
Minimum Front Yard Setback	3	m	6	m
Minimum Corner Side Yard Setback	3	m	3.5(varies)	m
Minimum Interior Side Yard Setback	5	m	24 (varies)	m
Minimum Interior Side Yard Setback abutting Residential	9	m	n/a	m
Minimum Rear Yard Setback abutting a Street	3	m	n/a	m
Minium Rear Yard Setback abutting Residential	9	m	n/a	m
Maximum Floor Space Index	2		34	%
Maximum Building Height	18	m	6	m
Minimum width of landscaping abutting a Street	3	m	3	m
Minimum width of landscaping abutting a Residential zone	6	m	6	m
Minimum width of landscaping around a parking lot	3	m	3	m
Parking Requirements				
Parking Spaces for Retail/Personal Services	19			
Parking Spaces for Restaurant Use	56			
Parking Spaces for Restaurant with Drive-thru	19			
Parking Spaces for Office	61			
Parking Spaces for Daycare Use	11			
Total Parking spaces required (including barrier free parking spaces)	**158**		**164**	
Maximum Parking spaces (Table 103)	**173**			
Minimum queuing spaces for Drive-Thru	11		11	
Barrier-free parking spaces	8		8	
Bike Parking	18		30	
Loading Spaces for Office	1		1	
Loading Spaces for Retail	0		0	

ZONING COMPLIANCE TABLE - PART 3

Project: Earl Armstrong Plaza

Address: 1515 Earl Armstrong Road, Ottawa, ON

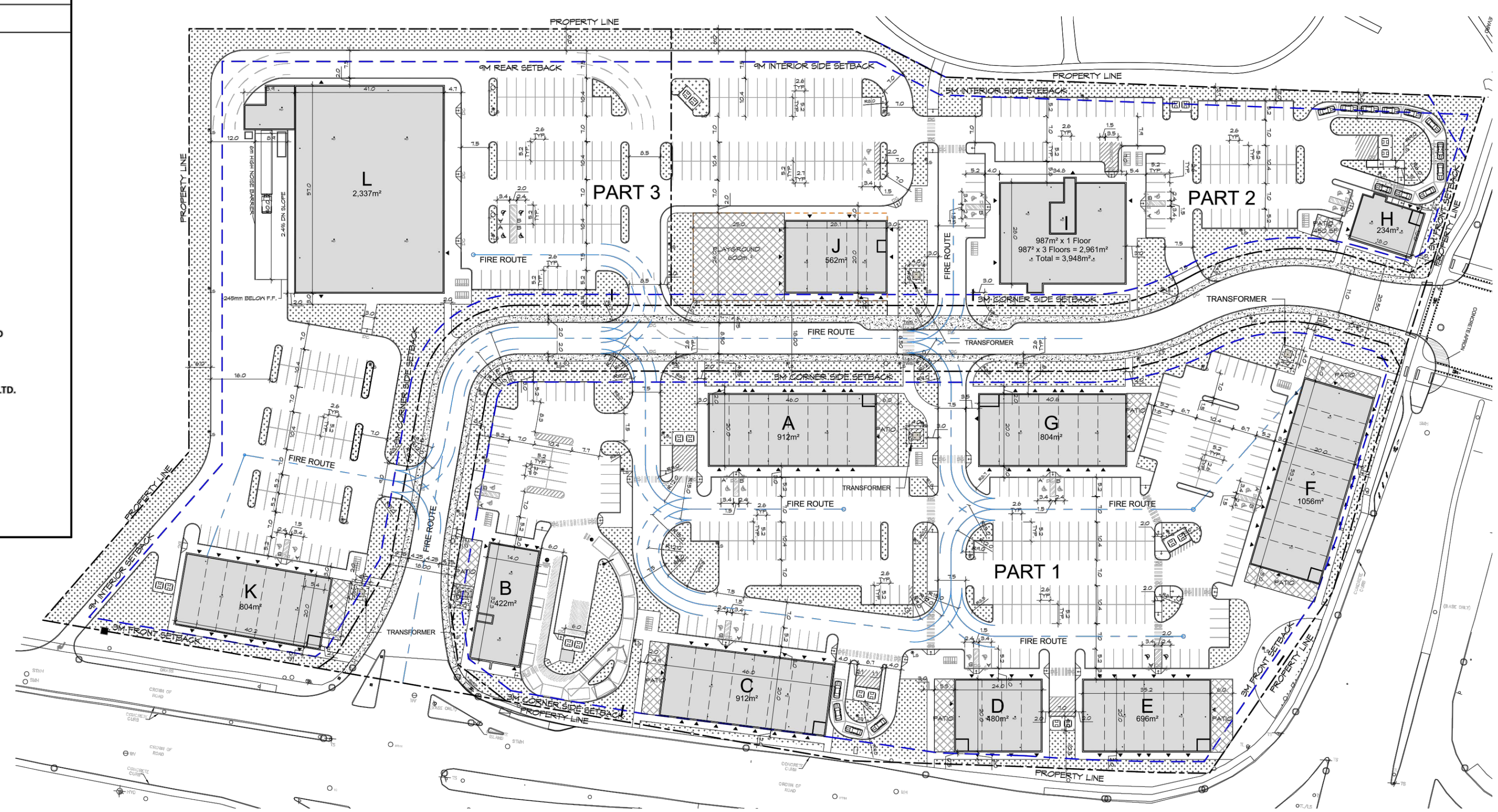
Zoning: GM26
Property Identification Number : 04331-4232
Existing Lot Area: 16,422 m2
Site Development Area Frontage: 76.5 m (along Earl Armstrong)
Gross Floor Area (all buildings): 3,141 m2
Legal Description:
Part of Lots 20 and 21 and Part of the Road Allowance between Lots 20 and 21, Concession 1 (Rideau Front), Geographic Township of Gloucester, City of Ottawa

	REQUIRED		PROVIDED	
Minimum Lot Area	no minimum		3,141	m2
Minimum Lot Width	no minimum			m
Minimum Front Yard Setback	3	m	5	m
Minimum Corner Side Yard Setback	3	m	3 (varies)	m
Minimum Interior Side Yard Setback	5	m	n/a	m
Minimum Interior Side Yard Setback abutting Residential	9	m	15	m
Minimum Rear Yard Setback abutting a Street	3	m	n/a	m
Minium Rear Yard Setback abutting Residential	9	m	15.5	m
Maximum Floor Space Index	2		19	%
Maximum Building Height	18	m	7	m
Minimum width of landscaping abutting a Street	3	m	3	m
Minimum width of landscaping abutting a Residential zone	6	m	6	m
Minimum width of landscaping around a parking lot	3	m	3	m
Parking Requirements				
Parking Spaces for Retail/Personal Services	91			
Parking Spaces for Restaurant Use	48			
Parking Spaces for Restaurant with Drive-thru	0			
Parking Spaces for Daycare Use	0			
Total Parking spaces required (including barrier free parking spaces)	**139**		**154**	
Maximum Parking spaces (Table 103)	**154**			
Minimum queuing spaces for Drive-Thru	11		n/a	
Barrier-free parking spaces	6		6	
Bike Parking	12		18	
Loading Spaces for Office	0		0	
Loading Spaces for Retail	2		2	

EARL ARMSTRONG PLAZA

1515 Earl Armstrong Road
Ottawa, Ontario

OWNER / APPLICANT:	**URBANDALE CORPORATION** 2193 ARCH ST. OTTAWA, ON K1G 2H5
ARCHITECT:	**DREDGE LEAHY ARCHITECTS INC.** 11 HOLLAND AVE., SUITE 411 OTTAWA, ON K1Y 4R9
CIVIL ENGINEERING:	**IBI GROUP** 333 PRESTON ST., SUITE 500 OTTAWA, ON K1S 5N4
PLANNING:	**FOTENN** 396 COOPER ST., SUITE 300 OTTAWA, ON K2P 2H7
M&E ENGINEERING:	**JRP ENGINEERING** 9 HOLGATE COURT KANATA, ON K2K 1B4
LANDSCAPE ARCHITECT:	**CSW LANDSCAPE ARCHITECTS LTD** 319 MCRAE AVE., SUITE 502 OTTAWA, ON K1Z 0B9
SURVEYOR:	**ANNIS, O'SULLIVAN, VOLLEBEKK LTD.** 14 CONCOURSE GATE, SUITE 500 OTTAWA, ON K2E 7S6
GEOTECHNICAL:	**PATERSON GROUP** 9 AURIGA DRIVE OTTAWA, ON K2E 7T9
STRUCTURAL:	**CLELAND JARDINE ENGINEERING** 580 TERRY FOX DRIVE, SUITE 200 OTTAWA, ON K2L 4B9



1 KEY PLAN
A000 SCALE: 1 : 750

Client:

Key Plan:
Plan Clé:
T.N. = TRUE NORTH
P.N. = PROJECT NORTH

2	RE-ISSUED FOR SITE PLAN APPLICATION	29/06/2023
1	ISSUED FOR SITE PLAN APPLICATION	15/12/2022
Issue:		Date:

Prime Consultant:
Expert-Conseil:

DREDGE LEAHY ARCHITECTS INC.
411-11 Holland Ave.
Ottawa, ON K1Y 4S1
613.724.9865
dl-arch.ca

Sub Consultant:
Expert-Conseil:

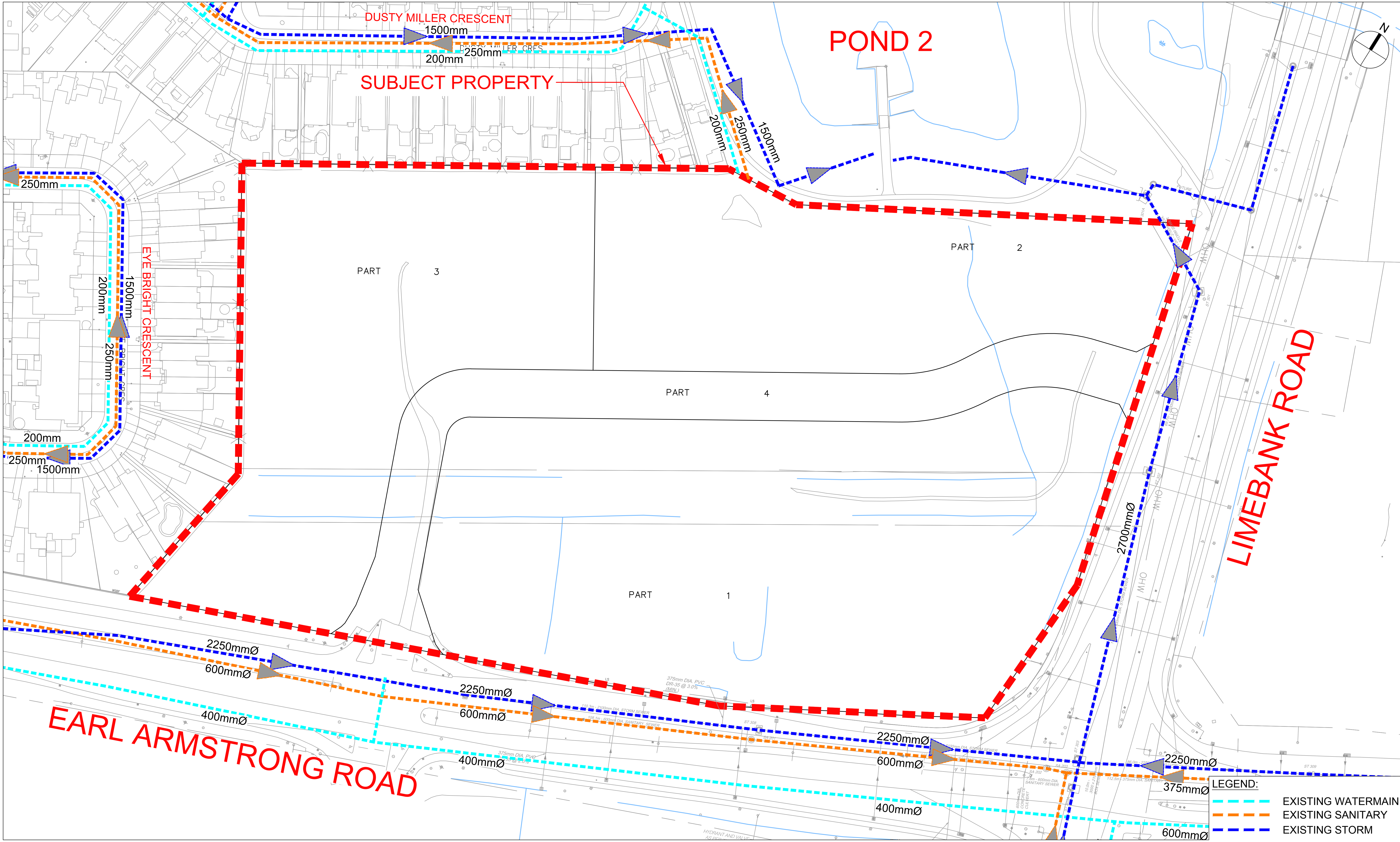
Project:
Projet: EARL ARMSTRONG PLAZA
1515 EARL ARMSTRONG RD, OTTAWA, ON

Drawing:
Dessin: ZONING TABLES

Drawn by: / Dessiné par: SG	Scale: / Échelle: 1 : 750
Designed by: / Conçu par: MD	Date: DEC. 2022
Approved by: / Approuvé par: MD	Client Project No. / No. du Projet du Client:
Seal: / Sceau: ONTARIO ASSOCIATION OF ARCHITECTS MICHELE L. DREDGE LICENCE 4998	Project No.: / No. du Projet: 1225-01
	Sheet No.: / No. de la feuille: A000

Plan Number: 18900
D07-16-22-0010
D07-12-22-0169

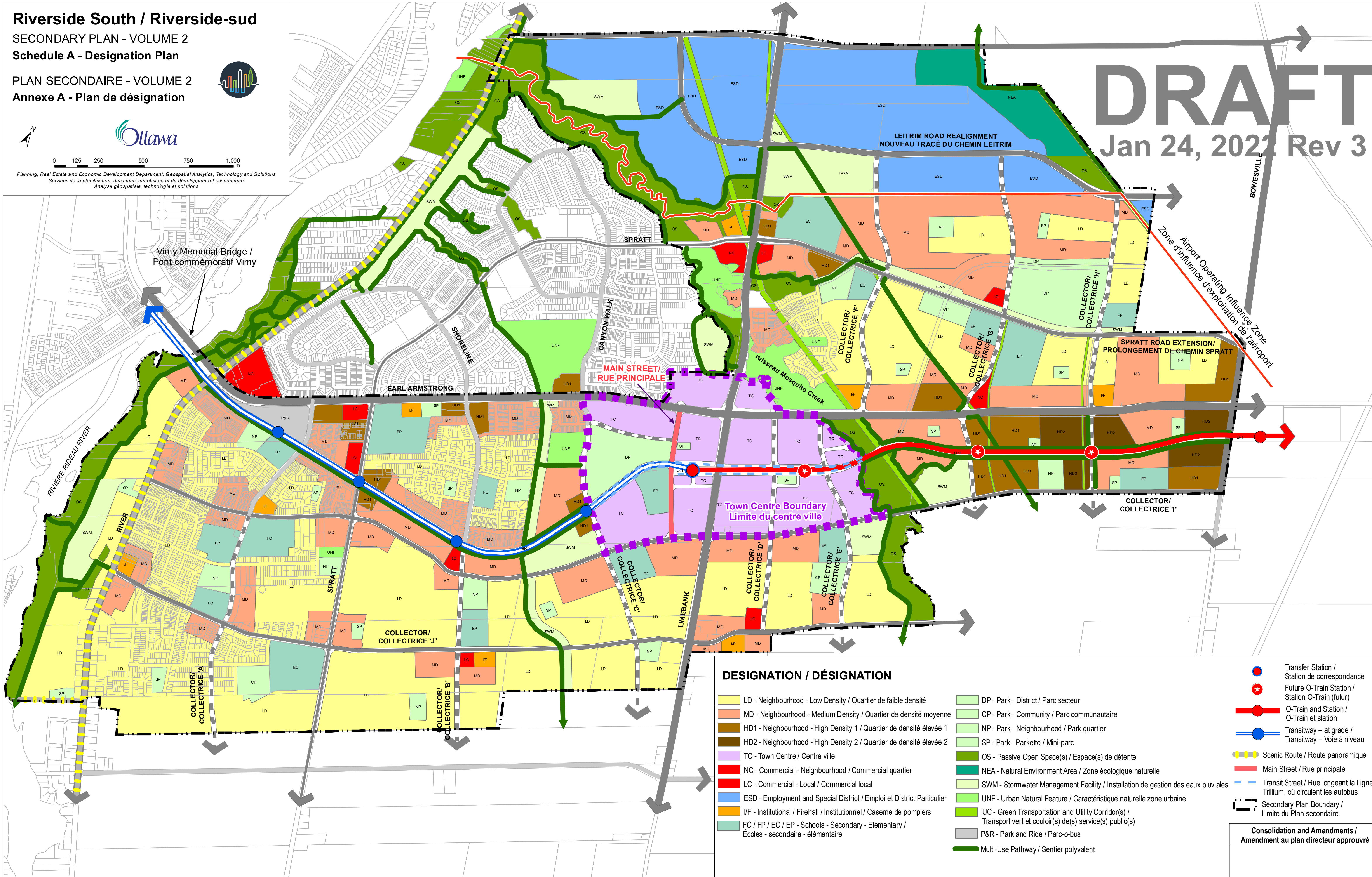
IBI	Scale	Project Title	Drawing Title	Sheet No.
	NTS	EARL ARMSTRONG/LIMEBANK PLAZA	CONCEPT PLAN	FIGURE 1.3



Scale	Project Title	Drawing Title	Sheet No.
N.T.S.	EARL ARMSTRONG/LIMEBANK PLAZA	LOCATION OF EXISTING INFRASTRUCTURE	FIGURE 1.4

Appendix A

- 2016 Riverside South Community Design Plan – Land Use Plan
- January 29, 2020 Pre-Consultation Meeting Notes


Riverside South / Riverside-sud
SECONDARY PLAN - VOLUME 2
Schedule A - Designation Plan
PLAN SECONDAIRE - VOLUME 2
Annexe A - Plan de désignation
Ottawa
0 125 250 500 750 1,000 m
Planning, Real Estate and Economic Development Department, Geospatial Analytics, Technology and Solutions
Services de la planification, des biens immobiliers et du développement économique
Analyse géospatiale, technologie et solutions
DRAFT
Jan 24, 2022 Rev 3
Vimy Memorial Bridge /
Pont commémoratif Vimy
RIVIÈRE RIDEAU RIVER
LEITRIM ROAD REALIGNMENT
NOUVEAU TRACÉ DU CHEMIN LEITRIM
BOWESVILLE
Airport Operating Influence Zone
Zone d'influence d'exploitation de l'aéroport
SPRATT ROAD EXTENSION/
PROLONGEMENT DE CHEMIN SPRATT
SPRATT
CANYON WALK
SHORELINE
EARL ARMSTRONG
MAIN STREET/
RUE PRINCIPALE
ruisseau Mosquito Creek
Town Centre Boundary
Limite du centre ville
RIVER
LIMEBANK
COLLECTOR/ COLLECTRICE 'A'
COLLECTOR/ COLLECTRICE 'B'
COLLECTOR/ COLLECTRICE 'C'
COLLECTOR/ COLLECTRICE 'D'
COLLECTOR/ COLLECTRICE 'E'
COLLECTOR/ COLLECTRICE 'F'
COLLECTOR/ COLLECTRICE 'G'
COLLECTOR/ COLLECTRICE 'H'
COLLECTOR/ COLLECTRICE 'I'
COLLECTOR/ COLLECTRICE 'J'
DESIGNATION / DÉSIGNATION
LD - Neighbourhood - Low Density / Quartier de faible densité
MD - Neighbourhood - Medium Density / Quartier de densité moyenne
HD1 - Neighbourhood - High Density 1 / Quartier de densité élevée 1
HD2 - Neighbourhood - High Density 2 / Quartier de densité élevée 2
TC - Town Centre / Centre ville
NC - Commercial - Neighbourhood / Commercial quartier
LC - Commercial - Local / Commercial local
ESD - Employment and Special District / Emploi et District Particulier
I/F - Institutional / Firehall / Institutionnel / Caserne de pompiers
FC / FP / EC / EP - Schools - Secondary - Elementary / Écoles - secondaire - élémentaire
DP - Park - District / Parc secteur
CP - Park - Community / Parc communautaire
NP - Park - Neighbourhood / Park quartier
SP - Park - Parkette / Mini-parc
OS - Passive Open Space(s) / Espace(s) de détente
NEA - Natural Environment Area / Zone écologique naturelle
SWM - Stormwater Management Facility / Installation de gestion des eaux pluviales
UNF - Urban Natural Feature / Caractéristique naturelle zone urbaine
UC - Green Transportation and Utility Corridor(s) / Transport vert et couloir(s) de(s) service(s) public(s)
P&R - Park and Ride / Parc-o-bus
Multi-Use Pathway / Sentier polyvalent
Transfer Station / Station de correspondance
Future O-Train Station / Station O-Train (futur)
O-Train and Station / O-Train et station
Transitway – at grade / Transitway – Voie à niveau
Scenic Route / Route panoramique
Main Street / Rue principale
Transit Street / Rue longeant la Ligne Trillium, où circulent les autobus
Secondary Plan Boundary / Limite du Plan secondaire
Consolidation and Amendments / Amendment au plan directeur approuvé

1515 Earl Armstrong Rd

Meeting Summary and Additional Comments

January 29, 2020 Ottawa City Hall

Attendees:

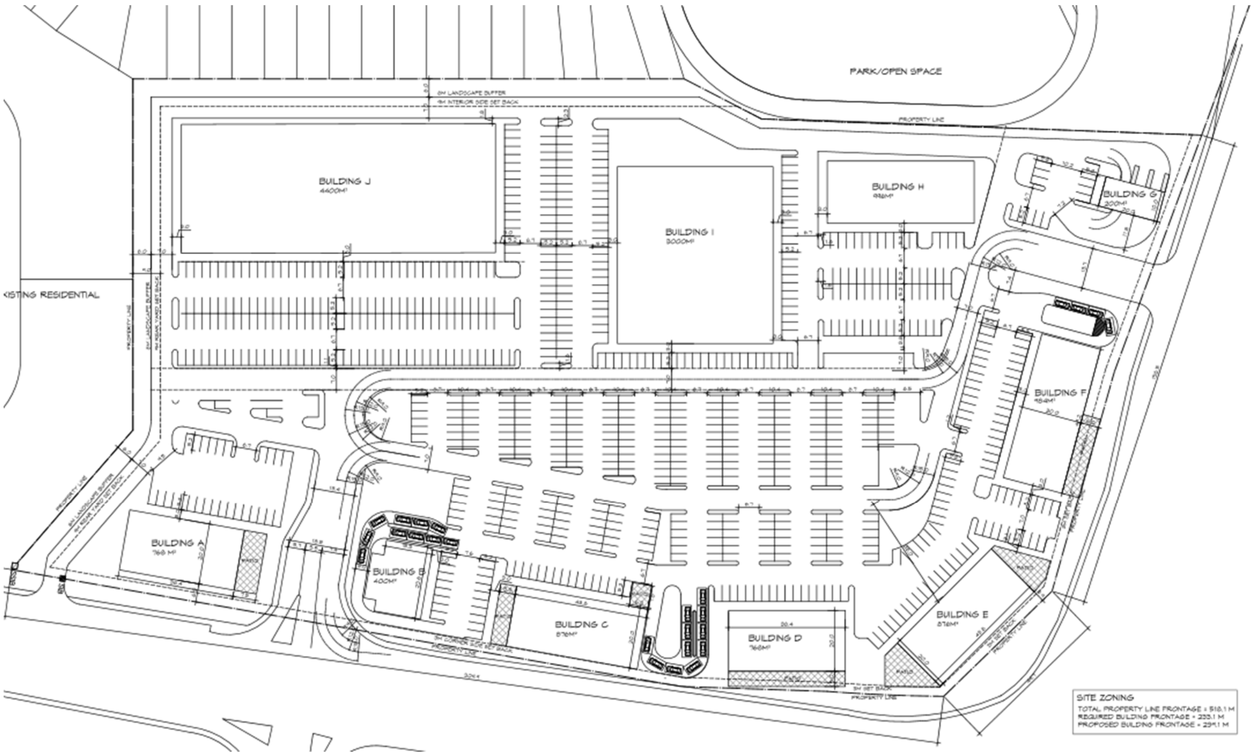
- Christa Jones, Urbandale
- Marcel Denomme, Urbandale
- Roger Tuttle, Urbandale
- Michele Dredge, Architect
- Jamie Batchelor, RVCA
- Josianne Gervais (Transportation Project Manager, City of Ottawa)
- Natasha Baird (Project Manager, City of Ottawa)
- Christopher Moise (Urban Designer, Architect, City of Ottawa)
- Burl Walker, Parks Planner, City of Ottawa
- Matthew Hayley, Environmental Planner, City of Ottawa
- Tracey Scaramozzino (File Lead, Planner, City of Ottawa)

Unable to Attend:

- Mark Richardson, Forester, City of Ottawa

Proposal:

- Currently vacant
- 140,000 square foot retail (bank, drive-through, potential 4-storey office bldg.)
- Taking advantage of street frontages for patios
- Parking rate is based on highest ratio use (restaurant) and results in 5-6 spaces/100 square metres


PARK/OPEN SPACE
BUILDING J
BUILDING I
BUILDING H
BUILDING G
BUILDING F
BUILDING E
BUILDING D
BUILDING C
BUILDING B
BUILDING A
XISTING RESIDENTIAL
SITE ZONING
TOTAL PROPERTY LINE FRONTAGE = 510.1 M
REQUIRED BUILDING FRONTAGE = 255.1 M
PROPOSED BUILDING FRONTAGE = 291.1 M

1. **Official Plan -** designated “General Urban Area.”
    a. **RSS Secondary Plan** (estimated to be in effect Summer 2020) – “community core”
    b. **RSS CDP** (to be removed and replaced by Secondary Plan) - “mixed use/community core” – with higher residential density and mixed-use to support pedestrians.

2. **Zoning Information**
    a. **Currently: GM26**
        - Permits wide variety of non-residential uses (bank, restaurant, retail store..) and residential uses (low- and mid-rise apts, stacked dwelling...)
        - GM26 also permits car wash, gas bar, automobile service station...

    b. **Spring/Summer 2020: MCxx1[xxx1]-h** (as per the new secondary plan)

        Update the preamble of the MC – Mixed Use Centre Zone (Section 191 and 192 of the Zoning Bylaw) to add the following bolded text within purpose of the MC zone, item (1): “Ensure that the areas designated Mixed-Use Centres **or referred to as a community core** in the Official Plan, or a similar designation in a Secondary Plan, accommodate a combination of transit-supportive uses such as offices, secondary and post-secondary schools, hotels, hospitals, large institutional buildings, community recreation and leisure centres, day care centres, retail uses, entertainment uses, service uses such as restaurants and personal service businesses, and high- and medium-density residential uses"

        New Exception [XXX1] allows additional uses: gas bar, service station, car wash
        New Exception [XXX1] specifies how the holding symbol must be removed with a ‘demonstration plan’.

3. **Infrastructure/Servicing (Natasha Baird):**

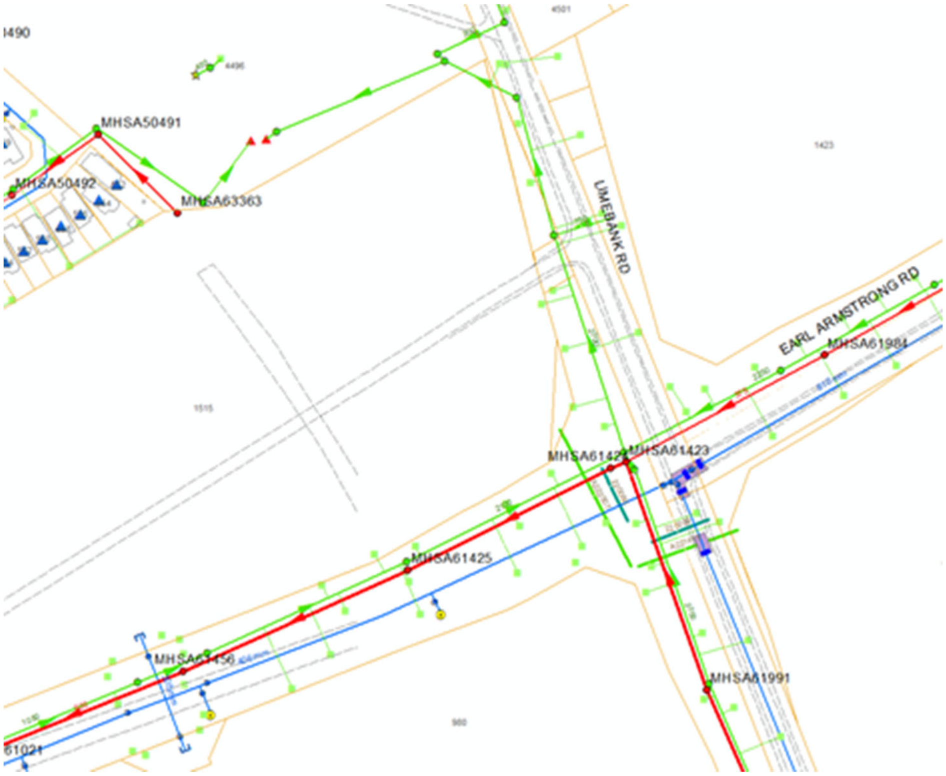
Water

Water District Plan No: Not available until the 600mm watermain is active
Existing public services:

- Earl Armstrong – 406mm PVC

Existing connection:

- 305mm PVC water service lateral from Earl Armstrong
- Existing on-site water service must be shown on the plans. If the existing on-site water service will not be reused, it is to be blanked at the watermain



Watermain Frontage Fees to be paid?: ☒ **No**

Boundary conditions:
Civil consultant must request boundary conditions from the City's assigned Project Manager prior to first submission.

- Water boundary condition requests must include the location of the service(s) and the expected loads required by the proposed developments. Please provide all the following information:
  - Location of service(s)
  - Type of development and the amount of fire flow required (as per FUS, 1999).
  - Average daily demand: ___ l/s.
  - Maximum daily demand: ___l/s.
  - Maximum hourly daily demand: ___ l/s.
- Fire protection (Fire demand, Hydrant Locations)

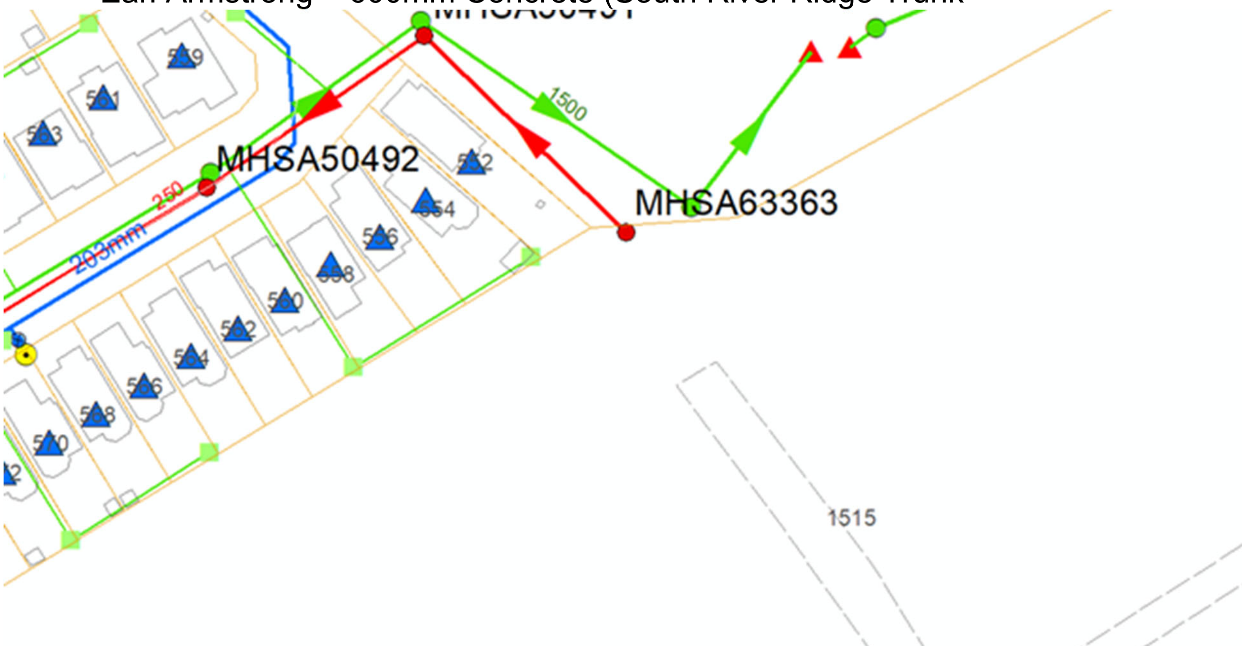
General comments

- A water meter sizing questionnaire [water card] will have to be completed prior to receiving a water permit (water card will be provided post approval)
- Service areas with a basic demand greater than 50 m^3/day or over 50 units shall be connected with a minimum of two water services, separated by an isolation valve, to avoid creation of vulnerable service area.

Sanitary Sewer

Existing public services:

- Dusty Miller / storm facility block – 250mm PVC
- Earl Armstrong – 600mm Concrete (South River Ridge Trunk -



Existing connection:

- Existing 250mm PVC sanitary service must be shown on the plans. If existing sanitary sewer is to be reused, provide CCTV inspection report along with consultant's assessment of the existing sewer conditions. Existing on-site sanitary sewer to be capped and abandoned to City of Ottawa standards at the property line if it will not be reused.

Is a monitoring manhole required on private property? ☒ **Yes**

General comments

- Any premise in which there is commercial or institutional food preparation shall install a grease and oil inceptor on all fixtures.
- The Environmental Site Assessment (ESA) may provide recommendations where site contamination may be present. The recommendations from the ESA need to be coordinated with the servicing report to ensure compliance with the Sewer Use By-Law.

Storm Sewer

Existing public services:

- Earl Armstrong – 2100mm Concrete
- Limebank – 2700mm Concrete – proposed as per the old

Existing connection:

- No existing storm connection.

General comments

- ***This site is located in the Riverside South Master Drainage Update and the storm serviceability has not been confirmed yet. The site will most likely be tributary to the existing Pond 2 in the Riverside South Development Area but no criteria is available yet. Prior to submitting this application, the MDP and MSS Updates need to be completed.***

Stormwater Management

Quality Control:

- Rideau Valley Conservation Authority to confirm quality control requirements.

Quantity Control:

- Master Drainage and Servicing Study underway.

Ministry of Environment, Conservation and Parks (MECP)
All development applications should be considered for an Environmental Compliance Approval, under MECP regulations.

1. Consultant determines if an approval for sewage works under Section 53 of OWRA is required. Consultant determines what type of application is required and the City's project manager confirms. (If the consultant is not clear if an ECA is required, they will work with the City to determine what is required. If unclear or there is a difference of opinion the City Project Manager will coordinate requirements with MECP).
2. The project will be either transfer of review (standard), transfer of review (additional), direct submission, or exempt as per O. Reg. 525/98.
3. Pre-consultation is not required if applying for standard or additional works (Schedule A of the Agreement) under Transfer Review.
4. Pre-consultation with local District office of MECP is recommended for direct submission.

NOTE: Site Plan Approval is required before any Ministry of the Environment and Climate Change (MOECC) application is sent

General Service Design Comments

- The City of Ottawa requests that all new services be located within the existing service trench to minimize necessary road cuts.
- Monitoring manholes should be located within the property near the property line in an accessible location to City forces and free from obstruction (i.e. not a parking).
- Where service length is greater than 30 m between the building and the first maintenance hole / connection, a cleanout is required.
- Manholes are required for connections to sanitary or combined trunk sewers as per City of Ottawa Standards S13.
- The City of Ottawa Standard Detail Drawings should be referenced where possible for all work within the Public Right-of-Way.
- The upstream and downstream manhole top of grate and invert elevations are required for all new sewer connections.
- Services crossing the existing watermain or sewers need to clearly provide the obvert/invert elevations to demonstration minimum separation distances. A watermain crossing table may be provided.

Exterior Site Lighting:

- If exterior Site Lighting is used, provide a certification and plan by a qualified engineer confirming the design complies with the following criteria:
    - It must be designed using only fixtures that meet the criteria for Full Cut-Off (Sharp cut-off) Classification, as recognized by the Illuminating Engineering Society of North America (IESNA or IES), and;
    - It must result in minimal light spillage onto adjacent properties. As a guideline, 0.5 foot-candle is normally the maximum allowable spillage.
    - The location of the fixtures, fixture types as in make, model and part number and the mounting heights must be shown on one of the approved plans.

Other

Capital Works Projects within proximity to application? ☒ **No**

References and Resources

- As per section 53 of the Professional Engineers Act, O. Reg 941/40, R.S.O. 1990, all documents prepared by engineers must be signed and dated on the seal.
- All required plans are to be submitted on standard A1 size sheets (594mm x 841mm) sheets, utilizing a reasonable and appropriate metric scale as per City of Ottawa Servicing and Grading Plan Requirements: title blocks are to be placed on the right of the sheets and not along the bottom. Engineering plans may be combined, but the Site Plans must be provided separately. Plans shall include the survey monument used to confirm datum. Information shall be provided to enable a non-surveyor to locate the survey monument presented by the consultant.
- All required plans & reports are to be provided in *.pdf format (at application submission and for any, and all, re-submissions)
- Please find relevant City of Ottawa Links to Preparing Studies and Plans below:

  https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans#standards-policies-and-guidelines
- To request City of Ottawa plan(s) or report information please contact the City of Ottawa Information Centre:

  InformationCentre@ottawa.ca<mailto:InformationCentre@ottawa.ca>

  (613) 580-2424 ext. 44455
- geoOttawa

  http://maps.ottawa.ca/geoOttawa/

4. **Initial Planning (Tracey Scaramozzino):**

   This is a very prominent location and will create the foundation for and be a gateway to the RSS Community Core. The Core lands are being developed around the o-train corridor and are to be geared towards transit and pedestrian activity.

   a. We appreciate that the bldgs are close to the street.
   b. Ensure compliance with the RSS Secondary Plan, which is to be in effect in the Spring/Summer 2020 – some points of which are identified below.
   c. Ensure regard is had for the current RSS CDP which provided guidance to the policies in the new Secondary Plan - some points of which are identified below.
   d. Identify how the density targets in the updated Official Plan are being met (100 people/jobs per net hectare).
   e. Consider developing the site in phases - develop the land on the eastern half of the site first which would allow the development to contain the same square footage as is being proposed, but in a reduced area and thereby increasing the heights of the buildings and creating the continuous street wall as per the CDP and Secondary Plan requirements.
   f. Please include some higher density residential uses – possibly as part of mixed-use buildings.
   g. Ensure all buildings are 2-storeys in height. This could be accomplished through comments 4e. and 4f. above.
   h. Provide functional doors on the street-fronts, and not single access doors on the parking lot side. A lot of the customers to the site will likely be on foot/bike.
   i. Reduce amount of parking, as this is a community core and very close to transit and eliminate parking spaces close to the street edges.
   j. Show tree plantings within medians of the parking lot
   k. Enhance the pedestrian connection through the site – north-south and east-west – to help travel within the development as well as providing ample connections to the neighbouring uses. This ped connection shall be in a contrasting colour and material from the asphalt parking lot.
   l. Decorative fencing and/or gateway feature will be required at the intersection of Limebank and Earl Armstrong.
   m. The site is subject to the UDRP to ensure a high level of architectural and urban design.
   n. Typical corporate facades shall be revised to reflect a cohesive design theme.
   o. Waste collection areas shall be internal to bldgs when possible and otherwise, well-designed to integrate into the site. Earth-bins are recommended.
   p. Employ green options in both the architectural and urban design – such as permeable pavers, solar panels, green roofs, butterfly gardens etc.
   q. Revise the drive-throughs away from the street frontages.

5. **Initial Design Comments (Christopher Moise):**
    a. How can we achieve some sense of the future of building H? It is the only building with density/height which is encouraged;
    b. How can the parking lot be further developed to accommodate more trees/green strips etc.
    c. Try to meet the intent of the UD guidelines for drive-thru's - ie. 45% of frontage to support the street (wrapping a building with a drive-thru does not meet this intent and removes this frontage from the 45% equation). The requirement of the 45% street frontage is to support and create a streetscape so we encourage you to develop an idea of what this is going to look like and how it may function as part of a street and pedestrian supportive development for the larger community to enjoy.
    d. Provide additional safe pedestrian connections through the parking zone to help support the pedestrian movement across the site.

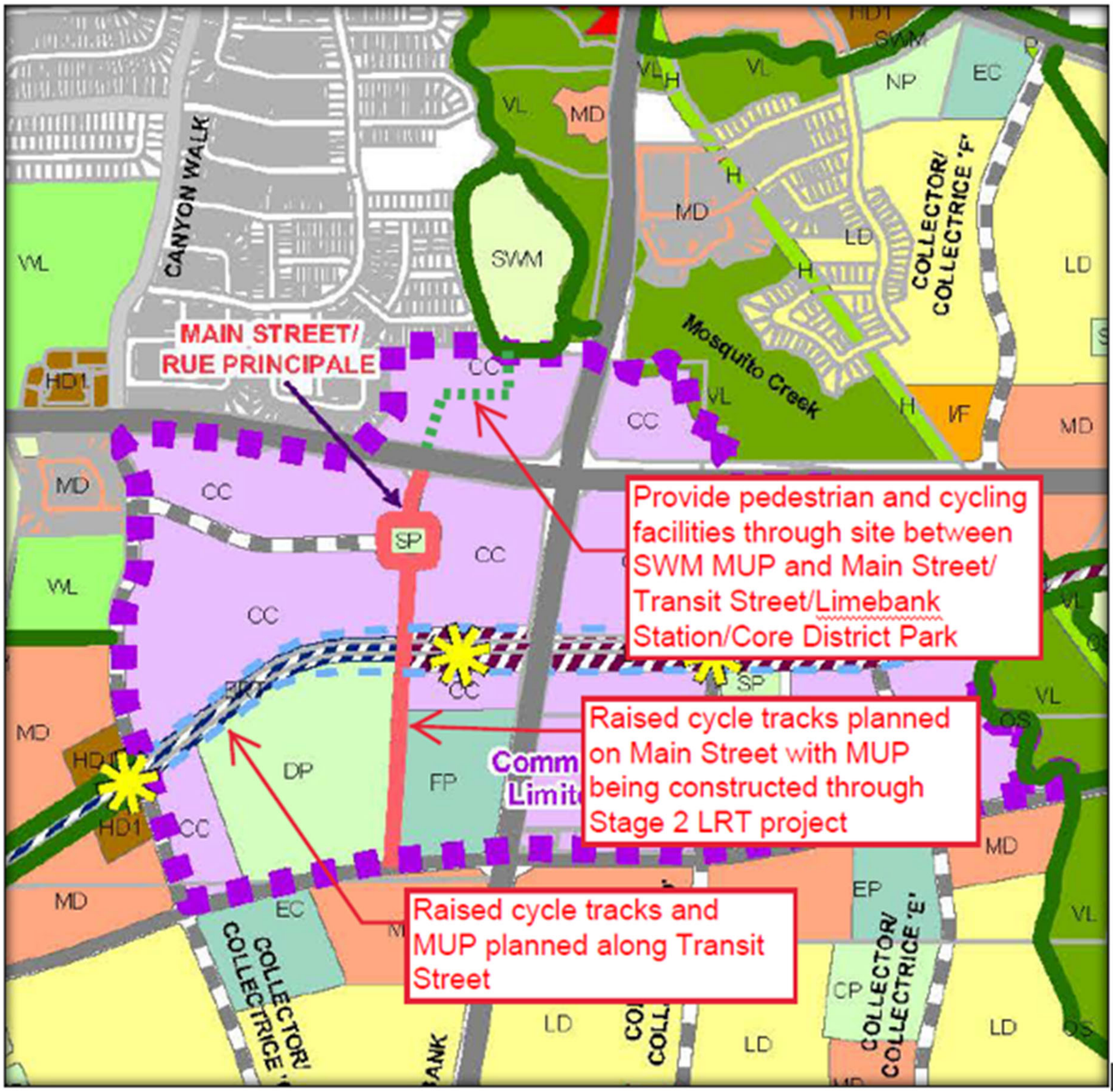
6. **Parks (Burl Walker):**
    a. No parks are planned on the subject property.

    b. The parkland dedication requirement for the proposed site plan application is approximately 0.123 ha as calculated below. In the event that the proposed land use changes or the gross land area of the site changes, the parkland dedication requirement will also change.

Proposed Use	**Gross Land Area (ha)**	**Parkland Dedication Rate**	**Parkland Dedication (ha)**
Commercial	6.152 ha	2% of Gross Land Area	0.123

    c. The Owner will be participating in the Riverside South park cost sharing agreement. The under dedication of 0.123 ha of parkland for this proposed development is intended to be offset by the over dedication of parkland elsewhere in the Riverside South CDP area. Prior to the registration of the site plan agreement, the Owner shall submit proof from the landowners' trustee or administrator that the Owner is party to the cost sharing agreement and has paid its share of any costs pursuant to the landowners' agreement, or the Owner shall submit other suitable documentation from the landowners' trustee demonstrating that the Owner is participating in the agreement.

    d. There is an existing multi-use pathway system located immediately to the north of the site including a pathway loop around the stormwater management pond. Pedestrian and cycling facilities should be provided through the site to connect the SWM MUP to the sidewalk and cycling facilities that are planned on Main Street and Transit Street. This will improve pedestrian and cycling connectivity between the residential area north of the site and Main Street, Transit Street, Limebank Station and the Core District Park. In addition, consider requiring the Owner to design and construct a short MUP connection (+/- 2m or 3m in length) on City property from the north lot line to the SWM MUP. See sketch below:



7. Trees (Mark Richardson):

1. a Tree Conservation Report (TCR) must be supplied for review along with the suite of other plans/reports required by the City; an approved TCR is a requirement of Site Plan or Plan of Subdivision approval

2. any removal of privately-owned trees 10cm or larger in diameter requires a tree permit issued under the Urban Tree Conservation Bylaw; the permit is based on the approved TCR
3. any removal of City-owned trees will require the permission of Forestry Services who will also review the submitted TCR
4. for this site, the TCR may be combined with the Landscape Plan provided all information is clearly displayed
    a. if possible, please submit separate plans showing 1) existing tree inventory, and 2) a plan showing to be retained and to be removed trees with tree protection details
5. the TCR must list all trees on site by species, diameter and health condition – separate stands of trees may be combined using averages
6. the TCR must address all trees with a critical root zone that extends into the developable area – all trees that could be impacted by the construction that are outside the developable area need to be addressed.
7. trees with a trunk that crosses/touches a property line are considered co-owned by both property owners; permission from the adjoining property owner must be obtained prior to the removal of co-owned trees
8. If trees are to be removed, the TCR must clearly show where they are, and document the reason they can not be retained – please provide a plan showing retained and removed treed areas
9. All retained trees must be shown and all retained trees within the area impacted by the development process must be protected as per City guidelines listed on Ottawa.ca

    a. the location of tree protection fencing must be shown on a plan

    b. include distance indicators from the trunk of the retained tree to the nearest part of the tree protection fencing

    c. show the critical root zone of the retained trees

    d. if excavation will occur within the critical root zone, please show the limits of excavation and calculate the percentage of the area that will be disturbed
10. the City encourages the retention of healthy trees; if possible, please seek opportunities for retention of trees that will contribute to the design/function of the site.
11. Please ensure newly planted trees have an adequate soil volume for their size at maturity. The following is a table of recommended minimum soil volumes:

Tree Type/Size	Single Tree Soil Volume (m3)	Multiple Tree Soil Volume (m3/tree)
Ornamental	15	9
Columnar	15	9
Small	20	12
Medium	25	15

Large	30	18
Conifer	25	15

12. For more information on the process or help with tree retention options, contact Mark Richardson mark.richardson@ottawa.ca

8. **Environment (Matthew Hayley)**
    a. This property is immediately south of a stormwater block that also contains Mosquito Creek. Mosquito Creek and its associated valley are part of the City of Ottawa's natural heritage system as indicated in Schedule L1. This means that any development within 30 m will trigger an Environmental Impact Statement. Accordingly, the site will trigger an EIS to address the site's impact on the natural heritage system (the Mosquito Creek Significant Valley), this will need to include the impacts from the operation of Building F.

9. **Conservation Authority (Jamie Batchelor):**
    a. Natural Hazards
        1. The northern property boundary is adjacent to a stormwater management block. The storm pond in the stormwater management block has a slope of approximately 3-4 metres in height and the top of the slope is only approximately 9 metres from the northern boundary of subject site. Therefore, it will be imperative that a slope stability analysis be completed to ensure that any development proposed on the site will not impact the stability of the stormwater management pond.

    b. Stormwater management is expected to be in conformity with the approved MDP.

10. **Transportation (Josiane Gervais):**

- Follow Traffic Impact Assessment Guidelines
    a. A TIA is required.
    b. Start this process asap. The application will not be deemed complete until the submission of the draft step 1-4, including the functional draft RMA package (if applicable) and/or monitoring report (if applicable).
    c. Request base mapping asap if RMA is required. Contact Engineering Services (https://ottawa.ca/en/city-hall/planning-and-development/engineering-services)
- ROW protection on Limebank between Leitrim and South Urban Community Boundary is 44.5m even.
- Corner triangles as per OP Annex 1 - Road Classification and Rights-of-Way at the following locations on the final plan will be required (measure on the property

line/ROW protected line; no structure above or below this triangle), Arterial Road to Arterial Road: 5 m x 5 m

- Sight triangle as per Zoning by-law is 6 m x 6 m measure on the curb line.
- Minimum Corner Clearance to the accesses should follow TAC guidelines (Figure 8.8.2).
- Indicate clear throat lengths on the site plan and ensure suggested minimum requirements are met for arterial roadways, as per TAC guidelines (Table 8.9.3).
- On site plan:
    a. Show all details of the roads abutting the site up to and including the opposite curb; include such items as pavement markings, accesses and/or sidewalks.
    b. Turning templates will be required for all accesses showing the largest vehicle to access the site; required for internal movements and at all access (entering and exiting and going in both directions).
    c. Show all curb radii measurements; ensure that all curb radii are reduced as much as possible
    d. Show lane/aisle widths.
    e. Show on-site pedestrian paths.
    f. Sidewalk is to be continuous across access as per City Specification 7.1.
    g. Access off Limebank Rd should be no more than 9.0m wide, as per the Private Approach Bylaw. It is strongly recommended that this access be limited to right-in/right-out movements.
    h. Grey out any area that will not be impacted by this application.
- AODA legislation is in effect for all organizations, please ensure that the design conforms to these standards.

- Noise Impact Studies required for the following:
    a. Stationary if there will be any exposed mechanical equipment due to the proximity to neighbouring noise sensitive land uses.
    b. Road (general offices, retail stores, outdoor patio areas)

11. General Information

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

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

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

<u>Key Policy Objectives for the City of Ottawa – as of December 2019</u>

The approved preliminary policy directions address six key themes:

- **Growth management –** policies would encourage more growth through intensification than through expansion into new or undeveloped areas, promote growth around transit, encourage sustainable village expansion and consider housing and transportation affordability.

- **Energy and climate mitigation –** policies would ensure climate change and energy conservation considerations are integrated into city planning guidelines, promote local energy generation, set new energy standards for buildings and reduce emissions through transportation and infrastructure.

- **Climate resiliency –** policies would align with the Climate Change Master Plan to reduce the urban heat island effect, further reduce the risk and impact of flooding and encourage more resilient homes, buildings, communities and infrastructure.

- **Transportation and mobility –** policies would aim to see more than half of all trips made by sustainable transportation. The City would pursue related policies as part of the coming Transportation Master Plan update.

- **Neighbourhood context –** policies would establish a framework of six areas, including the downtown core, inner urban area, outer urban area, suburban area, rural area and Greenbelt, and policies would be tailored to each so that growth can better address neighbourhood context.

- **Economic development –** policies would direct major employment to established hubs and corridors, support economic development in rural and village areas and establish a new economic zone centred on the airport.

Appendix B

- City of Ottawa Boundary Conditions
- Watermain Demand Calculation Sheet
- FUS Fire Flow Calculations
- Modeling Output Files

Boundary Conditions
1515 Earl Armstrong Plaza

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	22	0.36
Maximum Daily Demand	53	0.89
Peak Hour	96	1.60
Fire Flow Demand #1	9,000	150.00

Location

Results – Existing Conditions

Connection 1 – Earl Armstrong Rd.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	132.3	55.3
Peak Hour	125.0	45.0
Max Day plus Fire 1	125.9	46.4

Ground Elevation = 93.3 m

Connection 2 – Dusty Miller Cres.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	132.2	57.0
Peak Hour	125.0	46.7
Max Day plus Fire 1	116.2	34.2

Ground Elevation = 92.1 m

Results – SUC Zone Reconfiguration

Connection 1 – Earl Armstrong Rd.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	148.7	78.8
Peak Hour	145.7	74.4
Max Day plus Fire 1	144.7	73.0

Ground Elevation = 93.3 m

Connection 2 – Dusty Miller Cres.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	148.7	80.5
Peak Hour	145.7	76.1
Max Day plus Fire 1	134.9	60.8

Ground Elevation = 92.1 m

Notes

1. As per the Ontario Building Code in areas that may be occupied, the static pressure at any fixture shall not exceed 552 kPa (80 psi.) Pressure control measures to be considered are as follows, in order of preference:
   a. If possible, systems to be designed to residual pressures of 345 to 552 kPa (50 to 80 psi) in all occupied areas outside of the public right-of-way without special pressure control equipment.
   b. Pressure reducing valves to be installed immediately downstream of the isolation valve in the home/ building, located downstream of the meter so it is owner maintained.

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. Fire Flow analysis is a reflection of available flow in the watermain; there may be additional restrictions that occur between the watermain and the hydrant that the model cannot take into account.

IBI GROUP
333 PRESTON STREET
OTTAWA, ON
K1S 5N4

WATERMAIN DEMAND CALCULATION SHEET

PROJECT : 1515 EARL ARMSTRONG PLAZA
LOCATION : CITY OF OTTAWA
DEVELOPER : RIVERSIDE SOUTH DEVELOPMENT CORPORATION

FILE: 137404
DATE PRINTED: 13-Dec-22
DESIGN: LE

NODE	BUILDING	RESIDENTIAL				NON-RESIDENTIAL			AVERAGE DAILY DEMAND (l/s)			MAXIMUM DAILY DEMAND (l/s)			MAXIMUM HOURLY DEMAND (l/s)		
		UNITS			POP'N	INDTRL	COMM.	RETAIL									
		SF	SD & TH	OTHER		(ha.)	(ha.)	(m^2)	Res.	Non-res.	Total	Res.	Non-res.	Total	Res.	Non-res.	Total
J1	B & K							1,256	0.00	0.04	0.04	0.00	0.05	0.05	0.00	0.10	0.10
J5	H							234	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.02	0.02
J10	E & F							1,752	0.00	0.05	0.05	0.00	0.08	0.08	0.00	0.14	0.14
J12	L							2,337	0.00	0.07	0.07	0.00	0.10	0.10	0.00	0.18	0.18
J13	C & D							1,392	0.00	0.04	0.04	0.00	0.06	0.06	0.00	0.11	0.11
J14	A & G							1,716	0.00	0.05	0.05	0.00	0.07	0.07	0.00	0.13	0.13
J15	J							562	0.00	0.02	0.02	0.00	0.02	0.02	0.00	0.04	0.04
J16	I							3,662	0.00	0.11	0.11	0.00	0.16	0.16	0.00	0.29	0.29
TOTALS								**12,911**			**0.39**			**0.55**			**1.01**

ASSUMPTIONS

RESIDENTIAL DENSITIES

- Single Family (SF) 3.4 p / p / u
- Semi Detached (SD) & Townhouse (TH) 2.7 p / p / u
- Apartment (APT) 1.8 p / p / u
-Other 66 u / p / ha

AVG. DAILY DEMAND

- Residential 280 l / cap / day
- Retail (Shopping Centre) 2,500 l / 1000m^2 / day

MAX. DAILY DEMAND

- Residential 700 l / cap / day
- Retail (Shopping Centre) 3,750 l / 1000m^2 / day

MAX. HOURLY DEMAND

- Residential 1,540 l / cap / day
- Retail (Shopping Centre) 6,750 l / 1000m^2 / day

Fire Flow Requirement from Fire Underwriters Survey

1515 Earl Armstong Plaza - Building I

Building Floor Area

1st storey area		1,121	m^2
storey 2 to 4	847 x 3	2,541	
	Total Area	3,662	m^2

$F = 220C\sqrt{A}$

C	0.8		C =	1.5 wood frame
A	3,662	m^2		1.0 ordinary
				0.8 non-combustile
F	10,651	l/min		0.6 fire-resistive
use	11,000	l/min		

Occupancy Adjustment

			-25% non-combustile
			-15% limited combustile
Use	0%		0% combustile
			+15% free burning
Adjustment	0	l/min	+25% rapid burning
Fire flow	11,000	l/min	

Sprinkler Adjustment

Use	-30%	
Adjustment	-3,300	l/min

Exposure Adjustment

Building Face	Separation (m)	Adjacent Exposed Wall Length	Stories	L*H Factor	Exposure Charge *
north	>30				0%
east	>30				0%
south	27.5	40.0	1	40	0%
west	29.5	20.0	1	20	0%
Total					0%

Adjustment	-	l/min
Total adjustments	-3,300	l/min
Fire flow	7,700	l/min
Use	**8,000**	**l/min**
	133.3	**l/s**

* Exposure charges from Table 6 of 2020 Fire Underwriters Survey

Fire Flow Requirement from Fire Underwriters Survey

1515 Earl Armstong Plaza - Building L

Building Floor Area

area	2,337	m^2
stories	1	
Area	2,337	m^2

$F = 220C\sqrt{A}$

C	0.8		C =	1.5 wood frame
A	2,337	m^2		1.0 ordinary
				0.8 non-combustile
F	8,508	l/min		0.6 fire-resistive
use	9,000	l/min		

Occupancy Adjustment

			-25% non-combustile
			-15% limited combustile
Use	0%		0% combustile
			+15% free burning
Adjustment	0	l/min	+25% rapid burning
Fire flow	9,000	l/min	

Sprinkler Adjustment

Use	-30%	
Adjustment	-2,700	l/min

Exposure Adjustment

Building Face	Separation (m)	Adjacent Exposed Wall			Exposure Charge *
		Length	Stories	L*H Factor	
north	>30				0%
east	>30				0%
south	>30				0%
west	>30				0%
Total					0%

Adjustment	-	l/min
Total adjustments	-2,700	l/min
Fire flow	6,300	l/min
Use	**6,000**	**l/min**
	100.0	**l/s**

* Exposure charges from Table 6 of 2020 Fire Underwriters Survey

Fire Flow Requirement from Fire Underwriters Survey

1515 Earl Armstong Plaza - Building F

Building Floor Area

area	1,056	m^2
stories	1	
Area	1,056	m^2

$F = 220C\sqrt{A}$

C	0.8		C =	1.5	wood frame
A	1,056	m^2		1.0	ordinary
				0.8	non-combustile
F	5,719	l/min		0.6	fire-resistive
use	6,000	l/min			

Occupancy Adjustment

			-25%	non-combustile
			-15%	limited combustile
Use	0%		0%	combustile
			+15%	free burning
Adjustment	0	l/min	+25%	rapid burning
Fire flow	6,000	l/min		

Sprinkler Adjustment

Use	-30%	
Adjustment	-1,800	l/min

Exposure Adjustment

Building Face	Separation (m)	Adjacent Exposed Wall Length	Stories	L*H Factor	Exposure Charge *
north	>30				0%
east	>30				0%
south	>30				0%
west	>30				0%
Total					0%

Adjustment	-	l/min
Total adjustments	-1,800	l/min
Fire flow	4,200	l/min
Use	**4,000**	**l/min**
	66.7	**l/s**

* Exposure charges from Table 6 of 2020 Fire Underwriters Survey

Fire Flow Requirement from Fire Underwriters Survey

1515 Earl Armstong Plaza - Building A

Building Floor Area

area	912	m^2
stories	1	
Area	912	m^2

$F = 220C\sqrt{A}$

C	0.8		C =	1.5	wood frame
A	912	m^2		1.0	ordinary
				0.8	non-combustile
F	5,315	l/min		0.6	fire-resistive
use	5,000	l/min			

Occupancy Adjustment

			-25%	non-combustile
			-15%	limited combustile
Use	0%		0%	combustile
			+15%	free burning
Adjustment	0	l/min	+25%	rapid burning
Fire flow	5,000	l/min		

Sprinkler Adjustment

Use	0%	
Adjustment	0	l/min

Exposure Adjustment

Building Face	Separation (m)	Adjacent Exposed Wall			Exposure Charge *
		Length	Stories	L*H Factor	
north	27.0	27.0	1	27	0%
east	28.0	20.0	1	20	0%
south	>30				0%
west	>30				0%
Total					0%

Adjustment	-	l/min
Total adjustments	0	l/min
Fire flow	5,000	l/min
Use	**5,000**	**l/min**
	83.3	**l/s**

* Exposure charges from Table 6 of 2020 Fire Underwriters Survey

Fire Flow Requirement from Fire Underwriters Survey

1515 Earl Armstong Plaza - Building K

Building Floor Area

area	804	m^2
stories	1	
Area	804	m^2

$F = 220C\sqrt{A}$

				C =	
C	0.8			1.5	wood frame
A	804	m^2		1.0	ordinary
				0.8	non-combustile
F	4,990	l/min		0.6	fire-resistive
use	5,000	l/min			

Occupancy Adjustment

			-25%	non-combustile
			-15%	limited combustile
Use	0%		0%	combustile
			+15%	free burning
Adjustment	0	l/min	+25%	rapid burning
Fire flow	5,000	l/min		

Sprinkler Adjustment

Use	0%	
Adjustment	0	l/min

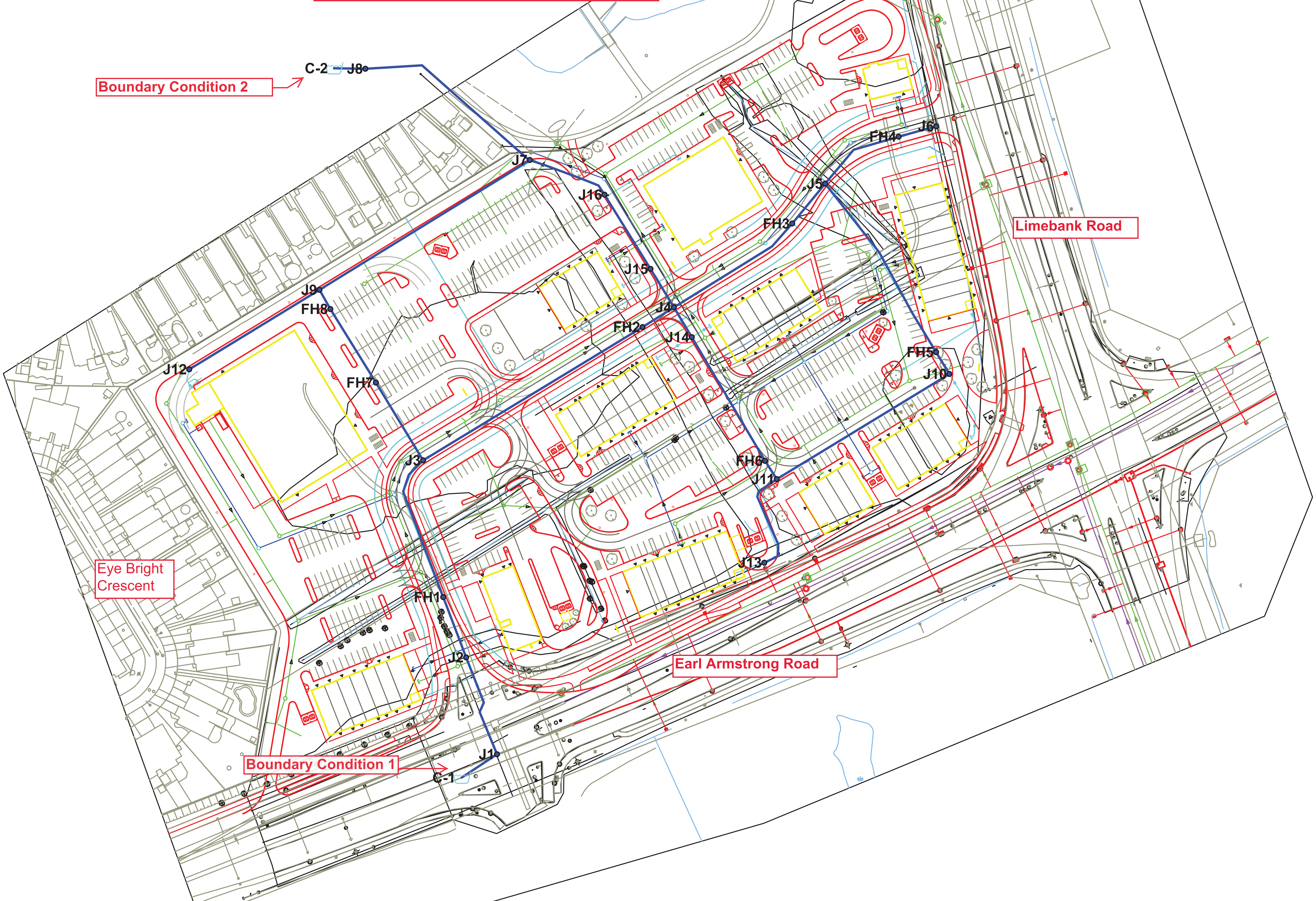
Exposure Adjustment

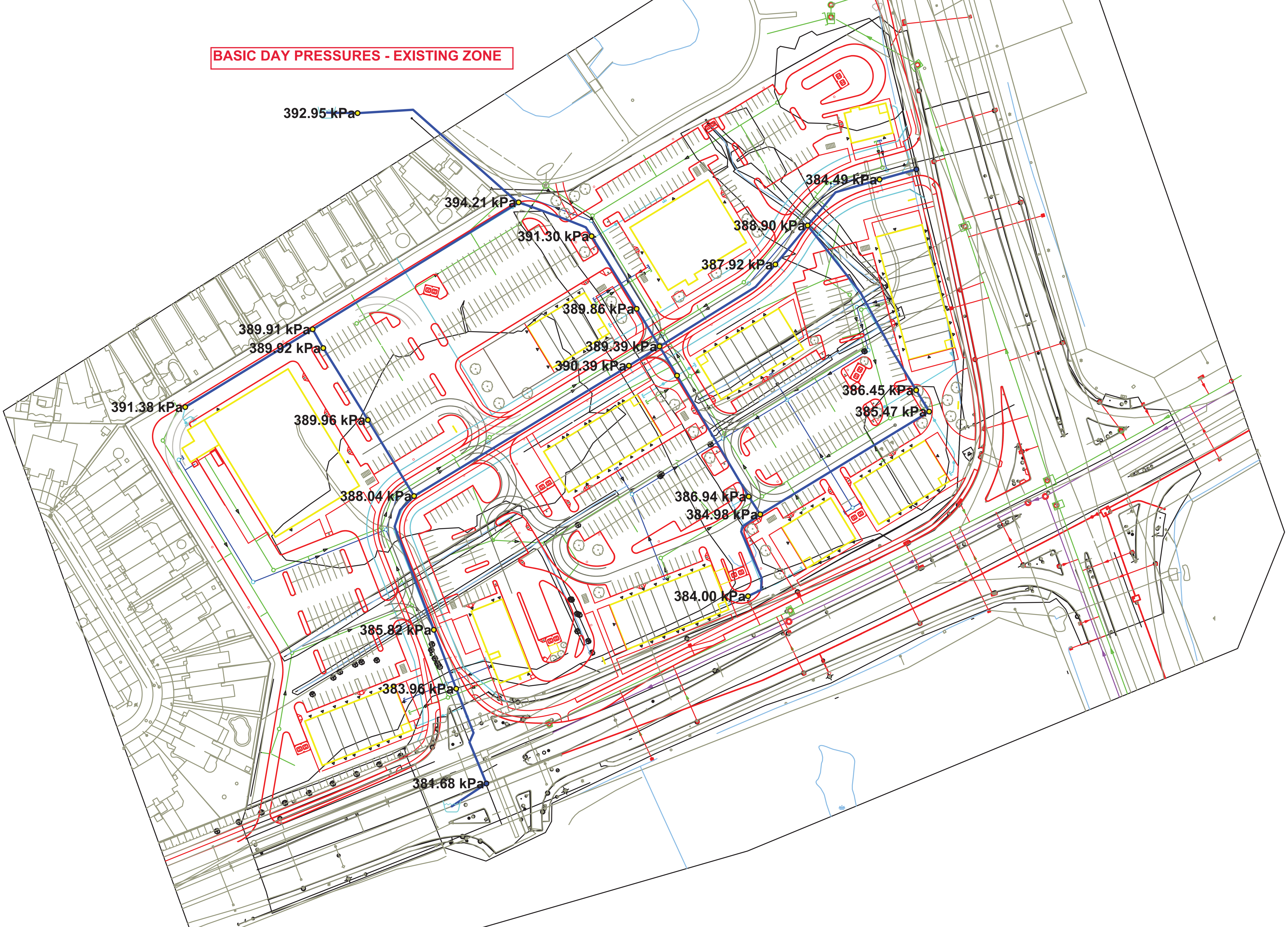
Building Face	Separation (m)	Adjacent Exposed Wall Length	Stories	L*H Factor	Exposure Charge *
north	>30				
east	>30				
south	>30				
west	25.0	10.0	2	20	0%
Total					0%

Adjustment	-	l/min
Total adjustments	0	l/min
Fire flow	5,000	l/min
Use	**5,000**	**l/min**
	83.3	**l/s**

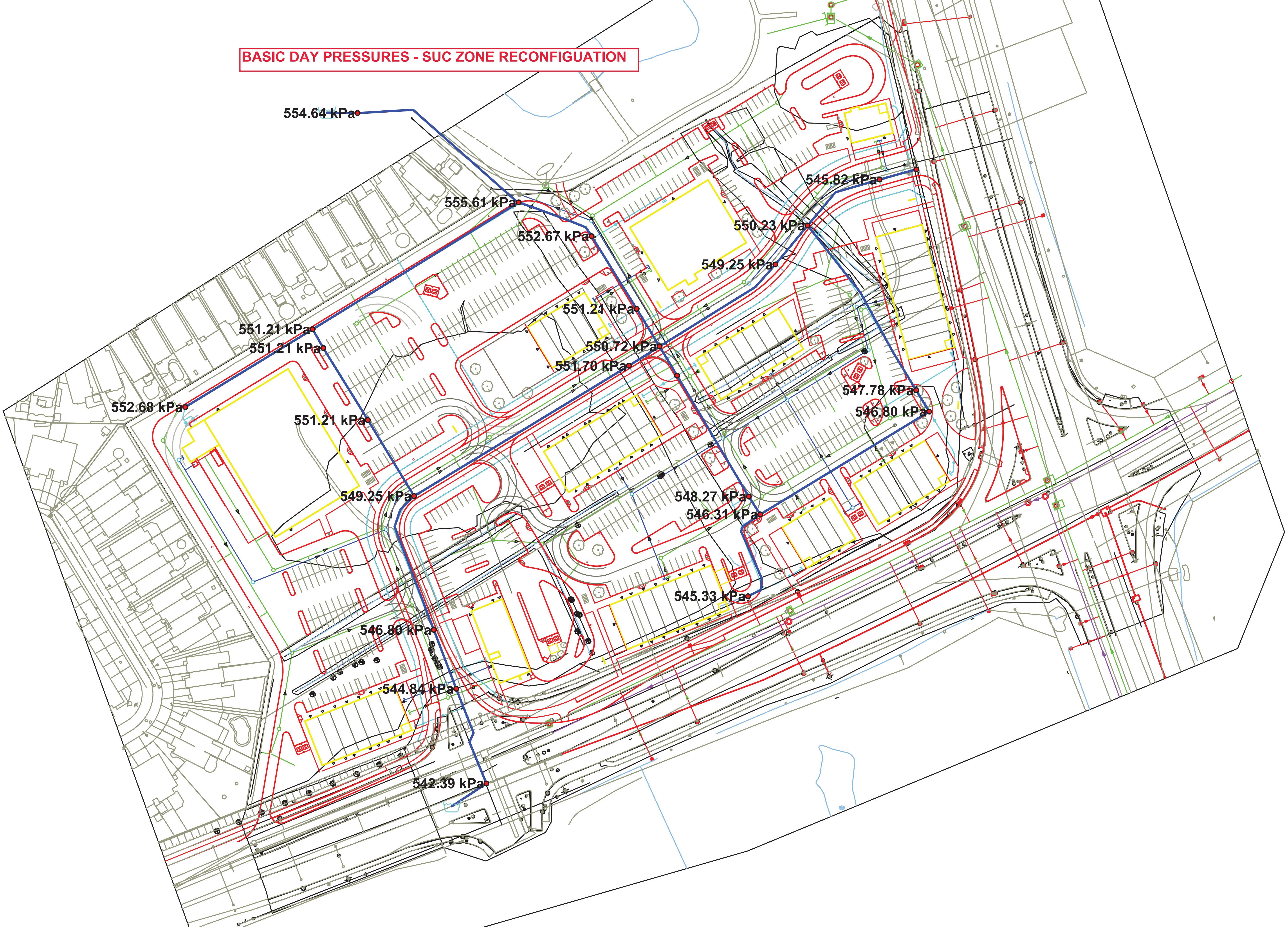
* Exposure charges from Table 6 of 2020 Fire Underwriters Survey

WATER MODEL 1515 EARL ARMSTONG PLAZA



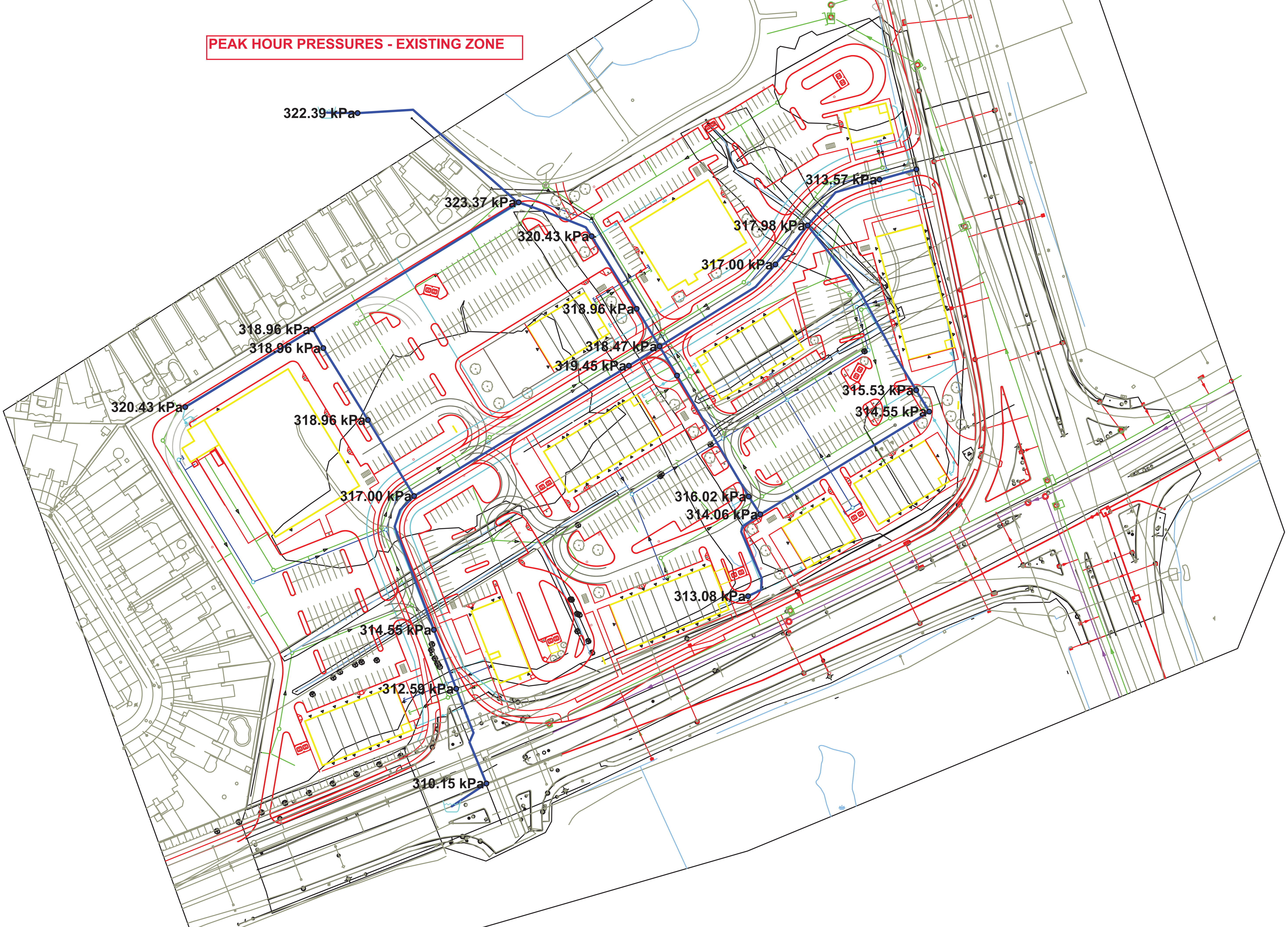

BASIC DAY PRESSURES - EXISTING ZONE
392.95 kPa
394.21 kPa
391.30 kPa
384.49 kPa
388.90 kPa
387.92 kPa
389.86 kPa
389.91 kPa
389.92 kPa
389.39 kPa
390.39 kPa
391.38 kPa
389.96 kPa
386.45 kPa
385.47 kPa
388.04 kPa
386.94 kPa
384.98 kPa
384.00 kPa
385.82 kPa
383.96 kPa
381.68 kPa

		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
1	☐	FH1	0.00	92.90	132.27	385.82
2	☐	FH2	0.00	92.40	132.24	390.39
3	☐	FH3	0.00	92.65	132.24	387.92
4	☐	FH4	0.00	93.00	132.24	384.49
5	☐	FH5	0.00	92.80	132.24	386.45
6	☐	FH6	0.00	92.75	132.24	386.94
7	☐	FH7	0.00	92.45	132.24	389.96
8	☐	FH8	0.00	92.45	132.24	389.92
9	☐	J1	0.04	93.35	132.30	381.68
10	☐	J10	0.05	92.90	132.24	385.47
11	☐	J11	0.00	92.95	132.24	384.98
12	☐	J12	0.07	92.30	132.24	391.38
13	☐	J13	0.04	93.05	132.24	384.00
14	☐	J14	0.05	92.50	132.24	389.39
15	☐	J15	0.02	92.45	132.24	389.86
16	☐	J16	0.11	92.30	132.23	391.30
17	☐	J2	0.00	93.10	132.28	383.96
18	☐	J3	0.00	92.65	132.25	388.04
19	☐	J4	0.00	92.50	132.24	389.39
20	☐	J5	0.01	92.55	132.24	388.90
21	☐	J6	0.00	93.20	132.24	382.53
22	☐	J7	0.00	92.00	132.23	394.21
23	☐	J8	0.00	92.10	132.20	392.95
24	☐	J9	0.00	92.45	132.24	389.91


BASIC DAY PRESSURES - SUC ZONE RECONFIGUATION
554.64 kPa
555.61 kPa
552.67 kPa
545.82 kPa
550.23 kPa
549.25 kPa
551.21 kPa
551.21 kPa
551.21 kPa
550.72 kPa
551.70 kPa
552.68 kPa
551.21 kPa
547.78 kPa
546.80 kPa
549.25 kPa
548.27 kPa
546.31 kPa
545.33 kPa
546.80 kPa
544.84 kPa
542.39 kPa

		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
1	☐	FH1	0.00	92.90	148.70	546.79
2	☐	FH2	0.00	92.40	148.70	551.69
3	☐	FH3	0.00	92.65	148.70	549.24
4	☐	FH4	0.00	93.00	148.70	545.81
5	☐	FH5	0.00	92.80	148.70	547.77
6	☐	FH6	0.00	92.75	148.70	548.26
7	☐	FH7	0.00	92.45	148.70	551.20
8	☐	FH8	0.00	92.45	148.70	551.20
9	☐	J1	0.10	93.35	148.70	542.39
10	☐	J10	0.14	92.90	148.70	546.79
11	☐	J11	0.00	92.95	148.70	546.30
12	☐	J12	0.18	92.30	148.70	552.67
13	☐	J13	0.11	93.05	148.70	545.32
14	☐	J14	0.13	92.50	148.70	550.71
15	☐	J15	0.04	92.45	148.70	551.20
16	☐	J16	0.29	92.30	148.70	552.67
17	☐	J2	0.00	93.10	148.70	544.84
18	☐	J3	0.00	92.65	148.70	549.24
19	☐	J4	0.00	92.50	148.70	550.71
20	☐	J5	0.02	92.55	148.70	550.22
21	☐	J6	0.00	93.20	148.70	543.85
22	☐	J7	0.00	92.00	148.70	555.61
23	☐	J8	0.00	92.10	148.70	554.64
24	☐	J9	0.00	92.45	148.70	551.20

PEAK HOUR PRESSURES - EXISTING ZONE

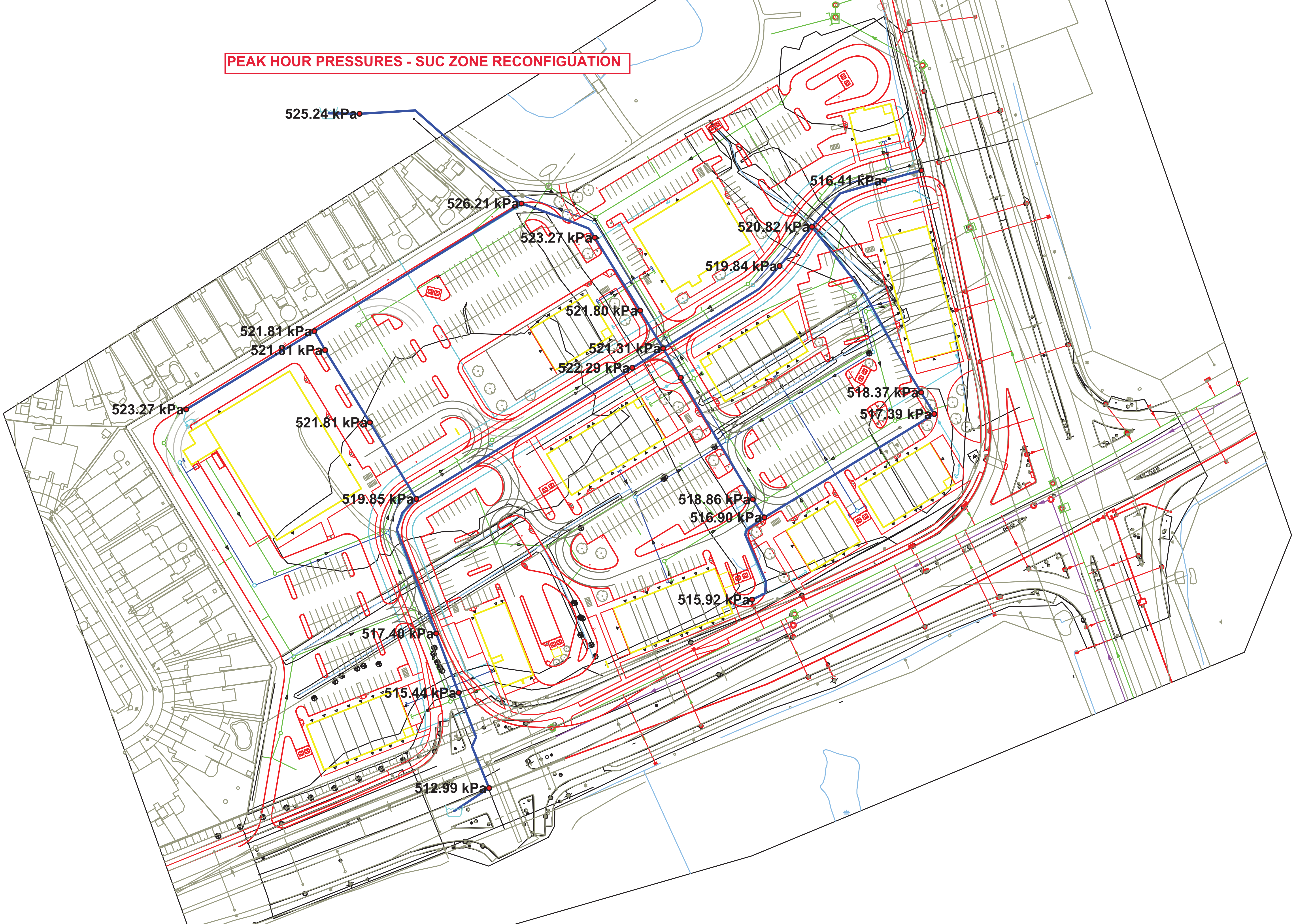


		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
1	☐	FH1	0.00	92.90	125.00	314.55
2	☐	FH2	0.00	92.40	125.00	319.45
3	☐	FH3	0.00	92.65	125.00	317.00
4	☐	FH4	0.00	93.00	125.00	313.57
5	☐	FH5	0.00	92.80	125.00	315.53
6	☐	FH6	0.00	92.75	125.00	316.02
7	☐	FH7	0.00	92.45	125.00	318.96
8	☐	FH8	0.00	92.45	125.00	318.96
9	☐	J1	0.10	93.35	125.00	310.15
10	☐	J10	0.14	92.90	125.00	314.55
11	☐	J11	0.00	92.95	125.00	314.06
12	☐	J12	0.18	92.30	125.00	320.43
13	☐	J13	0.11	93.05	125.00	313.08
14	☐	J14	0.13	92.50	125.00	318.47
15	☐	J15	0.04	92.45	125.00	318.96
16	☐	J16	0.29	92.30	125.00	320.43
17	☐	J2	0.00	93.10	125.00	312.59
18	☐	J3	0.00	92.65	125.00	317.00
19	☐	J4	0.00	92.50	125.00	318.47
20	☐	J5	0.02	92.55	125.00	317.98
21	☐	J6	0.00	93.20	125.00	311.61
22	☐	J7	0.00	92.00	125.00	323.37
23	☐	J8	0.00	92.10	125.00	322.39
24	☐	J9	0.00	92.45	125.00	318.96

Peak Hour Existing Conditions - Pipe Report

		ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness	Flow (L/s)	Velocity (m/s)	Headloss (m)	HL/1000 (m/k-m)	Status	Flow Reversal Count
1	☐	P11	J3	FH1	61.11	204.00	110.00	-0.39	0.01	0.00	0.00	Open	0
2	☐	P13	J1	J2	42.30	204.00	110.00	0.39	0.01	0.00	0.00	Open	0
3	☐	P15	J3	FH7	36.83	204.00	110.00	0.12	0.00	0.00	0.00	Open	0
4	☐	P17	J4	FH2	15.02	204.00	110.00	-0.27	0.01	0.00	0.00	Open	0
5	☐	P19	J4	J15	18.20	204.00	110.00	-0.13	0.00	0.00	0.00	Open	0
6	☐	P21	J7	J8	81.22	204.00	110.00	-0.52	0.02	0.00	0.00	Open	0
7	☐	P23	J5	FH3	20.96	204.00	110.00	-0.13	0.00	0.00	0.00	Open	0
8	☐	P25	J10	FH5	10.35	204.00	110.00	-0.11	0.00	0.00	0.00	Open	0
9	☐	P27	J10	J11	81.91	204.00	110.00	-0.03	0.00	0.00	0.00	Open	0
10	☐	P29	J9	J7	100.21	204.00	110.00	-0.06	0.00	0.00	0.00	Open	0
11	☐	P31	C-1	J1	1.00	204.00	110.00	0.49	0.02	0.00	0.00	Open	0
12	☐	P33	C-2	J8	1.00	204.00	110.00	0.52	0.02	0.00	0.00	Open	0
13	☐	P35	J6	FH4	15.81	204.00	110.00	0.00	0.00	0.00	0.00	Open	0
14	☐	P37	J4	J14	14.09	204.00	110.00	0.27	0.01	0.00	0.00	Open	0
15	☐	P39	J9	J12	61.85	204.00	110.00	0.18	0.01	0.00	0.00	Open	0
16	☐	P41	J13	J11	42.93	204.00	110.00	-0.11	0.00	0.00	0.00	Open	0
17	☐	P43	J14	FH6	58.22	204.00	110.00	0.14	0.00	0.00	0.00	Open	0
18	☐	P45	J15	J16	35.35	204.00	110.00	-0.17	0.01	0.00	0.00	Open	0
19	☐	P47	J16	J7	34.12	204.00	110.00	-0.46	0.01	0.00	0.00	Open	0
20	☐	P49	FH1	J2	26.07	204.00	110.00	-0.39	0.01	0.00	0.00	Open	0
21	☐	P51	FH2	J3	104.07	204.00	110.00	-0.27	0.01	0.00	0.00	Open	0
22	☐	P53	FH3	J4	59.18	204.00	110.00	-0.13	0.00	0.00	0.00	Open	0
23	☐	P55	FH4	J5	36.96	204.00	110.00	0.00	0.00	0.00	0.00	Open	0
24	☐	P57	FH5	J5	81.92	204.00	110.00	-0.11	0.00	0.00	0.00	Open	0
25	☐	P59	FH6	J11	8.80	204.00	110.00	0.14	0.00	0.00	0.00	Open	0
26	☐	P61	FH7	FH8	35.03	204.00	110.00	0.12	0.00	0.00	0.00	Open	0
27	☐	P63	FH8	J9	8.92	204.00	110.00	0.12	0.00	0.00	0.00	Open	0

PEAK HOUR PRESSURES - SUC ZONE RECONFIGUATION

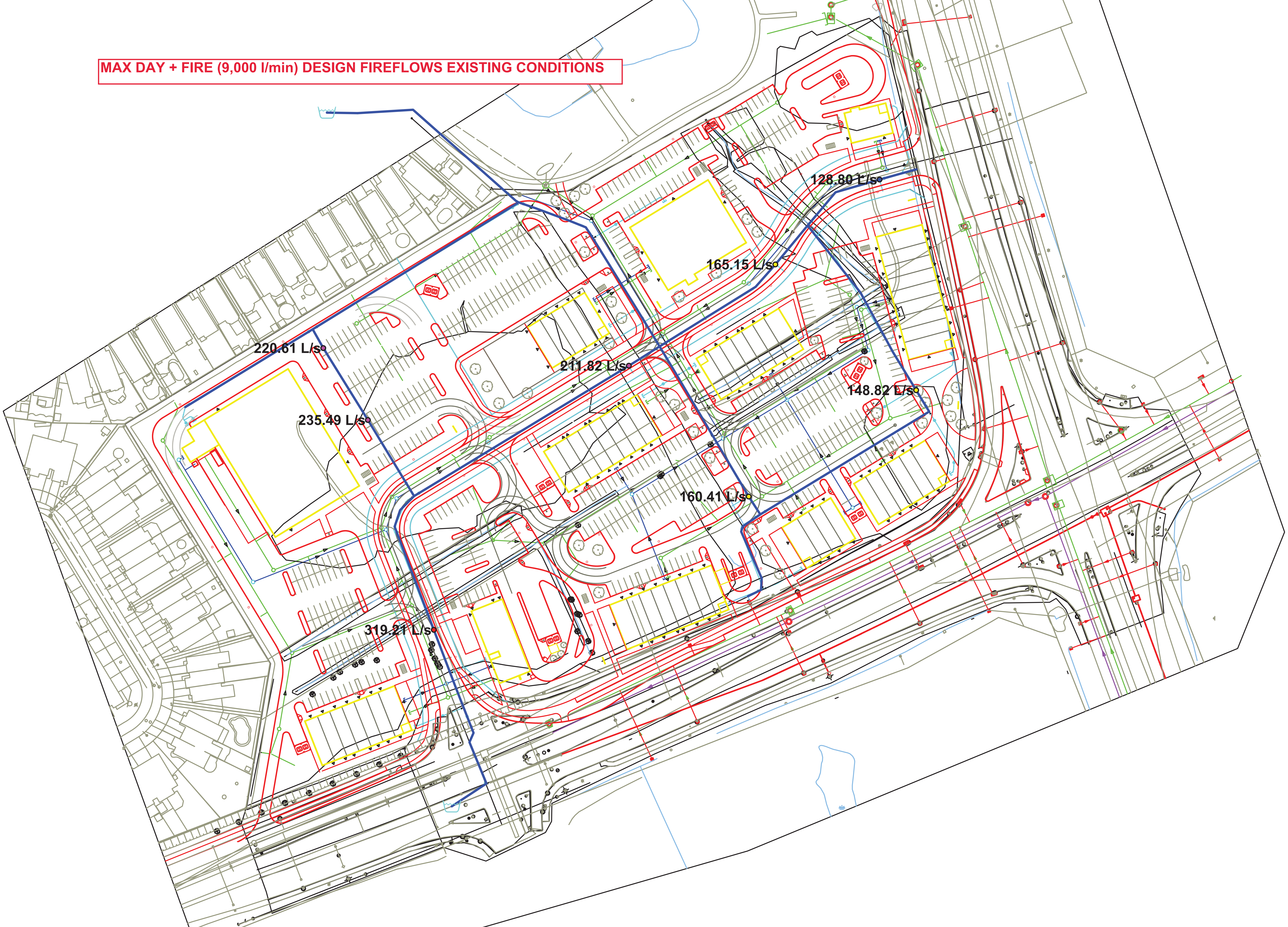


		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
1	☐	FH1	0.00	92.90	145.70	517.40
2	☐	FH2	0.00	92.40	145.70	522.29
3	☐	FH3	0.00	92.65	145.70	519.84
4	☐	FH4	0.00	93.00	145.70	516.41
5	☐	FH5	0.00	92.80	145.70	518.37
6	☐	FH6	0.00	92.75	145.70	518.86
7	☐	FH7	0.00	92.45	145.70	521.81
8	☐	FH8	0.00	92.45	145.70	521.81
9	☐	J1	0.10	93.35	145.70	512.99
10	☐	J10	0.14	92.90	145.70	517.39
11	☐	J11	0.00	92.95	145.70	516.90
12	☐	J12	0.18	92.30	145.70	523.27
13	☐	J13	0.11	93.05	145.70	515.92
14	☐	J14	0.13	92.50	145.70	521.31
15	☐	J15	0.04	92.45	145.70	521.80
16	☐	J16	0.29	92.30	145.70	523.27
17	☐	J2	0.00	93.10	145.70	515.44
18	☐	J3	0.00	92.65	145.70	519.85
19	☐	J4	0.00	92.50	145.70	521.31
20	☐	J5	0.02	92.55	145.70	520.82
21	☐	J6	0.00	93.20	145.70	514.45
22	☐	J7	0.00	92.00	145.70	526.22
23	☐	J8	0.00	92.10	145.70	525.24
24	☐	J9	0.00	92.45	145.70	521.81

Peak Hour SUC Zone - Pipe Report

		ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness	Flow (L/s)	Velocity (m/s)	Headloss (m)	HL/1000 (m/k-m)	Status	Flow Reversal Count
1	☐	P11	J3	FH1	61.11	204.00	110.00	-0.39	0.01	0.00	0.00	Open	0
2	☐	P13	J1	J2	42.30	204.00	110.00	0.39	0.01	0.00	0.00	Open	0
3	☐	P15	J3	FH7	36.83	204.00	110.00	0.12	0.00	0.00	0.00	Open	0
4	☐	P17	J4	FH2	15.02	204.00	110.00	-0.27	0.01	0.00	0.00	Open	0
5	☐	P19	J4	J15	18.20	204.00	110.00	-0.13	0.00	0.00	0.00	Open	0
6	☐	P21	J7	J8	81.22	204.00	110.00	-0.52	0.02	0.00	0.00	Open	0
7	☐	P23	J5	FH3	20.96	204.00	110.00	-0.13	0.00	0.00	0.00	Open	0
8	☐	P25	J10	FH5	10.35	204.00	110.00	-0.11	0.00	0.00	0.00	Open	0
9	☐	P27	J10	J11	81.91	204.00	110.00	-0.03	0.00	0.00	0.00	Open	0
10	☐	P29	J9	J7	100.21	204.00	110.00	-0.06	0.00	0.00	0.00	Open	0
11	☐	P31	C-1	J1	1.00	204.00	110.00	0.49	0.02	0.00	0.00	Open	0
12	☐	P33	C-2	J8	1.00	204.00	110.00	0.52	0.02	0.00	0.00	Open	0
13	☐	P35	J6	FH4	15.81	204.00	110.00	0.00	0.00	0.00	0.00	Open	0
14	☐	P37	J4	J14	14.09	204.00	110.00	0.27	0.01	0.00	0.00	Open	0
15	☐	P39	J9	J12	61.85	204.00	110.00	0.18	0.01	0.00	0.00	Open	0
16	☐	P41	J13	J11	42.93	204.00	110.00	-0.11	0.00	0.00	0.00	Open	0
17	☐	P43	J14	FH6	58.22	204.00	110.00	0.14	0.00	0.00	0.00	Open	0
18	☐	P45	J15	J16	35.35	204.00	110.00	-0.17	0.01	0.00	0.00	Open	0
19	☐	P47	J16	J7	34.12	204.00	110.00	-0.46	0.01	0.00	0.00	Open	0
20	☐	P49	FH1	J2	26.07	204.00	110.00	-0.39	0.01	0.00	0.00	Open	0
21	☐	P51	FH2	J3	104.07	204.00	110.00	-0.27	0.01	0.00	0.00	Open	0
22	☐	P53	FH3	J4	59.18	204.00	110.00	-0.13	0.00	0.00	0.00	Open	0
23	☐	P55	FH4	J5	36.96	204.00	110.00	0.00	0.00	0.00	0.00	Open	0
24	☐	P57	FH5	J5	81.92	204.00	110.00	-0.11	0.00	0.00	0.00	Open	0
25	☐	P59	FH6	J11	8.80	204.00	110.00	0.14	0.00	0.00	0.00	Open	0
26	☐	P61	FH7	FH8	35.03	204.00	110.00	0.12	0.00	0.00	0.00	Open	0
27	☐	P63	FH8	J9	8.92	204.00	110.00	0.12	0.00	0.00	0.00	Open	0

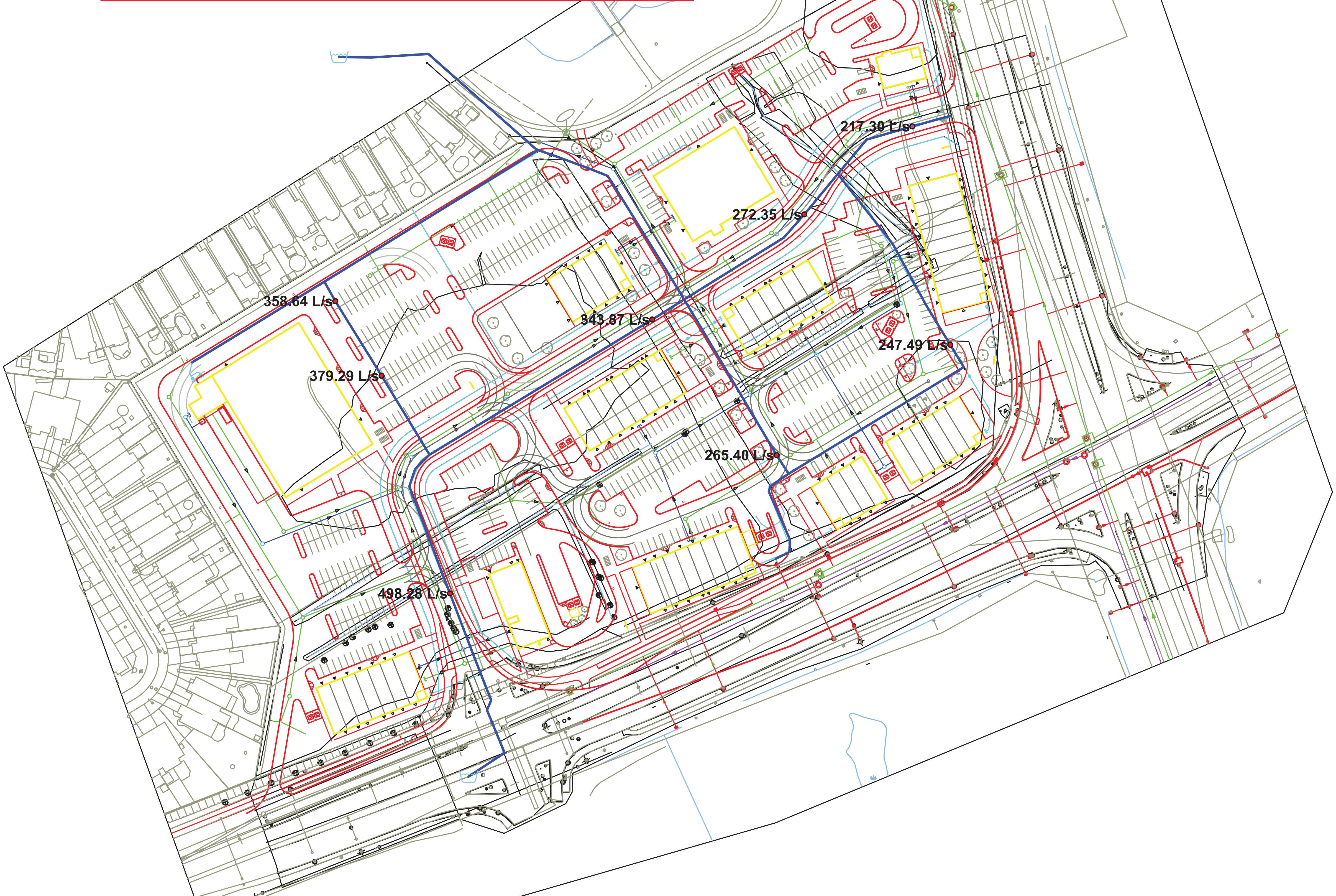
MAX DAY + FIRE (9,000 l/min) DESIGN FIREFLOWS EXISTING CONDITIONS



Max Day + Fire (150 l/s) Existing Conditions - Fireflow Design Report

		ID	Total Demand (L/s)	Available Flow at Hydrant (L/s)	Critical Node ID	Critical Node Pressure (kPa)	Critical Node Head (m)	Design Flow (L/s)	Design Pressure (kPa)	Design Fire Node Pressure (kPa)
1	☐	FH1	133.30	319.21	FH1	139.96	107.18	319.21	139.96	139.97
2	☐	FH2	133.30	211.82	FH2	139.96	106.68	211.82	139.96	139.97
3	☐	FH3	133.30	165.27	FH4	139.80	107.27	165.15	139.96	139.96
4	☐	FH4	133.30	128.80	FH4	139.96	107.28	128.80	139.96	139.96
5	☐	FH5	133.30	148.82	FH5	139.96	107.08	148.82	139.96	139.92
6	☐	FH6	133.30	160.41	FH6	139.96	107.03	160.41	139.96	139.84
7	☐	FH7	133.30	235.49	FH7	139.96	106.73	235.49	139.96	140.00
8	☐	FH8	133.30	220.61	FH8	139.96	106.73	220.61	139.96	139.97

MAX DAY + FIRE (9,000 l/min) DESIGN FIREFLOWS SUC ZONE REFONFIGURATION



Max Day + Fire SUC Zone - Fireflow Design Report

		ID	Total Demand (L/s)	Available Flow at Hydrant (L/s)	Critical Node ID	Critical Node Pressure (kPa)	Critical Node Head (m)	Design Flow (L/s)	Design Pressure (kPa)	Design Fire Node Pressure (kPa)
1	☐	FH1	133.30	498.28	FH1	139.96	107.18	498.28	139.96	140.15
2	☐	FH2	133.30	343.87	FH2	139.96	106.68	343.87	139.96	139.96
3	☐	FH3	133.30	272.35	FH3	139.96	106.93	272.35	139.96	139.96
4	☐	FH4	133.30	217.30	FH4	139.96	107.28	217.30	139.96	139.64
5	☐	FH5	133.30	247.49	FH5	139.96	107.08	247.49	139.96	139.45
6	☐	FH6	133.30	265.40	FH6	139.96	107.03	265.40	139.96	139.96
7	☐	FH7	133.30	379.29	FH7	139.96	106.73	379.29	139.96	139.97
8	☐	FH8	133.30	358.64	FH8	139.96	106.73	358.64	139.96	139.97

Ottawa

FUS CLASSIFICATION DECLARATION FOR MULTI-STOREY BUILDINGS

Project Name and Civic Address: 1515 EARL ARMSTRONG PLAZA – BUILDING I Number of Floors: 4

Development Review PM: 18900 City File No. D07-12-22-0169/ D07-16-22-0010

The building's FUS calculation has been determined using the following criteria: (check one of the following).

C = 1.5 ☐	**Type V Wood Frame Construction** A building is considered to be of Wood Frame construction (Type V) when structural elements, walls, arches, floors, and roofs are constructed entirely or partially of wood or other material. Note: Includes buildings with exterior wall assemblies that are constructed with any materials that do not have a fire resistance rating that meets the acceptance criteria of CAN/ULC-S114. May include exterior surface brick, stone, or other masonry materials where they do not meet the acceptance criteria. Total Effective Area (A) = 100% of all Floor Areas
C = 0.8 ☐ C = 0.9 ☐ C = 1.0 ☐ C = 1.5 ☐	**Type IV Mass Timber** Mass timber construction, including Encapsulated Mass Timber, Heavy Timber and other forms of Mass Timber are considered as one of the following sub-types relating to the fire resistance ratings of assemblies as follows: • Type IV-A Mass Timber Construction (Encapsulated Mass Timber) • Type IV-B Mass Timber Construction (Rated Mass Timber) • Type IV-C Mass Timber Construction (Ordinary Mass Timber) • Type IV-D Mass Timber Construction (Un-Rated Mass Timber) *Refer to Water Supply for Public Fire Protection, latest revision, for further Mass Timber Construction definitions and how to calculate Total Effective Area (A).
C = 1.0 ☐	**Type III Ordinary Construction** A building is considered to be of Ordinary construction (Type III) when exterior walls are of masonry construction (or other approved material) with a minimum

	1-hour fire resistance rating, but where other elements such as interior walls, arches, floors and/or roof do not have a minimum 1 hour fire resistance rating. Total Effective Area (A) = 100% of all Floor Areas
C = 0.8 ☒	**Type II Noncombustible Construction** A building is considered to be of Noncombustible construction (Type II) when all structural elements, walls, arches, floors, and ~~roofs~~ are constructed with a minimum 1-hour fire resistance rating and are constructed with noncombustible materials. Total Effective Area (A) = ☐ if any vertical openings in the building (ex. interconnected floor spaces, atria, elevators, escalators, etc.) are unprotected**, consider the two largest adjoining floor areas plus 50% of all floors immediately above them up to a maximum of eight; or ☒ if all vertical openings and exterior vertical communications are properly protected* in accordance with the National Building Code, consider only the single largest Floor Area plus 25% of each of the two immediately adjoining floors.
C = 0.6 ☐	**Type I Fire Resistive Construction** A building is considered to be of Fire-resistive construction (Type I) when all structural elements, walls, arches, floors, and roofs are constructed with a minimum 2-hour fire resistance rating, and all materials used in the construction of the structural elements, walls, arches, floors, and roofs are constructed with noncombustible materials. Total Effective Area (A) = ☐ if any vertical openings in the building (ex. interconnected floor spaces, atria, elevators, escalators, etc.) are unprotected**, consider the two largest adjoining floor areas plus 50% of all floors immediately above them up to a maximum of eight; or ☐ if all vertical openings and exterior vertical communications are properly protected* in accordance with the National Building Code, consider only the single largest Floor Area plus 25% of each of the two immediately adjoining floors.

Note: If a building cannot be defined within a single Construction Coefficient, the Construction Coefficient is determined by the predominate Construction Coefficient that makes up more than 66% of the Total Floor Area.

*Protected openings:

a) Enclosures shall have walls of masonry or other limited or non-combustible construction with a fire resistance rating of not less than one hour.
b) Openings including doors shall be provided with automatic closing devices
c) Elevator doors shall be of metal or metal-covered construction, so arranged that the doors must normally be closed for operation of the elevator.

**Unprotected openings:

a) Any opening through horizonal separations that are unprotected or otherwise have closures that do not meet the minimum requirements for protected openings, above.

The building's FUS calculation has been determined using the following criteria: (check all that apply)

30%	☒	**Automatic sprinkler protection designed and installed in accordance with NFPA 13** The initial credit for Automatic Sprinkler Protection is a maximum of 30% based on the system being designed and installed in accordance with the applicable criteria of NFPA 13, Standard for Installation of Sprinkler Systems, NFPA 13R, Standard for the Installation of Sprinkler Systems in Low-Rise Residential Occupancies, or NFPA 13D, Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes and being maintained in accordance with the applicable criteria of NFPA 25, Standard for the Inspections, Testing and Maintenance of Water-Based Fire (see Recognition of Automatic Sprinkler Protection).
10%	☒	**Water supply is standard for both the system and Fire Department hose lines** a) Sprinkler system is supplied by a pressurized water supply system (public or private) that is designed and built with no major non-conformance issues (i.e. water supply system is designed in accordance with Part 1 of the Water Supply for Public Fire Protection to qualify for fire insurance grading recognition). b) Calculated demand for maximum sprinkler design area operation in addition to hose stream requirements are below the available water supply curve (at the corresponding flow rate and pressure). An appropriate safety margin is used to take into account the difference between the available water supply curve at the time of hydrant flow testing as compared to the available water supply curve during Maximum Day Demand. c) Volume of water available is adequate for the total flow rate including the maximum sprinkler design area operation plus required hose streams plus Maximum Day Demand for the full duration of the design fire event. d) Residual pressure at all points in the water supply system can be maintained at not less than 150 kPa during the flowing of the sprinkler and required hose streams (plus Maximum Day Demand).
10%	☒	**Fully supervised system** a) a distinctive supervisory signal to indicate conditions that could impair the satisfactory operation of the sprinkler system (a fault alarm), that is to sound and be displayed, either at a location within the building that is constantly attended by qualified personnel (such as a security room), or at an approved remotely located receiving facility (such as a monitoring facility of the sprinkler system manufacturer); and

	b) a water flow alarm to indicate that the sprinkler system has been activated, which is to be transmitted to an approved, proprietary alarm-receiving facility, a remote station, a central station, or the fire department.

Note: Where only part of a building is protected by Automatic Sprinkler Protection, credit should be interpolated by determining the percentage of the Total Floor Area being protected by the automatic sprinkler system.

☒ Fully Supervised sprinkler system (per above description)

Ottawa

PROFESSIONAL SEAL APPLIED BY:

Civil Consultant: ______________________

Consultancy: ______________________

Phone Number: ______________________

Address: ______________________

Engineer's Seal

(initial)	The FUS design parameters will be carried into the building's design

PROFESSIONAL SEAL APPLIED BY:

Architect or Building Engineer: Philipp Puetz

Consultancy: JRP ENGINEERING

Phone Number: 613-627-2482 EXT. 702

Address: 116 Didsbury Road - Unit M090, KANATA, ON

Architect's or Building Engineer's Seal

LICENSED PROFESSIONAL ENGINEER
MAR 3 0 2023
P. PUETZ
100190159
PROVINCE OF ONTARIO

PP (initial)	The FUS design parameters will be carried into the building's design

Appendix C

- Riverside South Phase 4 Sanitary Drainage Area Plan
- Riverside South Phase 4 Sanitary Sewer Design Sheet
- 1515 Earl Armstrong Plaza Sanitary Sewer Design Sheet
- 137404-400 – Sanitary Drainage Area Plan
- Temporary ICD Calculations

	AREA (ha)	# OF PEOPLE	P.F.	Q (l/s)
COMMERCIAL	–	–	–	–
INDUSTRIAL	–	–	–	–
RESIDENTIAL	1.55	744	3.88	11.69
PEAK EXTRANEOUS FLOW (l/s)				0.43
TOTAL FLOW (l/s)				12.12

LEGEND

- CATCH BASIN
- HYDRANT
- SANITARY SEWER & MANHOLE
- LOT NUMBER
- DRAINAGE BOUNDARY
- AREA IN HECTARES / NUMBER OF UNITS
- PHASING LIMIT

NO.	REVISION	DATE
5	W/M SYSTEM REVISED FOR FUTURE CONVERSION TO HIGH PRESSURE	16/01/07
4	REVISED PER CITY COMMENTS FOR MOE APPROVAL	14/12/06
3	REVISED TO SUIT PHASING AND MINOR LAYOUT MODIFICATIONS	22/09/06
2	REVISED LAYOUT– RESUBMISSION TO CITY FOR REVIEW	23/06/06
1	ISSUED FOR CITY REVIEW	28/02/06

LICENSED PROFESSIONAL ENGINEER
J.S.C. BOUGIE
100010090
PROVINCE OF ONTARIO

URBANDALE CORPORATION

J.L.Richards
ENGINEERS·ARCHITECTS·PLANNERS
J.L. Richards & Associates Limited
864 Lady Ellen Place
Ottawa, ON Canada
K1Z 5M2
Tel: 613 728 3571
Fax: 613 728 6012

PROJECT:

RIVERSIDE SOUTH PHASE 4 URBANDALE CORPORATION CITY OF OTTAWA

DRAWING: V:\18418-04\LD\1841804 C D-SAN.dwg

SANITARY DRAINAGE PLAN

DESIGN: D.L.	REVISION NO.:
DRAWN: T.S.	DRAWING NO.:
CHECKED: L.D.	D2–SAN
DATE: AUGUST 2005	
SCALE: 1:1500	JOB NO.: 18418–04

Printed on 12/21/2006 at 7:34 AM

J.L.Richards
ENGINEERS · ARCHITECTS · PLANNERS

CITY OF OTTAWA

RIVERSIDE SOUTH PHASES 3 & 4
URBANDALE CORPORATION
JLR PROJECT NO.: 18418-04

Commercial Flow =	50000	L/s/ha
q =	350	l/cap/d
i =	0.28	l/s/ha
SING. HOUSING	3.4	pers/hse
MULT. HOUSING	2.7	pers/hse

SANITARY SEWER DESIGN SHEET
Designed: D.L.
Checked By: G.F.

LEGEND
DENOTES EXISTING SEWERS

Manning's Coefficient (n) = 0.013

Date: December 14, 2006

STREET	Phase	M.H. # FROM	M.H. # TO	RESIDENTIAL: NUMBER OF UNITS SING.	Stacks	Towns	POPUL. people	AREA ha	CUMMULATIVE POPUL. people	CUMMULATIVE AREA ha	PEAKING FACTOR	POPUL. FLOW l/s	COMMERCIAL AREA ha	CUMM. AREA l/s	COMM. FLOW l/s	R+C PEAK EXTR. FLOW l/s	PEAK DES. FLOW l/s
EASEMENT		146	145								4.00		6.49	6.49	5.63	1.82	7.45
EASEMENT	4	145	138	5			17	0.38	17	0.38	4.00	0.28		6.49	5.63	1.92	7.83
DUSTY MILLER CRESCENT	4	138	139	20			68	1.04	85	1.42	4.00	1.38		6.49	5.63	2.21	9.23
DUSTY MILLER CRESCENT	4	139	140	2			7	0.11	92	1.53	4.00	1.49		6.49	5.63	2.25	9.37
WOODY POINT DRIVE	4	130 (south)	141	7			24	0.41	24	0.41	4.00	0.39				0.11	0.50
WOODY POINT DRIVE	4	141	142	3			10	0.18	34	0.59	4.00	0.55				0.17	0.72
DUSTY MILLER CRESCENT	4	134	135	2			7	0.25	7	0.25	4.00	0.11				0.07	0.18
COYOTE BRUSH LANE	4	135	142	12			41	0.82	48	1.07	4.00	0.77				0.30	1.07
WOODY POINT DRIVE	4	142	143	2			7	0.11	88	1.77	4.00	1.43				0.50	1.93
WOODY POINT DRIVE	4	143	140	3			10	0.21	99	1.98	4.00	1.60				0.55	2.15
DUSTY MILLER CRESCENT	4	140	91 (south)	7			24	0.44	214	3.95	4.00	3.47		6.49	5.63	2.92	12.03
NORTH BLUFF DRIVE	4	91 (south)	92	1			3	0.12	218	4.07	4.00	3.53		6.49	5.63	2.96	12.12
NORTH BLUFF DRIVE	4	92	93	1			3	0.09	221	4.16	4.00	3.58		6.49	5.63	2.98	12.20
EYEBRIGHT CRESCENT	4	176	175			5	14	0.25	14	0.25	4.00	0.22				0.07	0.29
EYEBRIGHT CRESCENT	4	175	174			6	16	0.23	30	0.48	4.00	0.48				0.13	0.62
EYEBRIGHT CRESCENT	4	173	174			12	32	0.43	32	0.43	4.00	0.53				0.12	0.65
ROYAL FERN WAY	4	174	161		22	11	89	0.70	151	1.61	4.00	2.45				0.45	2.90
EYEBRIGHT CRESCENT	4	176	177			3	8	0.14	8	0.14	4.00	0.13				0.04	0.17
EYEBRIGHT CRESCENT	4	177	178			26	70	0.80	78	0.94	4.00	1.27				0.26	1.53
EYEBRIGHT CRESCENT	4	178	179			3	8	0.11	86	1.05	4.00	1.40				0.29	1.69
EYEBRIGHT CRESCENT	4	179	161			10	27	0.34	113	1.39	4.00	1.84				0.39	2.23
ROYAL FERN WAY	4	161	160		18	5	62	0.47	327	3.47	4.00	5.29				0.97	6.27
ROYAL FERN WAY	4	160	93					0.02	327	3.49	4.00	5.29				0.98	6.27
NORTH BLUFF DRIVE	4	93	94			3	8	0.24	556	7.89	3.95	8.89		6.49	5.63	4.03	18.55
DUSTY MILLER CRESCENT	4	131	130	11			37	0.69	37	0.69	4.00	0.61				0.19	0.80
DUSTY MILLER CRESCENT	4	130	88	5			17	0.40	54	1.09	4.00	0.88				0.31	1.19
NORTH BLUFF DRIVE	4	91	90	2			7	0.14	7	0.14	4.00	0.11				0.04	0.15
NORTH BLUFF DRIVE	4	90	223	2			7	0.10	14	0.24	4.00	0.22				0.07	0.29
FIREWEED TRAIL	4	221	222	17			58	0.75	58	0.75	4.00	0.94				0.21	1.15
FIREWEED TRAIL	4	222	223	1			3	0.10	61	0.85	4.00	0.99				0.24	1.23
NORTH BLUFF DRIVE	4	223	89	2			7	0.11	82	1.20	4.00	1.32				0.34	1.66
NORTH BLUFF DRIVE	4	89	88	5			17	0.32	99	1.52	4.00	1.60				0.43	2.02
BARBERRY CRESCENT	4	88	200	14			48	0.63	201	3.24	4.00	3.25				0.91	4.16
BARBERRY CRESCENT	4	200	201	10			34	0.41	235	3.65	4.00	3.80				1.02	4.82
BARBERRY CRESCENT	4	204	203			17	46	0.45	46	0.45	4.00	0.74				0.13	0.87
BARBERRY CRESCENT	4	203	201			20	54	0.57	100	1.02	4.00	1.62				0.29	1.90

STREET	Phase	M.H. # FROM	M.H. # TO	SEWER DATA: DIA. mm	SLOPE %	CAPAC. l/s	VEL. m/s (full)	LENGTH m	UPSTREAM: Center Line	Obvert Drop	Obvert	Invert	Cover	DOWNSTREAM: Center Line	Obvert	Invert	Cover	REMARKS
EASEMENT		146	145	250	0.40	39.24	0.77	54.90	92.20		88.968	88.718	3.23	91.40	88.748	88.498	2.65	
EASEMENT	4	145	138	250	0.40	39.24	0.77	50.00	91.40	0.06	88.688	88.438	2.71	92.03	88.488	88.238	3.54	
DUSTY MILLER CRESCENT	4	138	139	250	0.40	39.26	0.77	119.20	92.03		88.488	88.238	3.54	92.16	88.011	87.761	4.15	
DUSTY MILLER CRESCENT	4	139	140	250	0.40	39.24	0.77	14.90	92.16	0.03	87.981	87.731	4.18	92.25	87.921	87.671	4.33	
WOODY POINT DRIVE	4	130 (south)	141	250	0.40	39.24	0.77	74.00	92.35		89.760	89.510	2.59	92.23	89.464	89.214	2.77	
WOODY POINT DRIVE	4	141	142	250	0.40	39.24	0.77	34.55	92.23		89.464	89.214	2.77	92.45	89.326	89.076	3.12	
DUSTY MILLER CRESCENT	4	134	135	250	0.40	39.24	0.77	66.90	92.04		90.019	89.769	2.02	92.27	89.751	89.501	2.52	
COYOTE BRUSH LANE	4	135	142	250	0.40	39.24	0.77	106.30	92.27		89.751	89.501	2.52	92.45	89.326	89.076	3.12	
WOODY POINT DRIVE	4	142	143	250	0.40	39.24	0.77	30.20	92.45		89.326	89.076	3.12	92.20	89.205	88.955	3.00	
WOODY POINT DRIVE	4	143	140	250	0.40	39.24	0.77	51.10	92.20		89.205	88.955	3.00	92.25	89.001	88.751	3.25	
DUSTY MILLER CRESCENT	4	140	91 (south)	250	0.40	39.24	0.77	84.90	92.25	0.06	87.861	87.611	4.39	92.35	87.522	87.272	4.83	
NORTH BLUFF DRIVE	4	91 (south)	92	250	0.40	39.24	0.77	29.70	92.35	0.06	87.462	87.212	4.89	92.15	87.343	87.093	4.81	
NORTH BLUFF DRIVE	4	92	93	250	0.40	39.24	0.77	35.60	92.15	0.01	87.333	87.083	4.82	92.40	87.191	86.941	5.21	
EYEBRIGHT CRESCENT	4	176	175	200	0.65	27.59	0.85	29.60	92.65		89.200	89.000	3.45	92.35	89.008	88.808	3.34	
EYEBRIGHT CRESCENT	4	175	174	200	0.65	27.59	0.85	41.20	92.35	0.01	88.998	88.798	3.35	92.65	88.730	88.530	3.92	
EYEBRIGHT CRESCENT	4	173	174	200	0.65	27.59	0.85	75.80	92.70		89.250	89.050	3.45	92.65	88.757	88.557	3.89	
ROYAL FERN WAY	4	174	161	200	0.65	27.59	0.85	95.80	92.65	0.06	88.670	88.470	3.98	92.55	88.047	87.847	4.50	
EYEBRIGHT CRESCENT	4	176	177	200	0.65	27.59	0.85	14.60	92.65		89.200	89.000	3.45	92.70	89.105	88.905	3.59	
EYEBRIGHT CRESCENT	4	177	178	200	0.65	27.59	0.85	82.80	92.70	0.03	89.075	88.875	3.62	92.62	88.537	88.337	4.08	
EYEBRIGHT CRESCENT	4	178	179	200	0.65	27.59	0.85	13.80	92.62	0.03	88.507	88.307	4.11	92.60	88.417	88.217	4.18	
EYEBRIGHT CRESCENT	4	179	161	200	0.65	27.59	0.85	69.30	92.60	0.03	88.387	88.187	4.21	92.55	87.937	87.737	4.61	
ROYAL FERN WAY	4	161	160	250	0.40	39.24	0.77	71.00	92.55		87.937	87.687	4.61	92.26	87.653	87.403	4.61	
ROYAL FERN WAY	4	160	93	250	0.40	39.24	0.77	11.10	92.26	0.01	87.643	87.393	4.62	92.40	87.598	87.348	4.80	
NORTH BLUFF DRIVE	4	93	94	250	0.40	39.24	0.77	79.70	92.40		87.191	86.941	5.21	92.55	86.872	86.622	5.68	
DUSTY MILLER CRESCENT	4	131	130	250	0.40	39.24	0.77	94.60	92.25		89.699	89.449	2.55	92.35	89.321	89.071	3.03	
DUSTY MILLER CRESCENT	4	130	88	250	0.40	39.24	0.77	81.00	92.35	0.12	89.203	88.953	3.15	92.45	88.879	88.629	3.57	
NORTH BLUFF DRIVE	4	91	90	200	0.65	27.59	0.85	26.60	92.35		89.609	89.409	2.74	92.17	89.436	89.236	2.73	
NORTH BLUFF DRIVE	4	90	223	200	0.65	27.59	0.85	18.00	92.17	0.02	89.416	89.216	2.75	92.05	89.299	89.099	2.75	
FIREWEED TRAIL	4	221	222	200	0.65	27.59	0.85	88.50	92.19		89.965	89.765	2.22	92.19	89.390	89.190	2.80	
FIREWEED TRAIL	4	222	223	200	0.65	27.59	0.85	24.60	92.19		89.390	89.190	2.80	92.05	89.230	89.030	2.82	
NORTH BLUFF DRIVE	4	223	89	250	0.40	39.24	0.77	20.70	92.05		89.230	88.980	2.82	92.05	89.147	88.897	2.90	
NORTH BLUFF DRIVE	4	89	88	250	0.40	39.24	0.77	67.00	92.05		89.147	88.897	2.90	92.45	88.879	88.629	3.57	
BARBERRY CRESCENT	4	88	200	250	0.40	39.24	0.77	80.50	92.45	0.05	88.829	88.579	3.62	92.42	88.507	88.257	3.91	
BARBERRY CRESCENT	4	200	201	250	0.40	39.24	0.77	83.20	92.42		88.507	88.257	3.91	92.25	88.174	87.924	4.08	
BARBERRY CRESCENT	4	204	203	200	0.65	27.59	0.85	72.80	92.37		89.014	88.814	3.36	92.26	88.541	88.341	3.72	
BARBERRY CRESCENT	4	203	201	250	0.40	39.24	0.77	89.30	92.26	0.01	88.531	88.281	3.73	92.25	88.174	87.924	4.08	

LICENSED PROFESSIONAL ENGINEER
M. N. L. DALRYMPLE
Dec. 21/06
PROVINCE OF ONTARIO

Filename: V:\18418-04.LD\DESIGN\STORM&SAN\SANITARY DES SHEET_PHASE 4_REV 9.XLS

Sheet Name: SANITARY (current)

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

SANITARY SEWER DESIGN SHEET

1515 Earl Armstrong Plaza
CITY OF OTTAWA
Urbandale Corporation

LOCATION: STREET	LOCATION: AREA ID	LOCATION: FROM MH	LOCATION: TO MH	RESIDENTIAL: AREA w/ Units (Ha)	RESIDENTIAL: UNIT TYPES SF	UNIT TYPES TH/SD	UNIT TYPES 1 Bed APT	UNIT TYPES 2 Bed APT	AREA w/o Units (Ha)	POPULATION IND	POPULATION CUM	RES PEAK FACTOR	PEAK FLOW (L/s)	ICI AREAS: AREA (Ha) INSTITUTIONAL IND	INSTITUTIONAL CUM	COMMERCIAL IND	COMMERCIAL CUM	INDUSTRIAL IND	INDUSTRIAL CUM	ICI PEAK FACTOR	PEAK FLOW (L/s)	INFILTRATION ALLOWANCE: AREA (Ha) IND	AREA (Ha) CUM	FLOW (L/s)	FIXED FLOW (L/s) IND	FIXED FLOW (L/s) CUM	TOTAL FLOW (L/s)	PROPOSED SEWER DESIGN: CAPACITY (L/s)	LENGTH (m)	DIA (mm)	SLOPE (%)	VELOCITY (full) (m/s)	AVAILABLE CAPACITY L/s	AVAILABLE CAPACITY (%)
Part 3	BLK K	BLDG K	MH01A							0.0	0.00	3.80	0.00			0.40	0.40			1.50	0.19	0.40	0.40	0.13		0.00	0.33	34.22	7.28	200	1.00	1.055	33.89	99.05%
		MH01A	MH100A							0.0	0.00	3.80	0.00			0.00	0.40			1.50	0.19	0.00	0.40	0.13		0.00	0.33	34.22	15.08	200	1.00	1.055	33.89	99.05%
Part 1	BLK B	BLDG B	MH02A							0.0	0.00	3.80	0.00			0.32	0.32			1.50	0.16	0.32	0.32	0.11		0.00	0.26	34.22	3.67	200	1.00	1.055	33.96	99.24%
		MH02A	MH100A							0.0	0.00	3.80	0.00			0.00	0.32			1.50	0.16	0.00	0.32	0.11		0.00	0.26	34.22	11.59	200	1.00	1.055	33.96	99.24%
Street 1	MH100A	MH100A	MH101A							0.0	0.00	3.80	0.00				0.72			1.50	0.35	0.11	0.83	0.27		0.00	0.62	39.01	70.00	200	1.30	1.203	38.39	98.40%
Part 3	BLK L	BLDG L	MH52A							0.0	0.00	3.80	0.00			0.90	0.90			1.50	0.44	0.90	0.90	0.30		0.00	0.73	34.22	2.00	200	1.00	1.055	33.48	97.85%
Part 3	MH52A	MH52A	MH54A							0.0	0.00	3.80	0.00			0.10	1.00			1.50	0.49	0.10	1.00	0.33		0.00	0.82	24.19	57.63	200	0.50	0.746	23.38	96.63%
Part 3	MH54A	MH54A	MH101A							0.0	0.00	3.80	0.00			0.29	1.29			1.50	0.63	0.29	1.29	0.43		0.00	1.05	24.19	63.07	200	0.50	0.746	23.14	95.65%
Street 1	MH101A	MH101A	MH102A							0.0	0.00	3.80	0.00				2.01			1.50	0.98	0.02	2.14	0.71		0.00	1.68	21.64	13.77	200	0.40	0.667	19.96	92.22%
Street 1	MH102A	MH102A	MH103A							0.0	0.00	3.80	0.00				2.01			1.50	0.98	0.08	2.22	0.73		0.00	1.71	21.64	39.89	200	0.40	0.667	19.93	92.10%
Street 1	MH103A	MH103A	MH104A							0.0	0.00	3.80	0.00				2.01			1.50	0.98	0.14	2.36	0.78		0.00	1.76	21.64	84.25	200	0.40	0.667	19.88	91.89%
Part 1	BLK A	BLDG A	MH60A							0.0	0.00	3.80	0.00			0.43	0.43			1.50	0.21	0.43	0.43	0.14		0.00	0.35	34.22	12.70	200	1.00	1.055	33.87	98.97%
Part 1	BLK B	BLDG C	MH60A							0.0	0.00	3.80	0.00			0.38	0.38			1.50	0.18	0.38	0.38	0.13		0.00	0.31	34.22	37.72	200	1.00	1.055	33.91	99.09%
Part 1	MH60A	MH60A	MH112A							0.0	0.00	3.80	0.00			0.15	0.96			1.50	0.47	0.15	0.96	0.32		0.00	0.78	27.59	44.25	200	0.65	0.851	26.80	97.16%
Part 1	BLK F	BLDG F	MH64A							0.0	0.00	3.80	0.00			0.29	0.29			1.50	0.14	0.29	0.29	0.10		0.00	0.24	34.22	13.55	200	1.00	1.055	33.98	99.31%
Part 1	MH64A	MH64A	MH62A							0.0	0.00	3.80	0.00			0.10	0.39			1.50	0.19	0.10	0.39	0.13		0.00	0.32	27.59	18.45	200	0.65	0.851	27.27	98.85%
Part 1	MH62A	MH62A	MH63A							0.0	0.00	3.80	0.00			0.08	0.47			1.50	0.23	0.08	0.47	0.16		0.00	0.38	27.59	39.49	200	0.65	0.851	27.20	98.61%
Part 1	BLK G	BLDG G	MH63A							0.0	0.00	3.80	0.00			0.13	0.13			1.50	0.06	0.13	0.13	0.04		0.00	0.11	34.22	12.70	200	1.00	1.055	34.11	99.69%
Part 1	BLK D	BLDG D	MH66A							0.0	0.00	3.80	0.00			0.11	0.11			1.50	0.05	0.11	0.11	0.04		0.00	0.09	34.22	4.00	200	1.00	1.055	34.13	99.74%
Part 1	BLK E	BLDG E	MH66A							0.0	0.00	3.80	0.00			0.13	0.13			1.50	0.06	0.13	0.13	0.04		0.00	0.11	34.22	4.00	200	1.00	1.055	34.11	99.69%
Part 1	MH66A	MH66A	MH63A							0.0	0.00	3.80	0.00			0.26	0.50			1.50	0.24	0.26	0.50	0.17		0.00	0.41	34.22	52.30	200	1.00	1.055	33.81	98.81%
Part 1	MH63A	MH63A	MH112A							0.0	0.00	3.80	0.00			0.07	1.17			1.50	0.57	0.07	1.17	0.39		0.00	0.95	21.64	30.93	200	0.40	0.667	20.69	95.59%
Part 1	MH112A	MH112A	MH03A							0.0	0.00	3.80	0.00			0.10	0.10			1.50	0.05	0.10	0.10	0.03		0.00	0.08	21.64	39.44	200	0.40	0.667	21.56	99.62%
		MH03A	MH104A							0.0	0.00	3.80	0.00				2.23			1.50	1.08	0.00	2.23	0.74		0.00	1.82	21.64	9.86	200	0.40	0.667	19.82	91.59%
Part 2	BLK H	BLDG H	MH04A							0.0	0.00	3.80	0.00			0.22	0.22			1.50	0.11	0.22	0.22	0.07		0.00	0.18	34.22	13.55	200	1.00	1.055	34.04	99.48%
Part 2		MH04A	MH107A							0.0	0.00	3.80	0.00				0.22			1.50	0.11	0.00	0.22	0.07		0.00	0.18	34.22	10.96	200	1.00	1.055	34.04	99.48%
Street 1	MH107A	MH107A	MH106A							0.0	0.00	3.80	0.00				0.22			1.50	0.11	0.06	0.28	0.09		0.00	0.20	48.39	23.45	200	2.00	1.492	48.19	99.59%
Street 1	MH106A	MH106A	MH105A							0.0	0.00	3.80	0.00				0.22			1.50	0.11	0.25	0.53	0.17		0.00	0.28	24.19	53.38	200	0.50	0.746	23.91	98.84%
Street 1	MH105A	MH105A	MH104A							0.0	0.00	3.80	0.00				0.22			1.50	0.11	0.07	0.60	0.20		0.00	0.30	24.19	42.15	200	0.50	0.746	23.89	98.74%
Part 2	BLK J	BLDG J	104A-109A							0.0	0.00	3.80	0.00			0.21	0.21			1.50	0.10	0.21	0.21	0.07		0.00	0.17	34.22	0.00	200	1.00	1.055	34.05	99.50%
Part 2	BLK I	BLDG I	104A-109A							0.0	0.00	3.80	0.00			0.24	0.24			1.50	0.12	0.24	0.24	0.08		0.00	0.20	34.22	0.00	200	1.00	1.055	34.02	99.43%
Part 2 (Easement)	MH104A	MH104A	MH108A							0.0	0.00	3.80	0.00			0.21	5.12			1.50	2.49	0.21	5.85	1.93		0.00	4.42	21.64	56.16	200	0.40	0.667	17.22	79.58%
Part 2 (Easement)	MH108A	MH108A	EXMHSAN							0.0	0.00	3.80	0.00			0.29	5.41			1.50	2.63	0.29	6.14	2.03		0.00	4.66	21.64	31.69	200	0.40	0.667	16.98	78.48%
																														250				

Design Parameters:

Residential			ICI Areas			
SF	3.4	p/p/u				
TH/SD	2.7	p/p/u	INST	28,000	L/Ha/day	
1 Bed	1.4	p/p/u	COM	28,000	L/Ha/day	
2 Bed	2.1	p/p/u	IND	35,000	L/Ha/day	MOE Chart
Other	60	p/p/Ha		17000	L/Ha/day	

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

Designed: SEL

Checked: TB

Dwg. Reference: 137404-400

No.	Revision	Date
1.	Design Brief - Submission No. 1	2022-12-16
2.	Design Brief - Submission No. 2	2023-03-27
3.	Design Brief - Submission No. 3	2023-06-12

File Reference:	Date:	Sheet No:
137404-6.04.04	2023-06-12	1 of 1

CLIENT

Urbandale CORPORATION

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ISSUES

No.	DESCRIPTION	DATE
1	SUBMISSION 1 FOR CITY REVIEW	2022-12-16
2	ISSUED FOR COORDINATION	2023-03-09
3	REVISED AS PER CITY COMMENTS	2023-04-06
4	ISSUED FOR TENDER	2023-04-27
5	REVISED AS PER CITY COMMENTS	2023-06-13
6	REVISED PER NEW SITE PLAN	2023-06-29

NOT FOR CONSTRUCTION

SEE 010, 011, 012 FOR NOTES, LEGEND, CB TABLE, STREET SECTIONS AND DETAILS

KEY PLAN

CONSULTANTS

Owner / Applicant: Urbandale Corporation
Architect: Dredge Leahy Architecture Inc.
Civil Engineers: IBI Group
Structural Engineers: Cleland Jardine Engineering Ltd
Planning: Fotenn
Landscape Architect: CSW Landscape Architects Ltd
Surveyor: Annis O'Sullivan Vollebekk Ltd
Geotechnical: Paterson and Associates
Electrical: JRP Engineering
Mechanical: JRP Engineering

1:750

SEAL

LICENSED PROFESSIONAL ENGINEER
S. E. LABADIE
100214983
23/06/29
PROVINCE OF ONTARIO

IBI GROUP
Suite 500 – 333 Preston Street
Ottawa ON K1S 5N4 Canada
tel 613 225 1311 / 613 241 3300 fax 613 225 9868
ibigroup.com

PROJECT
1515 EARL ARMSTRONG PLAZA

PROJECT NO: 137404

DRAWN BY: EH
CHECKED BY: TRB
PROJECT MGR: SEL
APPROVED BY: TRB

SHEET TITLE
SANITARY TRIBUTARY AREA PLAN

SHEET NUMBER 400
ISSUE 1

Plotted: Friday, June 30, 2023 2:53:44 PM by Eric Hennie

CITY FILE No. D07-12-22-0169 D07-16-22-0010

CITY PLAN No. 18900

Temporary Construction ICDs
Earl Armstong Plaza

Structure	Flow (l/s)	Grade Elev. (m)	Pipe Invert (m)	Pipe Size (m)	Height (m)	Area (Sq m)	Orifice Size	
							Sq. mm	mm dia.
Sanitary								
MH 108A	7.45	92.30	88.98	0.200	3.22	0.0015	39	44
Storm								
MH 108	700.59	92.30	87.31	0.750	4.61	0.1207	347	392
MH 57	179.11	92.16	87.44	0.600	4.42	0.0315	178	200

Based On Equation: Where: A=(Q/(C*(2*g*h)^.5)
C= 0.61
g= 9.81

2022-12-15

Appendix D

- Riverside South Phase 4 Storm Drainage Area Plan
- Riverside South Phase 4 Storm Sewer Design Sheet
- 1515 Earl Armstrong Plaza Storm Sewer Design Sheet
- Stormwater Management Calculations
- Underground Pipe Storage Calculations
- Runoff Coefficient Calculations
- Flow Control Roof Drainage Declaration
- Flow Control Roof Drain emails
- 137404-001 – General Plan
- 137404-010 – Notes-Legend
- 137404-011 – Street Sections
- 137404-200 – Grading Plan
- 137404-500 – Storm Drainage Area Plan
- 137404-600 – Ponding Plan

LEGEND

- CATCH BASIN
- INTERCONNECTED ROADWAY CB C/W ONE 19.8L/S IPEX TYPE 'A' ICD OR CITY APPROVED EQUIVALENT
- CATCH BASIN WITH INDIVIDUAL 74.0 L/S CUSTOM MADE ICD
- CATCH BASIN WITH INDIVIDUAL 37.0 L/S IPEX TYPE 'C' ICD OR CITY APPROVED EQUIVALENT
- CATCH BASIN WITH INDIVIDUAL 19.8 L/S IPEX TYPE 'A' ICD OR CITY APPROVED EQUIVALENT
- CATCH BASIN C/W CUSTOM MADE 13.4 L/S ICD
- HYDRANT
- 123 — STORM SEWER & MANHOLE
- 113 — LOT NUMBER
- DRAINAGE BOUNDARY
- 0.31 | 0.45 / 586–585 — AREA IN HECTARES; RUNOFF COEFFICIENT; PIPE REACH UPSTREAM MANHOLE TO DOWNSTREAM MANHOLE

NO.	REVISION	DATE
5	W/M SYSTEM REVISED FOR FUTURE CONVERSION TO HIGH PRESSURE	16/01/07
4	REVISED PER CITY COMMENTS FOR MOE APPROVAL	14/12/06
3	REVISED TO SUIT PHASING AND MINOR LAYOUT MODIFICATIONS	22/09/06
2	REVISED LAYOUT– RESUBMISSION TO CITY FOR REVIEW	23/06/06
1	ISSUED FOR CITY REVIEW	28/02/06

LICENSED PROFESSIONAL ENGINEER
J.S.C. BOUGIE
100010090
PROVINCE OF ONTARIO

URBANDALE CORPORATION

J.L.Richards
ENGINEERS·ARCHITECTS·PLANNERS
J.L. Richards & Associates Limited
864 Lady Ellen Place
Ottawa, ON Canada
K1Z 5M2
Tel: 613 728 3571
Fax: 613 728 6012

PROJECT:

RIVERSIDE SOUTH PHASE 4
URBANDALE CORPORATION
CITY OF OTTAWA

DRAWING: V:\18418-04.LD\1841804 C D-ST.dwg

STORM DRAINAGE PLAN

DESIGN:	D.L.	REVISION NO.:	
DRAWN:	T.S.	DRAWING NO.:	D2–ST
CHECKED:	L.D.		
DATE:	AUG. 2005		
SCALE:	1:1500	JOB NO.:	18418–04

J.L.Richards
ENGINEERS · ARCHITECTS · PLANNERS

CITY OF OTTAWA

RIVERSIDE SOUTH PHASES 3 & 4
URBANDALE CORPORATION
JLR PROJECT NO.: 18418

Printed on 12/21/2006 at 10:27 AM

STORM SEWER DESIGN SHEET
1:5 YEAR IDF CURVE

LICENSED PROFESSIONAL ENGINEER
M. N. L. DALRYMPLE
Dec. 21, '06
PROVINCE OF ONTARIO

Designed: D.L.
Checked By: G.F.

Date: December 14, 2006

5 YEAR IDF CURVE
Manning's Coefficient (n) = 0.013

LEGEND
DENOTES EXISTING SEWERS

STREET	PHASE	MANHOLE NUMBER From	MANHOLE NUMBER To	AREAS (ha) 0.20	0.30	0.45	0.50	0.55	0.60	0.70	0.80	1:5 YR PEAK FLOW GENERATION 2.78AR	2.78AR CUMM	Time min	Intens. mm/hr	Peak Flow (l/s)	SEWER DATA Dia (mm)	Slope %	Q full (l/s)	V full (m/s)	Length (m)	Flow Time (min)	UPSTREAM Pr. Center Line	Obvert Drop	Obvert	Invert	Cover	DOWNSTREAM Pr. Center Line	Obvert	Invert	Cover
ROYAL FERN WAY	4	674	661						0.62			1.03	2.84	16.58	78.78	223.39	525	0.40	283.76	1.27	98.50	1.29	92.56		89.63	89.10	2.93	92.50	89.24	88.71	3.26
EYEBRIGHT CRESCENT	4	676 (north)	677						0.08			0.13	0.13	15.00	83.56	11.15	375	0.25	91.46	0.80	15.00	0.31	92.61		89.81	89.43	2.80	92.66	89.77	89.39	2.89
EYEBRIGHT CRESCENT	4	677	678				0.12		0.62			1.20	1.33	15.31	82.56	110.17	450	0.25	148.72	0.91	85.80	1.58	92.66		89.77	89.32	2.89	92.58	89.56	89.10	3.02
EYEBRIGHT CRESCENT	4	678	679										1.33	16.89	77.91	103.96	450	0.25	148.72	0.91	13.80	0.25	92.58		89.56	89.10	3.02	92.55	89.52	89.07	3.03
EYEBRIGHT CRESCENT	4	679	661						0.26			0.43	1.77	17.14	77.21	136.52	525	0.25	224.33	1.00	72.20	1.20	92.55		89.52	88.99	3.03	92.50	89.34	88.81	3.16
ROYAL FERN WAY	4	661	660						0.32			0.53	5.14	18.34	74.11	380.74	600	0.70	535.93	1.84	68.00	0.62	92.50		89.24	88.63	3.26	92.24	88.76	88.15	3.48
ROYAL FERN WAY	4	660	593										5.14	18.96	72.62	373.08	600	0.70	535.93	1.84	14.70	0.13	92.24		88.76	88.15	3.48	92.38	88.66	88.05	3.72
NORTH BLUFF DRIVE	4	593	592				0.10					0.14	27.41	24.60	61.54	1686.73	1200	0.18	1725.61	1.48	38.40	0.43	92.38		88.66	87.44	3.72	92.06	88.59	87.37	3.47
NORTH BLUFF DRIVE	4	592	591				0.19					0.26	27.67	25.03	60.84	1683.65	1200	0.18	1725.61	1.48	29.40	0.33	92.06		88.59	87.37	3.47	92.29	88.54	87.32	3.75
NORTH BLUFF DRIVE	4	588 (south)	589											15.00	83.56		300	0.40	63.80	0.87	69.60	1.33	92.40		89.60	89.30	2.80	92.40	89.32	89.02	3.08
NORTH BLUFF DRIVE	4	589	723				0.29					0.40	0.40	16.33	79.50	32.05	300	0.40	63.80	0.87	17.70	0.34	92.40		89.32	89.02	3.08	92.01	89.25	88.95	2.76
FIREWEED TRAIL	4	721	722				0.65					0.90	0.90	15.00	83.56	75.49	375	0.40	115.68	1.01	91.50	1.50	92.15		89.35	88.97	2.80	92.15	88.98	88.60	3.17
FIREWEED TRAIL	4	722	723				0.43					0.60	1.50	16.50	79.00	118.59	450	0.40	188.11	1.15	22.00	0.32	92.15		88.98	88.53	3.17	92.01	88.90	88.44	3.11
NORTH BLUFF DRIVE	4	723	590										1.90	16.82	78.10	148.72	450	0.40	188.11	1.15	17.60	0.26	92.01	0.18	88.71	88.25	3.30	92.13	88.64	88.18	3.49
NORTH BLUFF DRIVE	4	590	591										1.90	17.08	77.39	147.38	450	0.40	188.11	1.15	25.70	0.37	92.13		88.64	88.18	3.49	92.29	88.54	88.08	3.75
DUSTY MILLER CRESCENT	4	591	640				0.59					0.82	30.40	25.36	60.32	1833.51	1350	0.18	2362.38	1.60	88.80	0.93	92.29		88.54	87.17	3.75	92.18	88.38	87.01	3.80
WOODY POINT DRIVE	4	630	641				0.83					1.15	12.07	24.70	61.38	740.84	975	0.17	963.96	1.25	77.00	1.03	92.31		88.74	87.75	3.57	92.17	88.61	87.62	3.56
WOODY POINT DRIVE	4	641	642				0.16					0.22	12.29	25.73	59.76	734.60	975	0.17	963.96	1.25	34.60	0.46	92.17	0.01	88.60	87.61	3.57	92.41	88.54	87.55	3.87
DUSTY MILLER CRESCENT	4	634	635				0.29					0.40	0.40	15.00	83.56	33.68	375	0.30	100.18	0.88	67.20	1.27	92.00		89.20	88.82	2.80	92.25	89.00	88.62	3.25
COYOTE BRUSH LANE	4	635	642				0.37					0.51	0.92	16.27	79.65	73.07	375	0.25	91.46	0.80	107.05	2.22	92.25	0.01	88.99	88.61	3.26	92.41	88.72	88.34	3.69
WOODY POINT DRIVE	4	642	643										13.21	26.19	59.06	780.23	975	0.18	991.91	1.29	28.00	0.36	92.41		88.54	87.55	3.87	92.17	88.49	87.50	3.68
WOODY POINT DRIVE	4	643	640				0.41					0.57	13.78	26.55	58.53	806.51	975	0.17	963.96	1.25	50.65	0.67	92.17	0.01	88.48	87.49	3.69	92.18	88.40	87.41	3.78
DUSTY MILLER CRESCENT	4	640	639				0.12					0.17	44.34	27.23	57.56	2552.32	1500	0.18	3128.74	1.72	13.70	0.13	92.18		88.38	86.85	3.80	92.12	88.35	86.83	3.77
DUSTY MILLER CRESCENT	4	639	638				1.27					1.77	46.11	27.36	57.37	2645.32	1500	0.18	3128.74	1.72	119.20	1.16	92.12		88.35	86.83	3.77	92.00	88.14	86.62	3.86
DUSTY MILLER CRESCENT	4	638	645				0.44					0.61	46.72	28.52	55.80	2607.07	1500	0.18	3128.74	1.72	48.90	0.48	92.00		88.14	86.62	3.86	91.40	88.05	86.53	3.35
BLOCK 288	4	645	646										46.72	28.99	55.18	2578.26	1500	0.18	3128.74	1.72	62.90	0.61	91.40		88.05	86.53	3.35	91.40	87.94	86.41	3.46
BLOCK 288	4	646	Stub										46.72	29.60	54.41	2542.23	1500	0.18	3128.74	1.72	17.40	0.17	91.40		87.94	86.41	3.46	91.00	87.91	86.38	3.09
	4	Stub	POND										46.72	29.77	54.20	2532.46	1500	0.18	3128.74	1.72	22.60	0.22	91.00		87.91	86.38	3.09	88.60	87.87	86.34	0.73

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STORM SEWER DESIGN SHEET

1515 Earl Armstrong Plaza
CITY OF OTTAWA
Urbandale Corporation

LOCATION				AREA (Ha)										RATIONAL DESIGN FLOW															SEWER DATA									
STREET	AREA ID	FROM	TO	C= 0.20	C= 0.25	C= 0.30	C= 0.40	C= 0.50	C= 0.60	C= 0.65	C= 0.70	C= 0.80	C= 0.90	IND 2.78AC	CUM 2.78AC	INLET (min)	TIME IN PIPE	TOTAL (min)	i (2) (mm/hr)	i (5) (mm/hr)	i (10) (mm/hr)	i (100) (mm/hr)	2yr PEAK FLOW (L/s)	5yr PEAK FLOW (L/s)	10yr PEAK FLOW (L/s)	100yr PEAK FLOW (L/s)	FIXED FLOW IND	FIXED FLOW CUM	DESIGN FLOW (L/s)	CAPACITY (L/s)	LENGTH (m)	PIPE SIZE (mm) DIA	PIPE SIZE (mm) W	PIPE SIZE (mm) H	SLOPE (%)	VELOCITY (m/s)	AVAIL CAP (2yr) (L/s)	AVAIL CAP (2yr) (%)
Part 3	BLK K	BLDG K	MH100										0.08	0.20	0.20	10.00	0.28	10.28	76.81	104.19	122.14	178.56	15.37	20.86	24.45	35.74	0.00	0.00	15.37	62.04	20.86	250			1.00	1.224	46.67	75.2%
Part 1	BLK B	BLDG B	MH100										0.05	0.13	0.13	10.00	0.23	10.23	76.81	104.19	122.14	178.56	9.61	13.03	15.28	22.34	0.00	0.00	22.34	62.04	16.76	250			1.00	1.224	39.70	64.0%
Street 1		MH100	MH119											0.00	0.33	10.23	0.37	10.60	75.94	103.00	120.74	176.50	24.70	33.50	39.27	57.41	0.00	0.00	24.70	208.55	40.80	375			1.30	1.829	183.85	88.2%
Part 3	MH50	MH50	MH51		0.03								0.10	0.27	0.27	10.00	0.42	10.42	76.81	104.19	122.14	178.56	20.82	28.24	33.11	48.40	0.00	0.00	20.82	283.76	31.94	525			0.40	1.270	262.94	92.7%
Part 3	MH52	MH52	MH51										0.29	0.73	0.73	10.00	1.91	11.91	76.81	104.19	122.14	178.56	55.73	75.60	88.62	129.56	0.00	0.00	55.73	200.65	102.92	525			0.20	0.898	144.92	72.2%
Part 3	MH51	MH51	MH51B								0.19		0.11	0.64	1.64	11.91	0.83	12.74	70.17	95.08	111.41	162.80	115.20	156.08	182.89	267.25	0.00	0.00	115.20	200.65	44.76	525			0.20	0.898	85.45	42.6%
Part 3		MH51B	MH119											0.00	1.64	12.74	0.21	12.95	67.67	91.64	107.37	156.86	111.09	150.44	176.25	257.50	0.00	0.00	111.09	286.47	12.29	600			0.20	0.982	175.38	61.2%
Street 1	MH119	MH119	MH101							0.05		0.17		0.47	2.44	12.95	0.24	13.19	67.07	90.82	106.40	155.44	163.34	221.18	259.12	378.55	0.00	0.00	163.34	744.26	36.25	600			1.35	2.550	580.92	78.1%
Part 3	MH54	CB01	MH54										0.04	0.10	0.10	10.00	1.15	11.15	76.81	104.19	122.14	178.56	7.69	10.43	12.22	17.87	0.00	0.00	*17.87*	39.24	53.30	250			0.40	0.774	21.37	54.5%
Part 3	BLK L	BLDG L	01-54										0.25	0.63	0.63	10.00	0.08	10.08	76.81	104.19	122.14	178.56	48.04	65.17	76.40	111.69	0.00	0.00	48.04	62.04	6.12	250			1.00	1.224	14.00	22.6%
Part 3	MH51	MH54	MH101	0.08										0.04	0.77	11.15	0.99	12.14	72.66	98.50	115.44	168.71	55.96	75.85	88.89	129.92	0.00	0.00	55.96	63.80	51.94	300			0.40	0.874	7.85	12.3%
Street 1		MH101	MH102											0.00	3.21	13.19	0.16	13.35	66.41	89.91	105.33	153.87	212.86	288.20	337.62	493.20	0.00	0.00	212.86	405.13	13.54	600			0.40	1.388	192.27	47.5%
Street 1	MH102	MH102	MH103									0.10		0.22	3.43	13.35	0.51	13.86	65.96	89.30	104.61	152.81	226.09	306.10	358.57	523.79	0.00	0.00	226.09	405.13	42.73	600			0.40	1.388	179.03	44.2%
Street 1	MH103	MH103	MH104							0.01		0.15		0.35	3.78	13.86	0.94	14.80	64.59	87.42	102.40	149.57	244.11	330.41	387.01	565.28	0.00	0.00	244.11	554.62	84.74	675			0.40	1.501	310.51	56.0%
Part 1	CBMH59	CBMH59	MH60								0.05		0.21	0.62	0.62	10.00	0.36	10.36	76.81	104.19	122.14	178.56	47.83	64.88	76.06	111.19	0.00	0.00	47.83	162.91	21.49	450			0.30	0.992	115.08	70.6%
Part 1	MH60	MH60	MH60B								0.06	0.12	0.37	1.31	1.93	10.36	1.33	11.70	75.45	102.32	119.94	175.33	145.77	197.70	231.74	338.75	0.00	0.00	145.77	162.91	79.48	450			0.30	0.992	17.14	10.5%
Part 1		MH60B	MH112											0.00	1.93	11.70	0.11	11.80	70.85	96.01	112.51	164.41	136.90	185.51	217.38	317.66	0.00	0.00	136.90	350.85	7.62	600			0.30	1.202	213.95	61.0%
Part 1	BLK C	BLDG C	MH63										0.09	0.23	0.23	10.00	0.12	10.12	76.81	104.19	122.14	178.56	17.29	23.46	27.50	40.21	0.00	0.00	17.29	62.04	8.80	250			1.00	1.224	44.74	72.1%
Part 1		MH63	MH113											0.00	0.23	10.12	0.67	10.79	76.35	103.56	121.40	177.47	17.19	23.32	27.34	39.96	0.00	0.00	17.19	62.04	49.10	250			1.00	1.224	44.85	72.3%
Part 1	BLK F	BLDG F	MH64										0.11	0.28	0.28	10.00	0.16	10.16	76.81	104.19	122.14	178.56	21.14	28.68	33.62	49.14	0.00	0.00	21.14	62.04	12.05	250			1.00	1.224	40.90	65.9%
Part 1		MH64	MH65											0.00	0.28	10.16	0.63	10.80	76.18	103.33	121.13	177.07	20.97	28.44	33.34	48.73	0.00	0.00	20.97	62.04	46.52	250			1.00	1.224	41.07	66.2%
Part 1	BLK E	BLDG E	65-113										0.07	0.18	0.18	10.00	0.19	10.19	76.81	104.19	122.14	178.56	13.45	18.25	21.39	31.27	0.00	0.00	13.45	62.04	13.70	250			1.00	1.224	48.59	78.3%
Part 1	BLK D	BLDG D	65-113										0.05	0.13	0.13	10.00	0.19	10.19	76.81	104.19	122.14	178.56	9.61	13.03	15.28	22.34	0.00	0.00	9.61	62.04	13.72	250			1.00	1.224	52.43	84.5%
Part 1	MH65	MH65	MH113								0.06			0.12	0.69	10.80	0.97	11.77	73.87	100.16	117.39	171.58	51.14	69.33	81.26	118.77	0.00	0.00	51.14	78.14	62.23	300			0.60	1.071	27.01	34.6%
Part 1		MH113	MH112											0.00	0.92	11.77	0.52	12.28	70.63	95.71	112.15	163.88	64.80	87.80	102.89	150.35	0.00	0.00	64.80	71.33	30.27	300			0.50	0.978	6.54	9.2%
Part 1	MH61	MH61	MH62				0.03		0.14				0.13	0.59	0.59	10.00	0.28	10.28	76.81	104.19	122.14	178.56	45.48	61.70	72.33	105.73	0.00	0.00	45.48	636.13	23.02	750			0.30	1.395	590.65	92.9%
Part 1	MH62	MH62	MH62B										0.51	1.28	1.87	10.28	0.75	11.03	75.76	102.76	120.46	176.08	141.54	191.98	225.03	328.95	0.00	0.00	141.54	636.13	62.80	750			0.30	1.395	494.59	77.7%
Part 1		MH62B	MH112											0.00	1.87	11.03	0.07	11.09	73.08	99.07	116.11	169.70	136.53	185.08	216.91	317.03	0.00	0.00	136.53	350.85	5.00	600			0.30	1.202	214.32	61.1%
Part 1		MH112	MH111											0.00	4.72	12.28	0.31	12.59	69.03	93.51	109.56	160.08	325.65	441.14	516.87	755.21	0.00	0.00	325.65	554.62	27.68	675			0.40	1.501	228.97	41.3%
Part 1	BLK A	BLDG A	MH111										0.09	0.23	0.23	10.00	0.29	10.29	76.81	104.19	122.14	178.56	17.29	23.46	27.50	40.21	0.00	0.00	17.29	62.04	21.00	250			1.00	1.224	44.74	72.1%
Part 1	BLK G	BLDG G	MH111										0.08	0.20	0.20	10.00	0.06	10.06	76.81	104.19	122.14	178.56	15.37	20.86	24.45	35.74	0.00	0.00	15.37	62.04	4.37	250			1.00	1.224	46.67	75.2%
Part 1	MH111	MH111	MH104				0.05					0.07		0.21	5.35	12.59	0.24	12.83	68.11	92.25	108.08	157.91	364.69	493.94	578.70	845.49	0.00	0.00	364.69	554.62	21.62	675			0.40	1.501	189.93	34.2%
Part 2	BLK H	BLDG H	MH107										0.02	0.05	0.05	10.00	0.15	10.15	76.81	104.19	122.14	178.56	3.84	5.21	6.11	8.94	0.00	0.00	8.94	62.04	11.17	250			1.00	1.224	53.10	85.6%
Street 1		MH107	MH106											0.00	0.05	10.15	0.20	10.36	76.23	103.40	121.20	177.18	3.81	5.17	6.07	8.87	0.00	0.00	3.81	142.67	23.93	300			2.00	1.955	138.85	97.3%
Street 1	MH106	MH106	MH105								0.01	0.14		0.33	0.38	10.36	0.91	11.27	75.46	102.35	119.97	175.37	28.74	38.98	45.69	66.79	0.00	0.00	28.74	71.33	53.53	300			0.50	0.978	42.59	59.7%
Street 1	MH105	MH105	MH104								0.02	0.09		0.24	0.62	11.27	0.66	11.93	72.25	97.94	114.77	167.74	44.79	60.72	71.15	103.99	0.00	0.00	44.79	71.33	38.65	300			0.50	0.978	26.54	37.2%
Part 2	BLK J	BLDG J	104-108										0.06	0.15	0.15	10.00	0.25	10.25	76.81	104.19	122.14	178.56	11.53	15.64	18.34	26.81	0.00	0.00	11.53	62.04	18.19	250			1.00	1.224	50.51	81.4%
Part 2	BLK I	BLDG I	104-108										0.12	0.30	0.30	10.00	0.12	10.12	76.81	104.19	122.14	178.56	23.06	31.28	36.67	53.61	0.00	0.00	23.06	62.04	8.48	250			1.00	1.224	38.98	62.8%
Part 2 (Easement)		MH104	MH108											0.00	10.20	14.80	0.37	15.17	62.24	84.20	98.61	144.00	635.06	859.17	1006.18	1469.39	0.00	0.00	635.06	2296.77	57.17	1050			0.65	2.570	1661.71	72.3%
Part 2	MH56	CBMH56	MH57										0.94	2.35	2.35	10.00	0.78	10.78	76.81	104.19	122.14	178.56	180.64	245.05	287.26	419.95	0.00	0.00	180.64	1034.42	73.52	900			0.30	1.575	853.78	82.5%
Part 2		MH57	MH108	0.12										0.07	2.42	10.78	0.35	11.13	73.94	100.26	117.50	171.75	178.84	242.48	284.20	415.39	0.00	0.00	178.84	350.85	25.05	600			0.30	1.202	172.01	49.0%
Part 2	MH58	MH58	MH58B								0.11	0.14	0.16	0.93	0.93	10.00	0.99	10.99	76.81	104.19	122.14	178.56	71.10	96.46	113.07	165.30	0.00	0.00	71.10	636.13	83.07	750			0.30	1.395	565.03	88.8%
Part 2		MH58B	MH108											0.00	0.93	10.99	0.10	11.09	73.19	99.23	116.29	169.97	67.76	91.86	107.66	157.35	0.00	0.00	67.76	350.85	7.15	600			0.30	1.202	283.09	80.7%
Part 2 (Easement)		MH108	EX STM											0.00	13.55	15.17	0.15	15.32	61.36	83.00	97.20	141.93	831.33	1124.51	1316.85	1922.94	0.00	0.00	831.33	2296.77	22.44	1050			0.65	2.570	1465.44	63.8%

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

Notes:
1. Mannings coefficient (n) = 0.013

Designed: SEL

Checked: TB

Dwg. Reference: 137404-500

No.	Revision	Date
1.	Design Brief - Submission No. 1	2022-12-16
2.	Design Brief - Submission No. 2	2023-03-27
3.	Design Brief - Submission No. 3	2023-06-16
4.	Design Brief - Submission No. 4	2023-06-29

File Reference:	Date:	Sheet No:
137404-6.04.04	2023-06-30	1 of 1

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PROJECT: Earl Armstrong Plaza
DATE: 2023-03-27
FILE: 137404.6.04.04
REV #: 2
DESIGNED BY: SEL
CHECKED BY: TB

STORMWATER MANAGEMENT

Formulas and Descriptions

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

Maximum Allowable Release Rate

Restricted Flowrate per Model

Part 1	514.00
Part 2	264.00
Part 3	341.00

Q_{TOTAL} = 1119.00 L/s

Uncontrolled Release Offsite ($Q_{unN+E+S} = 2.78*C*i_{100yr}*A_{uncontrolled}$)

C =	0.53	(0.42*1.25)
T_c =	10	min
i_{100yr} =	178.56	mm/hr
$A_{uncontrolled}$ =	0.34	Ha

$Q_{unN+E+S}$ = 88.61 L/s

Uncontrolled Release CB01 (Loading Bay, $Q_{un01} = 2.78*C*i_{100yr}*A_{uncontrolled}$)

C =	1.00	(0.90*1.25, max 1.00)
T_c =	10	min
i_{100yr} =	178.56	mm/hr
$A_{uncontrolled}$ =	0.04	Ha

Q_{un01} = 19.86 L/s

Uncontrolled Release CB111 ($Q_{un111} = 2.78*C*i_{100yr}*A_{uncontrolled}$)

C =	0.70	(0.56*1.25)
T_c =	10	min
i_{100yr} =	178.56	mm/hr
$A_{uncontrolled}$ =	0.09	Ha

Q_{un111} = 31.27 L/s

Uncontrolled Release BLDG B+H ($Q_{unBH} = 2.78*C*i_{100yr}*A_{uncontrolled}$)

C =	1.00	(0.90*1.25, max 1.00)
T_c =	10	min
i_{100yr} =	178.56	mm/hr
$A_{uncontrolled}$ =	0.07	Ha

Q_{unBH} = 34.75 L/s

Total Uncontrolled Release ($Q_{uncontrolled} = 2.78*C*i_{100yr}*A_{uncontrolled}$)

$Q_{uncontrolled}$ =	174.48 L/s

Maximum Allowable Release Rate ($Q_{max\ allowable}$ = $Q_{restricted}$ - $Q_{uncontrolled}$)

$Q_{max\ allowable}$ =	944.52 L/s

ROOF STORAGE

Rooftop storage will be used for all buildings with the exception of B and H

Minimum available storage has been assumed per the below calculation. Feasibilty has been confirmed by structural, see report appendices.

Average rooftop ponding depth	0.05 m
Usable area of roof for storage	80% of total roof area
Flow Restriction	1 L/s per 100m2 of roof area

Example calculation for Building A

Storage Volume = 0.09 Ha * 10000 m2/Ha * 0.80 * 0.05m
= 36 m3

Release Rate = 1 L/s / 100m2 * 0.09 Ha * 10000 m2/Ha
9 L/s

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

Drainage Area	***MH51B****	CB50, CB52A, CB52B, CB52C, CB 52D, CB51, CB51A, CB54	
Area (Ha)	0.64	ICD Flowrate (L/s) =	160.00
C =	1.00	Effective Restricted Flow Q_r (L/s)=	80.00

100-Year Ponding						**100Yr +20%**		
T_c Variable (min)	***i_{100yr} (mm/hour)***	***Peak Flow Q_p=2.78xCi$_{100yr}$A (L/s)***	***Q_r (L/s)***	***Q_p-Q_r (L/s)***	***Volume 100yr (m^3)***	***100YRQp 20% (L/s)***	***Qp - Qr (L/s)***	***Volume 100+20 (m3)***
17	132.63	235.97	80.00	155.97	159.09			
19	123.87	220.39	80.00	140.39	160.04			
20	119.95	213.42	80.00	133.42	**160.10**	256.10	176.10	**211.32**
21	116.30	206.92	80.00	126.92	159.91			
23	109.68	195.15	80.00	115.15	158.90			

Storage (m^3)						100+20	
Overflow	**Required**	**Surface**	**Sub-surface**	**Balance**	**Overflow**	**Required**	**Balance**
0.00	160.10	93.93	65.34	**0.83**	0.00	211.32	117.39

overflows to: W Swale

Drainage Area	***MH51B****	
Area (Ha)	0.64	
C =	0.82	Restricted Flow Q_r (L/s)= 80.00

2-Year Ponding					
T_c Variable (min)	***i_{2yr} (mm/hour)***	***Peak Flow Q_p=2.78xCi$_{2yr}$A (L/s)***	***Q_r (L/s)***	***Q_p-Q_r (L/s)***	***Volume 2yr (m^3)***
4	111.72	163.00	80.00	83.00	19.92
6	96.64	140.99	80.00	60.99	21.96
7	90.66	132.27	80.00	52.27	**21.96**
8	85.46	124.68	80.00	44.68	21.44
10	76.81	112.05	80.00	32.05	19.23

Storage (m^3)				
Overflow	**Required**	**Surface**	**Sub-surface**	**Balance**
0.00	21.96	93.93	65.34	0.00

overflows to: W Swale

Drainage Area	MH57*	CB56A, CB56B, CB56C, CB56D, CB56E	
Area (Ha)	0.85	ICD Flowrate (L/s) =	252.00
C =	1.00	Effective Restricted Flow Q_r (L/s)=	126.00

100-Year Ponding						100Yr +20%		
T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p=2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 100yr (m^3)	100YRQp 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m3)
14	148.72	351.43	126.00	225.43	189.36			
16	137.55	325.03	126.00	199.03	191.07			
17	132.63	313.40	126.00	187.40	**191.15**	376.08	250.08	**255.08**
18	128.08	302.66	126.00	176.66	190.79			
20	119.95	283.44	126.00	157.44	188.93			

Storage (m^3)					100+20		
Overflow	Required	Surface	Sub-surface	Balance	Overflow	Required	Balance
0.00	191.15	125.11	66.56	**0.00**	0.00	255.08	129.97

overflows to: N Swale

Drainage Area	MH57*		
Area (Ha)	0.85		
C =	0.84	Restricted Flow Q_r (L/s)=	126.00

2-Year Ponding					
T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p=2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 2yr (m^3)
2	133.33	264.65	126.00	138.65	16.64
4	111.72	221.76	126.00	95.76	22.98
5	103.57	205.58	126.00	79.58	**23.87**
6	96.64	191.82	126.00	65.82	23.70
8	85.46	169.62	126.00	43.62	20.94

Storage (m^3)				
Overflow	Required	Surface	Sub-surface	Balance
0.00	23.87	125.11	66.56	0.00

overflows to: N Swale

Drainage Area	MH58B*	CB58A, CB58B, CB58C, CB58D	
Area (Ha)	0.43	ICD Flowrate (L/s) =	68.00
C =	1.00	Effective Restricted Flow Q_r (L/s)=	34.00

100-Year Ponding						100Yr +20%		
T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p=2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 100yr (m^3)	100YRQp 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m3)
28	96.27	115.09	34.00	81.09	136.23			
30	91.87	109.82	34.00	75.82	136.47			
31	89.83	107.38	34.00	73.38	**136.49**	128.86	94.86	**176.43**
32	87.89	105.06	34.00	71.06	136.43			
34	84.27	100.73	34.00	66.73	136.14			

Storage (m^3)					100+20		
Overflow	Required	Surface	Sub-surface	Balance	Overflow	Required	Balance
0.00	136.49	88.76	48.44	**0.00**	0.00	176.43	87.67

overflows to: OUT

Drainage Area	MH58B*		
Area (Ha)	0.43		
C =	0.80	Restricted Flow Q_r (L/s)=	34.00

2-Year Ponding					
T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p=2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 2yr (m^3)
8	85.46	81.72	34.00	47.72	22.91
10	76.81	73.45	34.00	39.45	23.67
11	73.17	69.97	34.00	35.97	**23.74**
12	69.89	66.84	34.00	32.84	23.65
14	64.23	61.43	34.00	27.43	23.04

Storage (m^3)				
Overflow	Required	Surface	Sub-surface	Balance
0.00	23.74	88.76	48.44	0.00

overflows to: OUT

Drainage Area	MH62B*	CB61A, CB61B, CB62A, CB62B, CB62C, CB62D	
Area (Ha)	0.81	ICD Flowrate (L/s) =	129.00
C =	1.00	Effective Restricted Flow Q_r (L/s)=	64.50

100-Year Ponding						100Yr +20%		
T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)	100YRQp 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m3)
28	96.27	216.79	64.50	152.29	255.85			
30	91.87	206.87	64.50	142.37	256.26			
31	89.83	202.27	64.50	137.77	**256.26**	242.73	178.23	**331.51**
32	87.89	197.90	64.50	133.40	256.13			
34	84.27	189.75	64.50	125.25	255.52			

Storage (m^3)					100+20		
Overflow	Required	Surface	Sub-surface	Balance	Overflow	Required	Balance
0.00	256.26	191.02	66.58	**0.00**	0.00	331.51	140.49

overflows to: OUT

Drainage Area	MH62B*		
Area (Ha)	0.81		
C =	0.83	Restricted Flow Q_r (L/s)=	64.50

2-Year Ponding					
T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 2yr (m^3)
8	85.46	159.72	64.50	95.22	45.70
10	76.81	143.55	64.50	79.05	47.43
11	73.17	136.75	64.50	72.25	**47.68**
12	69.89	130.63	64.50	66.13	47.61
14	64.23	120.05	64.50	55.55	46.66

Storage (m^3)				
Overflow	Required	Surface	Sub-surface	Balance
0.00	47.68	191.02	66.58	0.00

overflows to: OUT

Drainage Area	MH60B*	CB59A, CB59B, CB59C, CB60A, CB60B, CB60C, CB60D, CB60E, CB60F, CB63	
Area (Ha)	0.83	ICD Flowrate (L/s) =	224.00
C =	1.00	Effective Restricted Flow Q_r (L/s)=	112.00

100-Year Ponding						100Yr +20%		
T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 100yr (m^3)	100YRQp 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m3)
15	142.89	329.71	112.00	217.71	195.94			
17	132.63	306.03	112.00	194.03	197.91			
18	128.08	295.54	112.00	183.54	**198.22**	354.65	242.65	**262.06**
19	123.87	285.81	112.00	173.81	198.15			
21	116.30	268.34	112.00	156.34	196.99			

Storage (m^3)					100+20		
Overflow	Required	Surface	Sub-surface	Balance	Overflow	Required	Balance
0.00	198.22	155.41	43.22	**0.00**	0.00	262.06	106.65

overflows to: OUT

Drainage Area	MH60B*		
Area (Ha)	0.83		
C =	0.84	Restricted Flow Q_r (L/s)=	112.00

2-Year Ponding					
T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	$Q_p - Q_r$ (L/s)	Volume 2yr (m^3)
2	133.33	258.42	112.00	146.42	17.57
4	111.72	216.54	112.00	104.54	25.09
5	103.57	200.74	112.00	88.74	**26.62**
6	96.64	187.31	112.00	75.31	27.11
8	85.46	165.63	112.00	53.63	25.74

Storage (m^3)				
Overflow	Required	Surface	Sub-surface	Balance
0.00	26.62	155.41	43.22	0.00

overflows to: OUT

Drainage Area	W Swale	
Area (Ha)	0.08	
C =	0.25	Restricted Flow Q_r (L/s)= 6.00

100-Year Ponding / **100Yr +20%**

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p=2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 100yr (m^3)	100YRQp 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m3)
5	242.70	13.49	6.00	7.49	2.25			
7	211.67	11.77	6.00	5.77	2.42			
8	199.20	11.08	6.00	5.08	**2.44**	13.29	7.29	**3.50**
9	188.25	10.47	6.00	4.47	2.41			
11	169.91	9.45	6.00	3.45	2.27			

Storage (m^3) / 100+20

Overflow	Required	Surface	Sub-surface	Balance	Overflow (100+20)	Required (100+20)	Balance (100+20)
0.83	3.27	6.26	0.5	**0.00**	117.39	120.89	114.63

overflows to: N Swale

Drainage Area	W Swale	
Area (Ha)	0.08	
C =	0.20	Restricted Flow Q_r (L/s)= 6.00

2-Year Ponding

T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p=2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 2yr (m^3)
-2	229.26	10.20	6.00	4.20	-0.50
0	167.22	7.44	6.00	1.44	0.00
1	148.14	6.59	6.00	0.59	**0.04**
2	133.33	5.93	6.00	-0.07	-0.01
4	111.72	4.97	6.00	-1.03	-0.25

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	0.04	6.26	0.5	0.00

overflows to: N Swale

Drainage Area	N Swale	
Area (Ha)	0.13	ICD Flowrate (L/s) = 6.00
C =	0.25	Effective Restricted Flow Q_r (L/s)= 3.00

100-Year Ponding / **100Yr +20%**

T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p=2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 100yr (m^3)	100YRQp 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m3)
24	106.68	9.64	3.00	6.64	9.56			
26	101.18	9.14	3.00	6.14	9.58			
27	98.66	8.91	3.00	5.91	**9.58**	10.70	7.70	**12.47**
28	96.27	8.70	3.00	5.70	9.57			
30	91.87	8.30	3.00	5.30	9.54			

Storage (m^3) / 100+20

Overflow	Required	Surface	Sub-surface	Balance	Overflow (100+20)	Required (100+20)	Balance (100+20)
0.00	9.58	3.62	9.24	**0.00**	247.36	259.83	256.21

overflows to: OUT

Drainage Area	N Swale	
Area (Ha)	0.13	
C =	0.20	Restricted Flow Q_r (L/s)= 3.00

2-Year Ponding

T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p=2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 2yr (m^3)
6	96.64	6.99	3.00	3.99	1.43
8	85.46	6.18	3.00	3.18	1.52
9	80.87	5.85	3.00	2.85	**1.54**
10	76.81	5.55	3.00	2.55	1.53
12	69.89	5.05	3.00	2.05	1.48

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	1.54	3.62	9.24	0.00

overflows to: OUT

Drainage Area	BLDG A		
Area (Ha)	0.09		
C =	1.00	Restricted Flow Q_r (L/s)=	9.00

100-Year Ponding						100Yr +20%		
T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 100yr (m^3)	100YRQp 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m3)
22	112.88	28.24	9.00	19.24	25.40			
24	106.68	26.69	9.00	17.69	25.47			
25	103.85	25.98	9.00	16.98	**25.47**	31.18	22.18	**33.27**
26	101.18	25.32	9.00	16.32	25.45			
28	96.27	24.09	9.00	15.09	25.35			

Storage (m^3)					100+20		
Overflow	Required	Surface	Sub-surface	Balance	Overflow	Required	Balance
0.00	25.47	36.00	0	**0.00**	0.00	33.27	0.00

overflows to: OUT

Drainage Area	BLDG A		
Area (Ha)	0.09		
C =	0.90	Restricted Flow Q_r (L/s)=	9.00

2-Year Ponding					
T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 2yr (m^3)
7	90.66	20.42	9.00	11.42	4.79
9	80.87	18.21	9.00	9.21	4.97
10	76.81	17.29	9.00	8.29	**4.98**
11	73.17	16.48	9.00	7.48	4.93
13	66.93	15.07	9.00	6.07	4.74

Storage (m^3)				
Overflow	Required	Surface	Sub-surface	Balance
0.00	4.98	36.00	0	0.00

overflows to: OUT

Drainage Area	BLDG C		
Area (Ha)	0.09		
C =	1.00	Restricted Flow Q_r (L/s)=	9.00

100-Year Ponding						100Yr +20%		
T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 100yr (m^3)	100YRQp 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m3)
22	112.88	28.24	9.00	19.24	25.40			
24	106.68	26.69	9.00	17.69	25.47			
25	103.85	25.98	9.00	16.98	**25.47**	31.18	22.18	**33.27**
26	101.18	25.32	9.00	16.32	25.45			
28	96.27	24.09	9.00	15.09	25.35			

Storage (m^3)					100+20		
Overflow	Required	Surface	Sub-surface	Balance	Overflow	Required	Balance
0.00	25.47	36.00	0	**0.00**	0.00	33.27	0.00

overflows to: OUT

Drainage Area	BLDG C		
Area (Ha)	0.09		
C =	0.90	Restricted Flow Q_r (L/s)=	9.00

2-Year Ponding					
T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 2yr (m^3)
7	90.66	20.42	9.00	11.42	4.79
9	80.87	18.21	9.00	9.21	4.97
10	76.81	17.29	9.00	8.29	**4.98**
11	73.17	16.48	9.00	7.48	4.93
13	66.93	15.07	9.00	6.07	4.74

Storage (m^3)				
Overflow	Required	Surface	Sub-surface	Balance
0.00	4.98	36.00	0	0.00

overflows to: OUT

Drainage Area	BLDG D		
Area (Ha)	0.05		
C =	1.00	Restricted Flow Q_r (L/s)=	5.00

100-Year Ponding						100Yr +20%		
T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 100yr (m^3)	100YRQp 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m3)
22	112.88	15.69	5.00	10.69	14.11			
24	106.68	14.83	5.00	9.83	14.15			
25	103.85	14.43	5.00	9.43	**14.15**	17.32	12.32	**18.48**
26	101.18	14.06	5.00	9.06	14.14			
28	96.27	13.38	5.00	8.38	14.08			

Storage (m^3)					100+20		
Overflow	Required	Surface	Sub-surface	Balance	Overflow	Required	Balance
0.00	14.15	20.00	0	**0.00**	0.00	18.48	0.00

overflows to: OUT

Drainage Area	BLDG E		
Area (Ha)	0.07		
C =	1.00	Restricted Flow Q_r (L/s)=	7.00

100-Year Ponding						100Yr +20%		
T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 100yr (m^3)	100YRQp 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m3)
22	112.88	21.97	7.00	14.97	19.76			
24	106.68	20.76	7.00	13.76	19.81			
25	103.85	20.21	7.00	13.21	**19.81**	24.25	17.25	**25.88**
26	101.18	19.69	7.00	12.69	19.80			
28	96.27	18.74	7.00	11.74	19.71			

Storage (m^3)					100+20		
Overflow	Required	Surface	Sub-surface	Balance	Overflow	Required	Balance
0.00	19.81	28.00	0	**0.00**	0.00	25.88	0.00

overflows to: OUT

Drainage Area	BLDG D		
Area (Ha)	0.05		
C =	0.90	Restricted Flow Q_r (L/s)=	5.00

2-Year Ponding					
T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 2yr (m^3)
7	90.66	11.34	5.00	6.34	2.66
9	80.87	10.12	5.00	5.12	2.76
10	76.81	9.61	5.00	4.61	**2.76**
11	73.17	9.15	5.00	4.15	2.74
13	66.93	8.37	5.00	3.37	2.63

Storage (m^3)				
Overflow	Required	Surface	Sub-surface	Balance
0.00	2.76	20.00	0	0.00

overflows to: OUT

Drainage Area	BLDG E		
Area (Ha)	0.07		
C =	0.90	Restricted Flow Q_r (L/s)=	7.00

2-Year Ponding					
T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 2yr (m^3)
7	90.66	15.88	7.00	8.88	3.73
9	80.87	14.16	7.00	7.16	3.87
10	76.81	13.45	7.00	6.45	**3.87**
11	73.17	12.81	7.00	5.81	3.84
13	66.93	11.72	7.00	4.72	3.68

Storage (m^3)				
Overflow	Required	Surface	Sub-surface	Balance
0.00	3.87	28.00	0	0.00

overflows to: OUT

Drainage Area	BLDG F							
Area (Ha)	0.11							
C =	1.00	Restricted Flow Q_r (L/s)=			11.00			
100-Year Ponding						**100Yr +20%**		
T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 100yr (m^3)	100YRQp 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m3)
22	112.88	34.52	11.00	23.52	31.05			
24	106.68	32.62	11.00	21.62	31.13			
25	103.85	31.76	11.00	20.76	**31.13**	38.11	27.11	**40.66**
26	101.18	30.94	11.00	19.94	31.11			
28	96.27	29.44	11.00	18.44	30.98			

	Storage (m^3)				100+20		
Overflow	Required	Surface	Sub-surface	Balance	Overflow	Required	Balance
0.00	31.13	44.00	0	**0.00**	0.00	40.66	0.00

overflows to: OUT

Drainage Area	BLDG F				
Area (Ha)	0.11				
C =	0.90	Restricted Flow Q_r (L/s)=			11.00
2-Year Ponding					
T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 2yr (m^3)
7	90.66	24.95	11.00	13.95	5.86
9	80.87	22.26	11.00	11.26	6.08
10	76.81	21.14	11.00	10.14	**6.08**
11	73.17	20.14	11.00	9.14	6.03
13	66.93	18.42	11.00	7.42	5.79

	Storage (m^3)			
Overflow	Required	Surface	Sub-surface	Balance
0.00	6.08	44.00	0	0.00

overflows to: OUT

Drainage Area	BLDG G							
Area (Ha)	0.08							
C =	1.00	Restricted Flow Q_r (L/s)=			8.00			
100-Year Ponding						**100Yr +20%**		
T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 100yr (m^3)	100YRQp 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m3)
22	112.88	25.10	8.00	17.10	22.58			
24	106.68	23.72	8.00	15.72	22.64			
25	103.85	23.10	8.00	15.10	**22.64**	27.71	19.71	**29.57**
26	101.18	22.50	8.00	14.50	22.62			
28	96.27	21.41	8.00	13.41	22.53			

	Storage (m^3)				100+20		
Overflow	Required	Surface	Sub-surface	Balance	Overflow	Required	Balance
0.00	22.64	32.00	0	**0.00**	0.00	29.57	0.00

overflows to: OUT

Drainage Area	BLDG G				
Area (Ha)	0.08				
C =	0.90	Restricted Flow Q_r (L/s)=			8.00
2-Year Ponding					
T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 2yr (m^3)
7	90.66	18.15	8.00	10.15	4.26
9	80.87	16.19	8.00	8.19	4.42
10	76.81	15.37	8.00	7.37	**4.42**
11	73.17	14.65	8.00	6.65	4.39
13	66.93	13.40	8.00	5.40	4.21

	Storage (m^3)			
Overflow	Required	Surface	Sub-surface	Balance
0.00	4.42	32.00	0	0.00

overflows to: OUT

Drainage Area	BLDG I	
Area (Ha)	0.10	
C =	1.00	Restricted Flow Q_r (L/s)= 10.00

100-Year Ponding						100Yr +20%		
T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 100yr (m^3)	100YRQp 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m3)
22	112.88	31.38	10.00	21.38	28.22			
24	106.68	29.66	10.00	19.66	28.30			
25	103.85	28.87	10.00	18.87	**28.30**	34.64	24.64	**36.97**
26	101.18	28.13	10.00	18.13	28.28			
28	96.27	26.76	10.00	16.76	28.16			

Storage (m^3)					100+20		
Overflow	Required	Surface	Sub-surface	Balance	Overflow	Required	Balance
0.00	28.30	40.00	0	**0.00**	0.00	36.97	0.00

overflows to: OUT

Drainage Area	BLDG J	
Area (Ha)	0.06	
C =	1.00	Restricted Flow Q_r (L/s)= 6.00

100-Year Ponding						100Yr +20%		
T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 100yr (m^3)	100YRQp 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m3)
22	112.88	18.83	6.00	12.83	16.93			
24	106.68	17.79	6.00	11.79	16.98			
25	103.85	17.32	6.00	11.32	**16.98**	20.79	14.79	**22.18**
26	101.18	16.88	6.00	10.88	16.97			
28	96.27	16.06	6.00	10.06	16.90			

Storage (m^3)					100+20		
Overflow	Required	Surface	Sub-surface	Balance	Overflow	Required	Balance
0.00	16.98	24.00	0	**0.00**	0.00	22.18	0.00

overflows to: OUT

Drainage Area	BLDG I	
Area (Ha)	0.10	
C =	0.90	Restricted Flow Q_r (L/s)= 10.00

2-Year Ponding					
T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 2yr (m^3)
7	90.66	22.68	10.00	12.68	5.33
9	80.87	20.23	10.00	10.23	5.53
10	76.81	19.22	10.00	9.22	**5.53**
11	73.17	18.31	10.00	8.31	5.48
13	66.93	16.75	10.00	6.75	5.26

Storage (m^3)				
Overflow	Required	Surface	Sub-surface	Balance
0.00	5.53	40.00	0	0.00

overflows to: OUT

Drainage Area	BLDG J	
Area (Ha)	0.06	
C =	0.90	Restricted Flow Q_r (L/s)= 6.00

2-Year Ponding					
T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 2yr (m^3)
7	90.66	13.61	6.00	7.61	3.20
9	80.87	12.14	6.00	6.14	3.32
10	76.81	11.53	6.00	5.53	**3.32**
11	73.17	10.98	6.00	4.98	3.29
13	66.93	10.05	6.00	4.05	3.16

Storage (m^3)				
Overflow	Required	Surface	Sub-surface	Balance
0.00	3.32	24.00	0	0.00

overflows to: OUT

Drainage Area	BLDG K				
Area (Ha)	0.08				
C =	1.00	Restricted Flow Q_r (L/s)=			8.00

100-Year Ponding						100Yr +20%		
T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 100yr (m^3)	100YRQp 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m3)
22	112.88	25.10	8.00	17.10	22.58			
24	106.68	23.72	8.00	15.72	22.64			
25	103.85	23.10	8.00	15.10	**22.64**	27.71	19.71	**29.57**
26	101.18	22.50	8.00	14.50	22.62			
28	96.27	21.41	8.00	13.41	22.53			

Storage (m^3)					100+20		
Overflow	Required	Surface	Sub-surface	Balance	Overflow	Required	Balance
0.00	22.64	32.00	0	**0.00**	0.00	29.57	0.00

overflows to: OUT

Drainage Area	BLDG K				
Area (Ha)	0.08				
C =	0.90	Restricted Flow Q_r (L/s)=			8.00

2-Year Ponding					
T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 2yr (m^3)
7	90.66	18.15	8.00	10.15	4.26
9	80.87	16.19	8.00	8.19	4.42
10	76.81	15.37	8.00	7.37	**4.42**
11	73.17	14.65	8.00	6.65	4.39
13	66.93	13.40	8.00	5.40	4.21

Storage (m^3)				
Overflow	Required	Surface	Sub-surface	Balance
0.00	4.42	32.00	0	0.00

overflows to: OUT

Drainage Area	BLDG L				
Area (Ha)	0.25				
C =	1.00	Restricted Flow Q_r (L/s)=			23.00

100-Year Ponding						100Yr +20%		
T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{100yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 100yr (m^3)	100YRQp 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m3)
23	109.68	76.23	23.00	53.23	73.46			
25	103.85	72.17	23.00	49.17	73.76			
26	101.18	70.32	23.00	47.32	**73.82**	84.38	61.38	**95.76**
27	98.66	68.57	23.00	45.57	73.82			
29	94.01	65.34	23.00	42.34	73.67			

Storage (m^3)					100+20		
Overflow	Required	Surface	Sub-surface	Balance	Overflow	Required	Balance
0.00	73.82	100.00	0	**0.00**	0.00	95.76	0.00

overflows to: OUT

Drainage Area	BLDG L				
Area (Ha)	0.25				
C =	0.90	Restricted Flow Q_r (L/s)=			23.00

2-Year Ponding					
T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow $Q_p = 2.78xCi_{2yr}A$ (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 2yr (m^3)
8	85.46	53.45	23.00	30.45	14.62
10	76.81	48.04	23.00	25.04	15.02
11	73.17	45.77	23.00	22.77	**15.03**
12	69.89	43.72	23.00	20.72	14.92
14	64.23	40.18	23.00	17.18	14.43

Storage (m^3)				
Overflow	Required	Surface	Sub-surface	Balance
0.00	15.03	100.00	0	0.00

overflows to: OUT

SUMMARY

Drainage Area	Tributary Area	Restricted Flow	Req Storage	Avail Storage	Overflow		100-yr + 20% Ponding	2-yr Ponding
MH51B*	0.64	160.00	160.10	159.27	0.83	***Part 3***	117.39	0.00
MH57*	0.85	252.00	191.15	191.67	0.00	***Part 2 & 3***	129.97	0.00
MH58B*	0.43	68.00	136.49	137.20	0.00	***Part 2***	87.67	0.00
MH62B*	0.81	129.00	256.26	257.60	0.00	***Part 1***	140.49	0.00
MH60B*	0.83	224.00	198.22	198.63	0.00	***Part 1***	106.65	0.00
W Swale	0.08	6.00	3.27	6.76	-0.83	***Part 2***		
N Swale	0.13	6.00	9.58	12.86	0.00	***Part 2 & 3***		
Total Surface	3.77	845.00	955.06	963.99	0.00			
BLDG A	0.09	9.00	25.47	36.00	0.00	***Part 1***		
BLDG C	0.09	9.00	25.47	36.00	0.00	***Part 1***		
BLDG D	0.05	5.00	14.15	20.00	0.00	***Part 1***		
BLDG E	0.07	7.00	19.81	28.00	0.00	***Part 1***		
BLDG F	0.11	11.00	31.13	44.00	0.00	***Part 1***		
BLDG G	0.08	8.00	22.64	32.00	0.00	***Part 1***		
BLDG I	0.10	10.00	28.30	40.00	0.00	***Part 2***		
BLDG J	0.06	6.00	16.98	24.00	0.00	***Part 2***		
BLDG K	0.08	8.00	22.64	32.00	0.00	***Part 3***		
BLDG L	0.25	23.00	73.82	100.00	0.00	***Part 3***		
Total Buildings	0.98	96.00	280.44	392.00	0.00			
Total	**4.75**	**941.00**	**1235.50**	**1355.99**	**0.00**			
	Max Allowable	**944.52**						
	Remaining Cap.	**3.52**						

	Proportionate Flow by Area			
	Restricted Flow	***Unrestricted***	***Total***	***Per Model***
Part 1	402.00	98.01	500.01	514.00
Part 2	219.00	46.88	265.88	264.00
Part 3	320.00	29.59	349.59	341.00
Total	941.00	174.48	1115.48	1119.00

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PROJECT: Earl Armstrong Plaza
DATE: 2023-06-27
FILE: 137404.6.04.04
REV #: 3
DESIGNED BY: SEL

UNDERGROUND STORAGE CALCULATIONS - 1515 EARL ARMSTRONG

Top of MH = T/G-0.45m
Top of CB = T/G

Pipe Storage	***MH51B****				
From	**To**	**Length**	**Diameter**	**X-sec Area**	**Volume**
CB50	MH50	9.82	200	0.031	0.31
CB52A	MH52-MH51	3.18	200	0.031	0.10
CB52B	MH52-MH51	3.18	200	0.031	0.10
CB52C	MH52	13.25	200	0.031	0.42
CB52D	MH52	26.30	200	0.031	0.83
CB51	MH51-MH51B	17.99	200	0.031	0.57
CB54	CB51	19.69	200	0.031	0.62
CB51A	MH51-MH51B	18.00	200	0.031	0.57
MH50	MH51	31.94	525	0.216	6.91
MH52	MH51	102.92	525	0.216	22.28
MH51	MH51B	44.76	525	0.216	9.69
				Total	42.38

Structure Storage			***MH51B****			
	Invert	**Top**	**Height**	**diameter**	**X-sec Area**	**Volume**
CB50	91.720	93.12	1.40	600	0.360	0.50
CB52A	91.150	92.55	1.40	600	0.360	0.50
CB52B	91.150	92.55	1.40	600	0.360	0.50
CB52C	91.150	92.55	1.40	600	0.360	0.50
CB52D	91.150	92.55	1.40	600	0.360	0.50
CB51	91.100	92.50	1.40	600	0.360	0.50
CB54	91.100	92.50	1.40	600	0.360	0.50
CB51A	91.150	92.55	1.40	600	0.360	0.50
MH50	90.260	92.79	2.53	1500	1.767	4.47
MH51	89.540	92.44	2.90	1500	1.767	5.12
MH51B	89.360	92.42	3.06	1500	1.767	5.41
MH52	90.010	92.23	2.22	1500	1.767	3.92
					Total	22.96

TOTAL	**MH51B***	**65.34**

Pipe Storage	***MH57***				
From	**To**	**Length**	**Diameter**	**X-sec Area**	**Volume**
CB56A	MH56-MH57	3.67	200	0.031	0.12
CB56B	MH56-MH57	15.68	250	0.049	0.77
CB56C	CB56B	16.62	250	0.049	0.82
CB56D	MH56-MH57	4.52	200	0.031	0.14
CB56E	MH56-MH57	15.78	300	0.071	1.12
MH56	MH57	73.52	900	0.636	46.77
				Total	49.73

Structure Storage			***MH57***			
	Invert	**Top**	**Height**	**diameter**	**X-sec Area**	**Volume**
CB56A	90.800	92.20	1.40	600	0.360	0.50
CB56B	90.800	92.20	1.40	600	0.360	0.50
CB56C	90.800	92.20	1.40	600	0.360	0.50
CB56D	90.800	92.20	1.40	600	0.360	0.50
CB56E	90.750	92.15	1.40	600	0.360	0.50
MH56	89.743	91.91	2.17	1500	1.767	3.83
MH57	87.793	91.91	4.12	1800	2.545	10.48
					Total	16.83

TOTAL	**MH57**	**66.56**

Pipe Storage	*MH58B**				
From	**To**	**Length**	**Diameter**	**X-sec Area**	**Volume**
CB58A	MH58-MH59*	2.46	200	0.031	0.08
CB58B	MH58-MH59*	2.40	200	0.031	0.08
CB58C	MH58-MH59*	15.88	200	0.031	0.50
CB58D	MH58-MH59*	7.68	200	0.031	0.24
MH58	MH58B*	83.07	750	0.442	36.70
ECB/TCB LEADS		11.22	200	0.031	0.35
				Total	37.94

Structure Storage		*MH58B**				
	Invert	**Top**	**Height**	**diameter**	**X-sec Area**	**Volume**
CB58A	90.800	92.20	1.40	600	0.360	0.50
CB58B	90.800	92.20	1.40	600	0.360	0.50
CB58C	90.800	92.20	1.40	600	0.360	0.50
CB58D	90.950	92.35	1.40	600	0.360	0.50
MH58	89.861	91.94	2.08	1500	1.767	3.67
MH58B*	89.261	91.98	2.72	1500	1.767	4.80
					Total	10.49

TOTAL	**MH58B***	**48.44**

Pipe Storage	*MH62B**				
From	**To**	**Length**	**Diameter**	**X-sec Area**	**Volume**
CB61A	MH61-MH62	7.90	200	0.031	0.25
CB61B	MH61	10.82	200	0.031	0.34
CB62A	MH62-MH62B*	1.48	200	0.031	0.05
CB62B	MH62-MH62B*	16.00	200	0.031	0.50
CB62C	MH62-MH62B*	1.45	200	0.031	0.05
CB62D	MH62-MH62B*	16.00	250	0.049	0.79
CB62E	MH62	36.84	200	0.031	1.16
MH61	MH62	23.02	750	0.442	10.17
MH62	MH62B*	62.80	750	0.442	27.74
ECB/TCB SUBDRAIN		41.44	250	0.049	2.03
ECB/TCB LEADS		47.96	200	0.031	1.51
				Total	44.58

Structure Storage		*MH62B**				
	Invert	**Top**	**Height**	**diameter**	**X-sec Area**	**Volume**
CB61A	91.150	92.55	1.40	600	0.360	0.50
CB61B	91.100	92.50	1.40	600	0.360	0.50
CB62A	91.150	92.55	1.40	600	0.360	0.50
CB62B	91.100	92.50	1.40	600	0.360	0.50
CB62C	91.150	92.55	1.40	600	0.360	0.50
CB62D	91.100	92.50	1.40	600	0.360	0.50
CB62E	91.150	92.55	1.40	600	0.360	0.50
MH61	88.880	92.27	3.39	1500	1.767	5.99
MH62	88.810	92.28	3.47	1500	1.767	6.13
MH62B*	88.620	92.21	3.59	1500	1.767	6.34
					Total	21.99

TOTAL	**MH62B***	**66.58**

Pipe Storage	***MH60B****				
From	**To**	**Length**	**Diameter**	**X-sec Area**	**Volume**
CB59A	CBMH59	17.33	200	0.031	0.54
CB59B	CBMH59	19.95	200	0.031	0.63
CB59C	CBMH59	11.57	200	0.031	0.36
CB60A	CB60B	8.66	200	0.031	0.27
CB60B	MH60-MH60B*	14.59	200	0.031	0.46
CB60C	MH60-MH60B*	1.42	200	0.031	0.04
CB60D	MH60-MH60B*	16.00	200	0.031	0.50
CB60E	MH60-MH60B*	1.54	200	0.031	0.05
CB60F	MH60-MH60B*	16.00	200	0.031	0.50
CB63	CB60F	10.47	200	0.031	0.33
CBMH59	MH60	23.05	450	0.159	3.67
MH60	MH60B*	79.48	450	0.159	12.64
				Total	20.00

Structure Storage		***MH60B****				
	Invert	**Top**	**Height**	**diameter**	**X-sec Area**	**Volume**
CB59A	91.200	92.60	1.40	600	0.360	0.50
CB59B	91.200	92.60	1.40	600	0.360	0.50
CB59C	91.150	92.55	1.40	600	0.360	0.50
CB60A	91.340	92.74	1.40	600	0.360	0.50
CB60B	91.200	92.60	1.40	600	0.360	0.50
CB60C	91.200	92.60	1.40	600	0.360	0.50
CB60D	91.200	92.60	1.40	600	0.360	0.50
CB60E	91.200	92.60	1.40	600	0.360	0.50
CB60F	91.200	92.60	1.40	600	0.360	0.50
CB63	91.400	92.80	1.40	600	0.360	0.50
CBMH59	88.920	92.15	3.23	1500	1.767	5.71
MH60	88.870	92.30	3.43	1500	1.767	6.06
MH60B*	88.630	92.26	3.63	1500	1.767	6.41
					Total	23.22

TOTAL	**MH60B***	**43.22**

Pipe Storage	***N Swale***				
From	**To**	**Length**	**Diameter**	**X-sec Area**	**Volume**
ECB/TCB SUBDRAIN		178.00	250	0.049	8.74
				Total	8.74

Structure Storage		***N Swale***				
	Invert	**Top**	**Height**	**diameter**	**X-sec Area**	**Volume**
CB57	90.200	91.60	1.40	600	0.360	0.50
					Total	0.50

TOTAL	**N Swale**	**9.24**

RUNOFF COEFFICIENT CALCULATION SHEET

RESTRICTED - Stm Drainage Areas

MH50-East ECBs	Area (m^2)	C
Softscape	445	0.20
Hardscape	75	0.90
Total	520	**0.30**

CB54	Area (m^2)	C
Softscape	325	0.20
Hardscape	702	0.90
Total	1027	**0.68**

CB56E	Area (m^2)	C
Softscape	538	0.20
Playground	475	0.60
Hardscape	2373	0.90
Total	3386	**0.75**

CB58C	Area (m^2)	C
Softscape	345	0.20
Hardscape	1176	0.90
Total	1521	**0.74**

CB58D	Area (m^2)	C
Softscape	298	0.20
Hardscape	770	0.90
Total	1068	**0.70**

MH61-WestECB	Area (m^2)	C
Softscape	201	0.20
Hardscape	80	0.90
Total	281	**0.40**

CB61B	Area (m^2)	C
Softscape	563	0.20
Hardscape	755	0.90
Total	1318	**0.60**

CICB111-ECBs	Area (m^2)	C
Softscape	386	0.20
Hardscape	147	0.90
Total	533	**0.39**

CICB111	Area (m^2)	C
Softscape	105	0.20
Hardscape	313	0.90
Total	418	**0.72**

CB60B	Area (m^2)	C
Softscape	302	0.20
Hardscape	228	0.90
Total	530	**0.50**

CB59B	Area (m^2)	C
Softscape	74	0.20
Hardscape	212	0.90
Total	286	**0.72**

CB60A	Area (m^2)	C
Softscape	246	0.20
Hardscape	1121	0.90
Total	1367	**0.77**

CICB63	Area (m^2)	C
Softscape	182	0.20
Hardscape	640	0.90
Total	822	**0.75**

RESTRICTED - SWM Collective Areas

MH51B*	Area (ha)	C
CB54	0.10	0.70
MH50-East ECB	0.05	0.30
Parking Lots	0.49	0.90
Total	0.64	**0.82**

MH57*	Area (ha)	C
CB56E	0.34	0.75
Parking Lots	0.51	0.90
Total	0.85	**0.84**

MH58B*	Area (ha)	C
CB58D	0.11	0.70
CB58C	0.15	0.75
Parking Lots	0.17	0.90
Total	0.43	**0.80**

MH62B*	Area (ha)	C
ECBs	0.03	0.40
CB61B	0.13	0.60
Parking Lots	0.65	0.90
Total	0.81	**0.83**

MH60B*	Area (ha)	C
CB59B	0.03	0.75
CB60B	0.05	0.50
CB60A	0.14	0.80
CICB63	0.08	0.75
Parking Lots	0.53	0.90
Total	0.83	**0.84**

UNCONTROLLED

East Uncontrolled	Area (m^2)	C
Softscape	1064	0.20
Hardscape	345	0.90
Total	1409	**0.37**

North Uncontrolled	Area (m^2)	C
Softscape	376	0.20
Hardscape	36	0.90
Total	412	**0.26**

South Uncontrolled	Area (m^2)	C
Softscape	873	0.20
Hardscape	673	0.90
Total	1546	**0.50**

Uncontrolled E+N+S	Area (ha)	C
EAST	1409	0.37
NORTH	412	0.26
SOUTH	1546	0.50
Total	3367	**0.42**

MH119 E	Area (m^2)	C
Softscape	143	0.20
Hardscape	222	0.90
Total	365	**0.63**

MH119 W	Area (m^2)	C
Softscape	280	0.20
Hardscape	135	0.90
Total	415	**0.43**

MH102 N	Area (m^2)	C
Softscape	10	0.20
Hardscape	4	0.90
Total	14	**0.40**

MH102 S	Area (m^2)	C
Softscape	124	0.20
Hardscape	15	0.90
Total	139	**0.28**

MH103 N	Area (m^2)	C
Softscape	38	0.20
Hardscape	56	0.90
Total	94	**0.62**

MH105 N	Area (m^2)	C
Softscape	77	0.20
Hardscape	138	0.90
Total	215	**0.65**

MH106 N	Area (m^2)	C
Softscape	15	0.20
Hardscape	52	0.90
Total	67	**0.74**

FLOW CONTROL ROOF DRAINAGE DECLARATION

THIS FORM TO BE COMPLETED BY THE MECHANICAL AND STRUCTURAL ENGINEERS RESPONSIBLE FOR DESIGN

Permit Application No.

Project Name: Urbandale 1515 Earl Armstrong Plaza – Building A

Building Location: Earl Armstrong Road and Limebank Road

Municipality: Ottawa, ON

The roof drainage system has been designed in accordance with the following criteria: (please check one of the following).

M1. ☐ Conventionally drained roof (no flow control roof drains used).

M2. ☒ Flow control roof drains meeting the following conditions have been incorporated in this design:

(a) the maximum drain down time does not exceed 24h,
(b) one or more scuppers are installed so that the maximum depth of water on the roof cannot exceed 150mm,
(c) drains are located not more than 15m from the edge of roof and not more than 30m from adjacent drains, and
(d) there is at least one drain for each 900 sq.m

M3. ☐ A flow control drainage system that does not meet the minimum drainage criteria described in M2 has been incorporated in this design

PROFESSIONAL SEAL APPLIED BY:

Practitioner's Name: Philipp Puetz

Firm: JRP Engineering

Phone#: 613-627-2462 ext. 702

City: Ottawa Province: Ontario

LICENSED PROFESSIONAL ENGINEER
MAR 3 0 2023
P. PUETZ
100190159
PROVINCE OF ONTARIO

Mechanical Engineer's Seal

S1. ☒ The design parameters incorporated into the overall structural design are consistent with the information provided by the Mechanical Engineer in M2. Loads due to rain are not considered to act simultaneously with loads due to snow as per Sentence 4.1.7.3 (3) OBC.

S2. ☐ The structure has been designed incorporating the additional structural loading due to rain acting simultaneously with the snow load. The design parameters are consistent with the control flow drainage system designed by the mechanical engineer.

PROFESSIONAL SEAL APPLIED BY:

Practitioner's Name: TERENCE CAIN, P.ENG.

Firm: CLELAND JARDINE ENGINEERING LTD.

Phone#: 613-591-1533 ext. 245

City: KANATA Province: ONTARIO

LICENSED PROFESSIONAL ENGINEER
T. CAIN
100183891
MAR 30/23
PROVINCE OF ONTARIO

Structural Engineer's Seal

FLOW CONTROL ROOF DRAINAGE DECLARATION

THIS FORM TO BE COMPLETED BY THE MECHANICAL AND STRUCTURAL ENGINEERS RESPONSIBLE FOR DESIGN

Permit Application No.

Project Name: Urbandale 1515 Earl Armstrong Plaza – Building B

Building Location: Earl Armstrong Road and Limebank Road   Municipality: Ottawa, ON

The roof drainage system has been designed in accordance with the following criteria: (please check one of the following).

M1. ☒ Conventionally drained roof (no flow control roof drains used).

M2. ☐ Flow control roof drains meeting the following conditions have been incorporated in this design:

(a) the maximum drain down time does not exceed 24h,
(b) one or more scuppers are installed so that the maximum depth of water on the roof cannot exceed 150mm,
(c) drains are located not more than 15m from the edge of roof and not more than 30m from adjacent drains, and
(d) there is at least one drain for each 900 sq.m

M3. ☐ A flow control drainage system that does not meet the minimum drainage criteria described in M2 has been incorporated in this design

PROFESSIONAL SEAL APPLIED BY:

Practitioner's Name: Philipp Puetz

Firm: JRP Engineering

Phone#: 613-627-2462 ext. 702

City: Ottawa   Province: Ontario

LICENSED PROFESSIONAL ENGINEER
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PROVINCE OF ONTARIO

Mechanical Engineer's Seal

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S2. ☐ The structure has been designed incorporating the additional structural loading due to rain acting simultaneously with the snow load. The design parameters are consistent with the control flow drainage system designed by the mechanical engineer.

PROFESSIONAL SEAL APPLIED BY:

Practitioner's Name: TERENCE CAIN, P.ENG.

Firm: CLELAND JARDINE ENGINEERING LTD.

Phone#: 613-591-1533 ext. 245

City: KANATA   Province: ONTARIO

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PROVINCE OF ONTARIO

Structural Engineer's Seal

FLOW CONTROL ROOF DRAINAGE DECLARATION

THIS FORM TO BE COMPLETED BY THE MECHANICAL AND STRUCTURAL ENGINEERS RESPONSIBLE FOR DESIGN

Permit Application No.

Project Name: Urbandale 1515 Earl Armstrong Plaza – Building C

Building Location: Earl Armstrong Road and Limebank Road

Municipality: Ottawa, ON

The roof drainage system has been designed in accordance with the following criteria: (please check one of the following).

M1. ☐ Conventionally drained roof (no flow control roof drains used).

M2. ☒ Flow control roof drains meeting the following conditions have been incorporated in this design:

(a) the maximum drain down time does not exceed 24h,
(b) one or more scuppers are installed so that the maximum depth of water on the roof cannot exceed 150mm,
(c) drains are located not more than 15m from the edge of roof and not more than 30m from adjacent drains, and
(d) there is at least one drain for each 900 sq.m

M3. ☐ A flow control drainage system that does not meet the minimum drainage criteria described in M2 has been incorporated in this design

PROFESSIONAL SEAL APPLIED BY:

Practitioner's Name: Philipp Puetz

Firm: JRP Engineering

Phone#: 613-627-2462 ext. 702

City: Ottawa Province: Ontario

LICENSED PROFESSIONAL ENGINEER
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PROVINCE OF ONTARIO

Mechanical Engineer's Seal

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S2. ☐ The structure has been designed incorporating the additional structural loading due to rain acting simultaneously with the snow load. The design parameters are consistent with the control flow drainage system designed by the mechanical engineer.

PROFESSIONAL SEAL APPLIED BY:

Practitioner's Name: TERENCE CAIN, P.ENG.

Firm: CLELAND JARDINE ENGINEERING LTD.

Phone#: 613-591-1533 ext. 245

City: KANATA Province: ONTARIO

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Structural Engineer's Seal

FLOW CONTROL ROOF DRAINAGE DECLARATION

THIS FORM TO BE COMPLETED BY THE MECHANICAL AND STRUCTURAL ENGINEERS RESPONSIBLE FOR DESIGN

Permit Application No.

Project Name: Urbandale 1515 Earl Armstrong Plaza – Building D

Building Location: Earl Armstrong Road and Limebank Road

Municipality: Ottawa, ON

The roof drainage system has been designed in accordance with the following criteria: (please check one of the following).

M1. ☐ Conventionally drained roof (no flow control roof drains used).

M2. ☒ Flow control roof drains meeting the following conditions have been incorporated in this design:

(a) the maximum drain down time does not exceed 24h,
(b) one or more scuppers are installed so that the maximum depth of water on the roof cannot exceed 150mm,
(c) drains are located not more than 15m from the edge of roof and not more than 30m from adjacent drains, and
(d) there is at least one drain for each 900 sq.m

M3. ☐ A flow control drainage system that does not meet the minimum drainage criteria described in M2 has been incorporated in this design

PROFESSIONAL SEAL APPLIED BY:

Practitioner's Name: Philipp Puetz

Firm: JRP Engineering

Phone#: 613-627-2462 ext. 702

City: Ottawa Province: Ontario

LICENSED PROFESSIONAL ENGINEER
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PROVINCE OF ONTARIO

Mechanical Engineer's Seal

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S2. ☐ The structure has been designed incorporating the additional structural loading due to rain acting simultaneously with the snow load. The design parameters are consistent with the control flow drainage system designed by the mechanical engineer.

PROFESSIONAL SEAL APPLIED BY:

Practitioner's Name: TERENCE CAIN, P.ENG.

Firm: CLELAND JARDINE ENGINEERING LTD.

Phone#: 613-591-1533 ext. 245

City: KANATA Province: ONTARIO

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Structural Engineer's Seal

FLOW CONTROL ROOF DRAINAGE DECLARATION

THIS FORM TO BE COMPLETED BY THE MECHANICAL AND STRUCTURAL ENGINEERS RESPONSIBLE FOR DESIGN

Permit Application No.

Project Name: Urbandale 1515 Earl Armstrong Plaza – Building E

Building Location: Earl Armstrong Road and Limebank Road

Municipality: Ottawa, ON

The roof drainage system has been designed in accordance with the following criteria: (please check one of the following).

M1. ☐ Conventionally drained roof (no flow control roof drains used).

M2. ☒ Flow control roof drains meeting the following conditions have been incorporated in this design:

(a) the maximum drain down time does not exceed 24h,
(b) one or more scuppers are installed so that the maximum depth of water on the roof cannot exceed 150mm,
(c) drains are located not more than 15m from the edge of roof and not more than 30m from adjacent drains, and
(d) there is at least one drain for each 900 sq.m

M3. ☐ A flow control drainage system that does not meet the minimum drainage criteria described in M2 has been incorporated in this design

PROFESSIONAL SEAL APPLIED BY:

Practitioner's Name: Philipp Puetz

Firm: JRP Engineering

Phone#: 613-627-2462 ext. 702

City: Ottawa Province: Ontario

LICENSED PROFESSIONAL ENGINEER
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PROVINCE OF ONTARIO

Mechanical Engineer's Seal

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PROFESSIONAL SEAL APPLIED BY:

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City: KANATA Province: ONTARIO

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Structural Engineer's Seal

FLOW CONTROL ROOF DRAINAGE DECLARATION

THIS FORM TO BE COMPLETED BY THE MECHANICAL AND STRUCTURAL ENGINEERS RESPONSIBLE FOR DESIGN

Permit Application No.

Project Name: Urbandale 1515 Earl Armstrong Plaza – Building F

Building Location: Earl Armstrong Road and Limebank Road   Municipality: Ottawa, ON

The roof drainage system has been designed in accordance with the following criteria: (please check one of the following).

M1. ☐ Conventionally drained roof (no flow control roof drains used).

M2. ☒ Flow control roof drains meeting the following conditions have been incorporated in this design:

(a) the maximum drain down time does not exceed 24h,
(b) one or more scuppers are installed so that the maximum depth of water on the roof cannot exceed 150mm,
(c) drains are located not more than 15m from the edge of roof and not more than 30m from adjacent drains, and
(d) there is at least one drain for each 900 sq.m

M3. ☐ A flow control drainage system that does not meet the minimum drainage criteria described in M2 has been incorporated in this design

PROFESSIONAL SEAL APPLIED BY:

Practitioner's Name: Philipp Puetz

Firm: JRP Engineering

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City: Ottawa   Province: Ontario

LICENSED PROFESSIONAL ENGINEER
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Mechanical Engineer's Seal

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PROFESSIONAL SEAL APPLIED BY:

Practitioner's Name: TERENCE CAIN, P.ENG.

Firm: CLELAND JARDINE ENGINEERING LTD.

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Structural Engineer's Seal

FLOW CONTROL ROOF DRAINAGE DECLARATION

THIS FORM TO BE COMPLETED BY THE MECHANICAL AND STRUCTURAL ENGINEERS RESPONSIBLE FOR DESIGN

Permit Application No.

Project Name: Urbandale 1515 Earl Armstrong Plaza – Building G

Building Location: Earl Armstrong Road and Limebank Road

Municipality: Ottawa, ON

The roof drainage system has been designed in accordance with the following criteria: (please check one of the following).

M1. ☐ Conventionally drained roof (no flow control roof drains used).

M2. ☒ Flow control roof drains meeting the following conditions have been incorporated in this design:

- (a) the maximum drain down time does not exceed 24h,
- (b) one or more scuppers are installed so that the maximum depth of water on the roof cannot exceed 150mm,
- (c) drains are located not more than 15m from the edge of roof and not more than 30m from adjacent drains, and
- (d) there is at least one drain for each 900 sq.m

M3. ☐ A flow control drainage system that does not meet the minimum drainage criteria described in M2 has been incorporated in this design

PROFESSIONAL SEAL APPLIED BY:

Practitioner's Name: Philipp Puetz

Firm: JRP Engineering

Phone#: 613-627-2462 ext. 702

City: Ottawa Province: Ontario

LICENSED PROFESSIONAL ENGINEER
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PROVINCE OF ONTARIO

Mechanical Engineer's Seal

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S2. ☐ The structure has been designed incorporating the additional structural loading due to rain acting simultaneously with the snow load. The design parameters are consistent with the control flow drainage system designed by the mechanical engineer.

PROFESSIONAL SEAL APPLIED BY:

Practitioner's Name: TERENCE CAIN, P.ENG.

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Structural Engineer's Seal

FLOW CONTROL ROOF DRAINAGE DECLARATION

THIS FORM TO BE COMPLETED BY THE MECHANICAL AND STRUCTURAL ENGINEERS RESPONSIBLE FOR DESIGN

Permit Application No.

Project Name: Urbandale 1515 Earl Armstrong Plaza – Building H

Building Location: Earl Armstrong Road and Limebank Road

Municipality: Ottawa, ON

The roof drainage system has been designed in accordance with the following criteria: (please check one of the following).

M1. ☒ Conventionally drained roof (no flow control roof drains used).

M2. ☐ Flow control roof drains meeting the following conditions have been incorporated in this design:

(a) the maximum drain down time does not exceed 24h,
(b) one or more scuppers are installed so that the maximum depth of water on the roof cannot exceed 150mm,
(c) drains are located not more than 15m from the edge of roof and not more than 30m from adjacent drains, and
(d) there is at least one drain for each 900 sq.m

M3. ☐ A flow control drainage system that does not meet the minimum drainage criteria described in M2 has been incorporated in this design

PROFESSIONAL SEAL APPLIED BY:

Practitioner's Name: Philipp Puetz

Firm: JRP Engineering

Phone#: 613-627-2462 ext. 702

City: Ottawa Province: Ontario

LICENSED PROFESSIONAL ENGINEER
MAR 3 0 2023
P. PUETZ
100190159
PROVINCE OF ONTARIO

Mechanical Engineer's Seal

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S2. ☐ The structure has been designed incorporating the additional structural loading due to rain acting simultaneously with the snow load. The design parameters are consistent with the control flow drainage system designed by the mechanical engineer.

PROFESSIONAL SEAL APPLIED BY:

Practitioner's Name: TERENCE CAIN, P.ENG.

Firm: CLELAND JARDINE ENGINEERING LTD.

Phone#: 613-591-1533 ext. 245

City: KANATA Province: ONTARIO

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PROVINCE OF ONTARIO

Structural Engineer's Seal

FLOW CONTROL ROOF DRAINAGE DECLARATION

THIS FORM TO BE COMPLETED BY THE MECHANICAL AND STRUCTURAL ENGINEERS RESPONSIBLE FOR DESIGN

Permit Application No.

Project Name: Urbandale 1515 Earl Armstrong Plaza – Building I

Building Location: Earl Armstrong Road and Limebank Road   Municipality: Ottawa, ON

The roof drainage system has been designed in accordance with the following criteria: (please check one of the following).

M1. ☐ Conventionally drained roof (no flow control roof drains used).

M2. ☒ Flow control roof drains meeting the following conditions have been incorporated in this design:

(a) the maximum drain down time does not exceed 24h,
(b) one or more scuppers are installed so that the maximum depth of water on the roof cannot exceed 150mm,
(c) drains are located not more than 15m from the edge of roof and not more than 30m from adjacent drains, and
(d) there is at least one drain for each 900 sq.m

M3. ☐ A flow control drainage system that does not meet the minimum drainage criteria described in M2 has been incorporated in this design

PROFESSIONAL SEAL APPLIED BY:

Practitioner's Name: Philipp Puetz

Firm: JRP Engineering

Phone#: 613-627-2462 ext. 702

City: Ottawa   Province: Ontario

LICENSED PROFESSIONAL ENGINEER
MAR 3 0 2023
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PROVINCE OF ONTARIO

Mechanical Engineer's Seal

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S2. ☐ The structure has been designed incorporating the additional structural loading due to rain acting simultaneously with the snow load. The design parameters are consistent with the control flow drainage system designed by the mechanical engineer.

PROFESSIONAL SEAL APPLIED BY:

Practitioner's Name: TERENCE CAIN, P.ENG.

Firm: CLELAND JARDINE ENGINEERING LTD.

Phone#: 613-591-1533 ext. 245

City: KANATA   Province: ONTARIO

LICENSED PROFESSIONAL ENGINEER
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MAR 30/23
PROVINCE OF ONTARIO

Structural Engineer's Seal

FLOW CONTROL ROOF DRAINAGE DECLARATION

THIS FORM TO BE COMPLETED BY THE MECHANICAL AND STRUCTURAL ENGINEERS RESPONSIBLE FOR DESIGN

Permit Application No.

Project Name: Urbandale 1515 Earl Armstrong Plaza – Building J

Building Location: Earl Armstrong Road and Limebank Road   Municipality: Ottawa, ON

The roof drainage system has been designed in accordance with the following criteria: (please check one of the following).

M1. ☐ Conventionally drained roof (no flow control roof drains used).

M2. ☒ Flow control roof drains meeting the following conditions have been incorporated in this design:

(a) the maximum drain down time does not exceed 24h,
(b) one or more scuppers are installed so that the maximum depth of water on the roof cannot exceed 150mm,
(c) drains are located not more than 15m from the edge of roof and not more than 30m from adjacent drains, and
(d) there is at least one drain for each 900 sq.m

M3. ☐ A flow control drainage system that does not meet the minimum drainage criteria described in M2 has been incorporated in this design

PROFESSIONAL SEAL APPLIED BY:

Practitioner's Name: Philipp Puetz

Firm: JRP Engineering

Phone#: 613-627-2462 ext. 702

City: Ottawa   Province: Ontario

LICENSED PROFESSIONAL ENGINEER
MAR 3 0 2023
P. PUETZ
100190159
PROVINCE OF ONTARIO

Mechanical Engineer's Seal

S1. ☒ The design parameters incorporated into the overall structural design are consistent with the information provided by the Mechanical Engineer in M2. Loads due to rain are not considered to act simultaneously with loads due to snow as per Sentence 4.1.7.3 (3) OBC.

S2. ☐ The structure has been designed incorporating the additional structural loading due to rain acting simultaneously with the snow load. The design parameters are consistent with the control flow drainage system designed by the mechanical engineer.

PROFESSIONAL SEAL APPLIED BY:

Practitioner's Name: TERENCE CAIN, P.ENG.

Firm: CLELAND JARDINE ENGINEERING LTD.

Phone#: 613-591-1533 ext. 245

City: KANATA   Province: ONTARIO

LICENSED PROFESSIONAL ENGINEER
T. CAIN
100183891
MAR 30/23
PROVINCE OF ONTARIO

Structural Engineer's Seal

FLOW CONTROL ROOF DRAINAGE DECLARATION

THIS FORM TO BE COMPLETED BY THE MECHANICAL AND STRUCTURAL ENGINEERS RESPONSIBLE FOR DESIGN

Permit Application No.

Project Name: Urbandale 1515 Earl Armstrong Plaza – Building K

Building Location: Earl Armstrong Road and Limebank Road

Municipality: Ottawa, ON

The roof drainage system has been designed in accordance with the following criteria: (please check one of the following).

M1. ☐ Conventionally drained roof (no flow control roof drains used).

M2. ☒ Flow control roof drains meeting the following conditions have been incorporated in this design:

(a) the maximum drain down time does not exceed 24h,
(b) one or more scuppers are installed so that the maximum depth of water on the roof cannot exceed 150mm,
(c) drains are located not more than 15m from the edge of roof and not more than 30m from adjacent drains, and
(d) there is at least one drain for each 900 sq.m

M3. ☐ A flow control drainage system that does not meet the minimum drainage criteria described in M2 has been incorporated in this design

PROFESSIONAL SEAL APPLIED BY:

Practitioner's Name: Philipp Puetz

Firm: JRP Engineering

Phone#: 613-627-2462 ext. 702

City: Ottawa Province: Ontario

LICENSED PROFESSIONAL ENGINEER
MAR 3 0 2023
P. PUETZ
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PROVINCE OF ONTARIO

Mechanical Engineer's Seal

S1. ☒ The design parameters incorporated into the overall structural design are consistent with the information provided by the Mechanical Engineer in M2. Loads due to rain are not considered to act simultaneously with loads due to snow as per Sentence 4.1.7.3 (3) OBC.

S2. ☐ The structure has been designed incorporating the additional structural loading due to rain acting simultaneously with the snow load. The design parameters are consistent with the control flow drainage system designed by the mechanical engineer.

PROFESSIONAL SEAL APPLIED BY:

Practitioner's Name: TERENCE CAIN, P.ENG.

Firm: CLELAND JARDINE ENGINEERING LTD.

Phone#: 613-591-1533 ext. 245

City: KANATA Province: ONTARIO

LICENSED PROFESSIONAL ENGINEER
T. CAIN
100183891
MAR 30/23
PROVINCE OF ONTARIO

Structural Engineer's Seal

FLOW CONTROL ROOF DRAINAGE DECLARATION

THIS FORM TO BE COMPLETED BY THE MECHANICAL AND STRUCTURAL ENGINEERS RESPONSIBLE FOR DESIGN

Permit Application No.

Project Name: Urbandale 1515 Earl Armstrong Plaza – Building L

Building Location: Earl Armstrong Road and Limebank Road   Municipality: Ottawa, ON

The roof drainage system has been designed in accordance with the following criteria: (please check one of the following).

M1. ☐ Conventionally drained roof (no flow control roof drains used).

M2. ☒ Flow control roof drains meeting the following conditions have been incorporated in this design:

(a) the maximum drain down time does not exceed 24h,
(b) one or more scuppers are installed so that the maximum depth of water on the roof cannot exceed 150mm,
(c) drains are located not more than 15m from the edge of roof and not more than 30m from adjacent drains, and
(d) there is at least one drain for each 900 sq.m

M3. ☐ A flow control drainage system that does not meet the minimum drainage criteria described in M2 has been incorporated in this design

PROFESSIONAL SEAL APPLIED BY:

Practitioner's Name: Philipp Puetz

Firm: JRP Engineering

Phone#: 613-627-2462 ext. 702

City: Ottawa   Province: Ontario

LICENSED PROFESSIONAL ENGINEER
MAR 30 2023
P. PUETZ
100190159
PROVINCE OF ONTARIO

Mechanical Engineer's Seal

S1. ☒ The design parameters incorporated into the overall structural design are consistent with the information provided by the Mechanical Engineer in M2. Loads due to rain are not considered to act simultaneously with loads due to snow as per Sentence 4.1.7.3 (3) OBC.

S2. ☐ The structure has been designed incorporating the additional structural loading due to rain acting simultaneously with the snow load. The design parameters are consistent with the control flow drainage system designed by the mechanical engineer.

PROFESSIONAL SEAL APPLIED BY:

Practitioner's Name: TERENCE CAIN, P.ENG.

Firm: CLELAND JARDINE ENGINEERING LTD.

Phone#: 613-591-1533 ext. 245

City: KANATA   Province: ONTARIO

LICENSED PROFESSIONAL ENGINEER
T. CAIN
100183891
MAR 30/23
PROVINCE OF ONTARIO

Structural Engineer's Seal

Samantha Labadie

From: Terence Cain <tcain@clelandjardine.com>
Sent: Thursday, March 30, 2023 1:49 PM
To: Philipp Puetz
Cc: Roger Tuttle; Mike Gerrard (mike@jrpeng.com); Michele Dredge; Marcel Denomme; Cameron Macmillan; Samantha Labadie; Terry Brule; Mathieu Butovsky
Subject: RE: FW: 1515 Earl Armstrong - Roof Drain Control Letter
Attachments: 22-0110 23 03 30 - 1515 EARL ARMSTRONG PLAZA - BUILDINGS A TO L - FLOW CONTROL ROOF DRAINAGE DECLARATION - CJE SIGNED.pdf

Good afternoon,

Please find attached roof drain control letters for Earl Armstrong Plaza, signed by CJE.

REGARDS,

Terence Cain, P.Eng.
Senior Structural Engineer - Team Lead
New Construction Department

CLELAND JARDINE ENGINEERING LTD

CLELAND JARDINE ENGINEERING LTD
200-580 Terry Fox Drive, Ottawa, ON, Canada, K2L 4B9
Ottawa-Toronto-North Bay
T 613-591-1533 x 245
C 613-868-7250
W clelandjardine.com

From: Philipp Puetz <philipp@jrpeng.com>
Sent: Thursday, March 30, 2023 1:15 PM
To: Terence Cain <tcain@clelandjardine.com>
Cc: Roger Tuttle <rtuttle@urbandale.com>; Mike Gerrard (mike@jrpeng.com) <mike@jrpeng.com>; Michele Dredge <m.dredge@dl-arch.ca>; Marcel Denomme <mdenomme@urbandale.com>; Cameron Macmillan <cameron@jrpeng.com>; Samantha Labadie <samantha.labadie@ibigroup.com>; Terry Brule <tbrule@IBIGroup.com>
Subject: RE: FW: 1515 Earl Armstrong - Roof Drain Control Letter

Hi Terence,

Please find attached Roof Drain Control Letters for 1515 Earl Armstrong Plaza for your completion.

Thanks,

JRP Engineering
Philipp Puetz, P.Eng
Partner

Tel: 613-627-2462
Mobile: 613-863-7207
www.jrpengineering.ca

------- Original Message -------
On Thursday, March 30th, 2023 at 10:45 AM, Samantha Labadie <samantha.labadie@ibigroup.com> wrote:

Hi Philipp,

Just following up, we need this information today in order to have time to complete our submission.

Thank you,

Sam Labadie P.ENG

Civil Engineer

Suite 500, 333 Preston Street

Ottawa ON K1S 5N4 Canada

cell +1 613 899 5717

IBI Group is now proudly a part of Arcadis.

From: Philipp Puetz <philipp@jrpeng.com>
Sent: Tuesday, March 28, 2023 3:42 PM
To: Samantha Labadie <samantha.labadie@ibigroup.com>
Cc: Roger Tuttle <rtuttle@urbandale.com>; tcain@clelandjardine.com; Mike Gerrard (mike@jrpeng.com) <mike@jrpeng.com>; Michele Dredge <m.dredge@dl-arch.ca>; Marcel Denomme <mdenomme@urbandale.com>; Cameron Macmillan <cameron@jrpeng.com>
Subject: RE: FW: 1515 Earl Armstrong - Roof Drain Control Letter

Thanks for confirming Sam.

Regards,

JRP Engineering
Philipp Puetz, P.Eng
Partner

Tel: 613-627-2462
Mobile: 613-863-7207
www.jrpengineering.ca

------- Original Message -------
On Tuesday, March 28th, 2023 at 3:37 PM, Samantha Labadie <samantha.labadie@ibigroup.com> wrote:

Hi Philipp,

Yes, the FUS Declaration will only be required for Building I.

Thanks,

Sam

From: Philipp Puetz <philipp@jrpeng.com>
Sent: Tuesday, March 28, 2023 3:34 PM
To: Samantha Labadie <samantha.labadie@ibigroup.com>
Cc: Roger Tuttle <rtuttle@urbandale.com>; tcain@clelandjardine.com; Mike Gerrard (mike@jrpeng.com) <mike@jrpeng.com>; Michele Dredge <m.dredge@dl-arch.ca>; Marcel Denomme <mdenomme@urbandale.com>; Cameron Macmillan <cameron@jrpeng.com>
Subject: Re: FW: 1515 Earl Armstrong - Roof Drain Control Letter

Hi Sam,

One of the documents attached are titled 'FUS Classification Declaration for Multi-Storey Buildings'. To my knowledge, only Building 'I' will be multi-storey.

Can you please clarify if a FUS Classification Declaration is still required for all buildings (including Building 'I')?

Thanks,

JRP Engineering
Philipp Puetz, P.Eng
Partner

Tel: 613-627-2462
Mobile: 613-863-7207
www.jrpengineering.ca

------- Original Message -------
On Friday, March 24th, 2023 at 9:26 AM, Roger Tuttle <rtuttle@urbandale.com> wrote:

Team,

Following message and attachments from Samantha Labadie of IBI regarding rooftop storm water storage and release rates.

Please review and prepare your respective responses / reports so they can be included in the reply to the City's Site Plan Approval report.

Just a reminder that the Lease Agreement for Building B precludes the use of the roof for stormwater storage. I believe I had forwarded that to you some time ago.

So, we have to work around that one, somehow.

Please let us know if there are any issues or concerns.

Best regards,

ROGER TUTTLE | Construction Manager

Urbandale CORPORATION

2193 Arch Street
Ottawa, ON - K1G 2H5
O: 613 731 6331
F: 613 731 7835
C: 613 223 1125

urbandalecorporation.com

From: Samantha Labadie <samantha.labadie@ibigroup.com>
Sent: March 23, 2023 5:18 PM
To: Michele Dredge <m.dredge@dl-arch.ca>
Cc: Roger Tuttle <rtuttle@urbandale.com>; Marcel Denomme <mdenomme@urbandale.com>; Terry Brule <tbrule@IBIGroup.com>; Lance Erion <lerion@IBIGroup.com>
Subject: 1515 Earl Armstrong - Roof Drain Control Letter

Hi Michele,

One of the city's comments was that we needed to include a roof drain control letter (template attached) for each building. It is a new requirement that requires a mechanical and structural engineer to sign off.

With the exception of Buildings B and H, we have made the assumption that the following storage and release rates can be met per building. It was assumed storage could be provided for an average depth of 0.05m over 80% of the roof area and that flow could be restricted to 1 L/s per 100 m2 of roof area. Please confirm if this is feasible.

ICD AREA	TRIBUTARY AREA	100-YEAR STORM		
		RESTRICTED FLOW (L/S)	REQUIRED STORAGE (M^3)	ASSUMED STORAGE (M^3)
BLDG A	0.09	9.00	25.47	36.00
BLDG C	0.09	9.00	25.47	36.00
BLDG D	0.05	5.00	14.15	20.00
BLDG E	0.07	7.00	19.81	28.00
BLDG F	0.11	11.00	31.13	44.00
BLDG G	0.08	8.00	22.64	32.00
BLDG I	0.12	12.00	33.97	48.00
BLDG J	0.06	6.00	16.98	24.00
BLDG K	0.08	8.00	22.64	32.00
BLDG L	0.25	23.00	73.82	100.00
Total Buildings	**1.00**	**98.00**	**286.10**	

In addition to the roof drain control letter, the city is now requiring the attached FUS Design Declaration to be completed. FUS stands for the Fire Underwriters Survey which is the method we use to calculate the fire flow requirement for buildings based on the type of construction, sprinkler systems and separation from other buildings. We will sign and stamp as the civil consultant, but it requires a sign off by the building engineer or architect. We will forward the declaration for this site once I get a fillable form from the city.

Thanks,

Sam Labadie P.ENG

Civil Engineer

Suite 500, 333 Preston Street

Ottawa ON K1S 5N4 Canada

cell +1 613 899 5717

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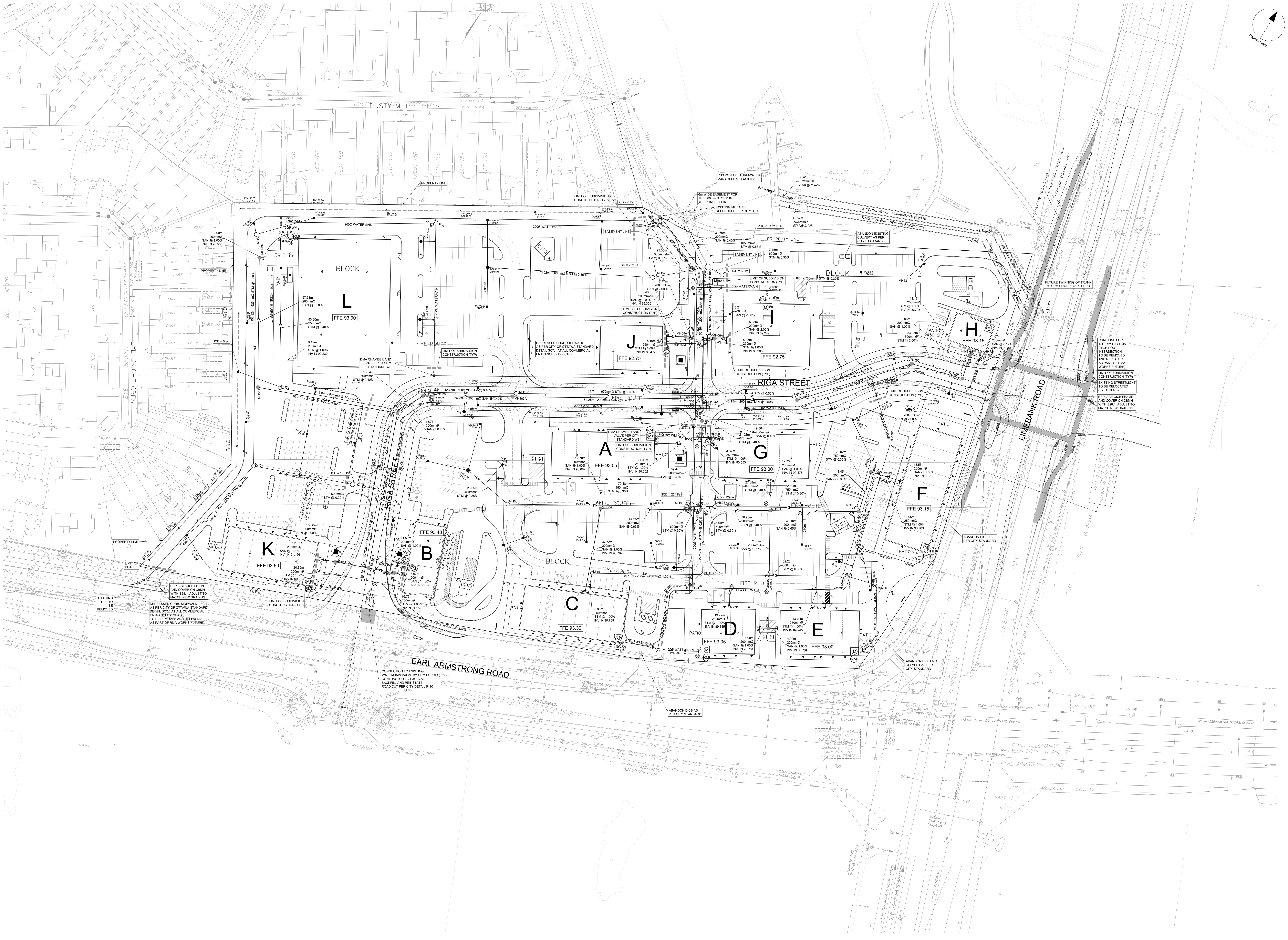

CLIENT

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ISSUES

No.	DESCRIPTION	DATE
1	SUBMISSION 1 FOR CITY REVIEW	2022-12-16
2	ISSUED FOR COORDINATION	2023-03-09
3	REVISED AS PER CITY COMMENTS	2023-04-06
4	ISSUED FOR TENDER	2023-04-27
5	REVISED AS PER CITY COMMENTS	2023-06-13
6	REVISED PER NEW SITE PLAN	2023-06-29

NOT FOR CONSTRUCTION

SEE 010, 011, 012 FOR NOTES, LEGEND, CB TABLE, STREET SECTIONS AND DETAILS

KEY PLAN

SITE

CONSULTANTS

Owner / Applicant:
Urbandale Corporation
Architect:
Dredge Leahy Architecture Inc.
Civil Engineers:
IBI Group
Structural Engineers
Cleland Jardine Engineering Ltd
Planning:
Fotenn
Landscape Architect:
CSW Landscape Architects Ltd
Surveyor:
Annis O'Sullivan Vollebekk Ltd
Geotechnical:
Paterson and Associates
Electrical:
JRP Engineering
Mechanical:
JRP Engineering

1:750

SEAL

LICENSED PROFESSIONAL ENGINEER
S. E. LABADIE
100214983
23/06/29
PROVINCE OF ONTARIO

IBI GROUP
Suite 500 – 333 Preston Street
Ottawa ON K1S 5N4 Canada
tel 613 225 1311 | 613 241 3300 fax 613 225 9868
ibigroup.com

PROJECT
1515 EARL ARMSTRONG PLAZA

PROJECT NO: 137404	
DRAWN BY: EH	CHECKED BY: TRB
PROJECT MGR: SEL	APPROVED BY: TRB

SHEET TITLE
GENERAL PLAN

SHEET NUMBER	ISSUE
001	1

CITY PLAN No. 18900

CITY FILE No. D07-12-22-0169 D07-16-22-0010

File Location: J:\137404_Earl_Armstr\7.0_Production\7.03_Design\04_Civil\Sheets\001 GENERAL PLAN.dwg Last Saved: June 29, 2023, by Ehennie Plotted: Friday, June 30, 2023 2:43:57 PM by Eric Hennie

GENERAL LEGEND

Symbol	Description
	LIMIT OF CONSTRUCTION
	PHASING LINE
	BARRIER CURB
	MOUNTABLE CURB
	DEPRESSED BARRIER CURB
CONCRETE SIDEWALK	CONCRETE SIDEWALK
	TACTILE WALKING SURFACE INDICATOR
ASPHALT SIDEWALK	ASPHALT SIDEWALK / PATHWAY
BUS	BUS STOP CONCRETE / ASPHALT

SERVICING LEGEND

Symbol	Description
MH118A	SANITARY MANHOLE
200mmØ SAN	SANITARY SEWER
MH109 MH118	STORM MANHOLE
825mmØ STM	STORM SEWER - LESS THAN 900Ø
900mmØ STM	STORM SEWER - 900Ø AND GREATER
200Ø WATERMAIN	WATERMAIN
CB100 T/G 104.10	STREET CATCHBASIN C/W TOP OF GRATE
CICB101 G/G 104.25	CURB INLET CATCHBASIN C/W GUTTER GRADE
DCB100 T/G 104.10	DOUBLE CATCHBASIN C/W TOP OF GRATE
DCICB101 G/G 104.25	DOUBLE CURB INLET CATCHBASIN C/W GUTTER GRADE
DI101 T/G 103.59	DITCH INLET MANHOLE C/W TOP OF GRATE
CBMH101 T/G 103.59	CATCHBASIN MANHOLE C/W TOP OF GRATE
RYCB T/G 104.35	REAR YARD CATCHBASIN IN ROAD CONNECTING STRUCTURE C/W SOLID GRATE
T/G 104.35 INV 103.35	REAR YARD "TEE" CATCHBASIN (300Ø) C/W TOP OF GRATE AND INVERT OUT
T/G 104.50 INV 103.50	REAR YARD "END" CATCHBASIN (300Ø) C/W TOP OF GRATE AND INVERT OUT
T/G 104.35 INV 103.35	REAR YARD "CUSTOM ANGLED " CATCHBASIN (450Ø) C/W TOP OF GRATE AND INVERT OUT
T/G 104.35 INV 103.35	REAR YARD "THREE WAY" CATCHBASIN (450Ø) C/W TOP OF GRATE AND INVERT OUT
	PERFORATED REAR YARD SUBDRAIN
300mmØ CSP	CSP CULVERT C/W DIAMETER
V&VB	VALVE AND VALVE BOX
V&VC	VALVE AND VALVE CHAMBER
	PARK VALVE CHAMBER C/W SERVICE POST
HYD 104.35	FIRE HYDRANT C/W BOTTOM OF FLANGE ELEVATION
200Ø WM RED 150Ø WM	WATERMAIN REDUCER
2 VBENDS	VERTICAL BEND LOCATION
	SIAMESE CONNECTION (IF REQUIRED)
M	METER (IF REQUIRED)
RM	REMOTE METER (IF REQUIRED)
A	WATERMAIN IDENTIFICATION (IF REQUIRED)
1	PIPE CROSSING IDENTIFICATION (IF REQUIRED)
	SINGLE SERVICE LOCATION
	DOUBLE SERVICE LOCATION
BH 12 102.00	INFERRED REFUSAL (SEE GEOTECHNICAL REPORT)
HGL 101.79	100 YEAR STORM HYDRAULIC GRADE LINE AT MANHOLE
USF 101.79	UNDERSIDE OF FOOTING ELEVATION
	CLAY SEAL IN SEWER / WATERMAIN TRENCH
	PRESSURE REDUCING VALVE

ROADWAY STRUCTURE:

CAR ONLY PARKING AREA :(500mm)

- 50mm - SUPERPAVE 12.5 ASPHALTIC CONCRETE
- 150mm - OPSS GRANULAR "A" CRUSHED STONE
- 300mm - OPSS GRANULAR "B" TYPE II

STREET NO. 1 ACCESS LANES AND HEAVY TRUCK PARKING AREA :(690mm)

- 40mm - SUPERPAVE 12.5 ASPHALTIC CONCRETE
- 50mm - SUPERPAVE 19.0 ASPHALTIC CONCRETE
- 150mm - OPSS GRANULAR "A" CRUSHED STONE
- 450mm - OPSS GRANULAR "B" TYPE II

Roof Drain Schedule

Building ID	Restricted Flowrate (L/s)	100-Year Storage Volume (m3)
A	9.00	25.47
B	N/A	N/A
C	9.00	25.47
D	5.00	14.15
E	7.00	19.81
F	11.00	31.13
G	8.00	22.64
H	N/A	N/A
I	10.00	28.30
J	6.00	16.98
K	8.00	22.64
L	23.00	73.82

STM STRUCTURE TABLE

NAME	RIM ELEV.	INVERT IN	INVERT IN AS-BUILT	INVERT OUT	INVERT OUT AS-BUILT	DESCRIPTION
CBMH56	92.20			NE89.136		1500Ø OPSD 701.011
CBMH59	92.60			E89.954		1500Ø OPSD 701.011
EXMHSTM	91.44	SE87.244				2400Ø OPSD 701.061
MH50	93.25			N90.562		1500Ø OPSD 701.011
MH51	92.88	NW89.894 S90.434		E89.834		1500Ø OPSD 701.011
MH51B	92.86	W89.744		E89.419		1500Ø OPSD 701.011
MH52	92.61			SE90.100		1500Ø OPSD 701.011
MH54	92.74	NW89.583		E89.533		1200Ø OPSD 701.010
MH57	92.33	SW88.915		NE87.915		1500Ø OPSD 701.011
MH58	92.43			SW89.561		1500Ø OPSD 701.011
MH58B	92.39	NE89.311		W89.261		1500Ø OPSD 701.011
MH60	92.75	W89.890		NE89.840		1500Ø OPSD 701.011
MH60B	92.71	SW89.602		NE88.952		1500Ø OPSD 701.011
MH61	92.72			S89.651		1500Ø OPSD 701.011
MH62	92.73	N89.582		SW89.282		1500Ø OPSD 701.011
MH62B	92.66	NE89.094		SW89.044		1500Ø OPSD 701.011
MH63	92.99	S90.621		NE90.171		1200Ø OPSD 701.010
MH64	92.75	E90.669		S90.569		1200Ø OPSD 701.010
MH65	92.69	N90.103		SW89.803		1200Ø OPSD 701.010
MH111	92.79	W90.715 SW90.392 NE90.509 SE88.743		NW88.523		1500Ø OPSD 701.011
MH112	92.69	SE89.229 NE89.029 SW88.929		NW88.854		1800Ø OPSD 701.012
MH113	92.79	NE89.430 SW89.680		NW89.380		1200Ø OPSD 701.010

SAN STRUCTURE TABLE

NAME	RIM ELEV.	INVERT IN	INVERT IN AS-BUILT	INVERT OUT	INVERT OUT AS-BUILT	DESCRIPTION
EXMHSAN	91.76	E88.739				1200Ø OPSD 701.010
MH01A	92.71	W91.093		E91.073		1200Ø OPSD 701.010
MH02A	92.58	E91.058		W91.038		1200Ø OPSD 701.010
MH03A	90.96	SE89.670		NW89.360		1200Ø OPSD 701.010
MH04A	92.26	N90.667		S90.647		1200Ø OPSD 701.010
MH05A	90.85	SW89.187		NE89.167		1200Ø OPSD 701.010
MH06A	90.82	NE89.136		SW89.116		1200Ø OPSD 701.010
MH52A	92.72	NE90.566		SE90.506		1200Ø OPSD 701.010
MH54A	92.68	NW90.217		E90.157		1200Ø OPSD 701.010
MH60A	92.66	S90.415 NW90.555		NE90.355		1200Ø OPSD 701.010
MH62A	92.76	N90.358		SW90.328		1200Ø OPSD 701.010
MH63A	92.66	NE90.071 SE90.111		SW90.051		1200Ø OPSD 701.010
MH64A	92.72	E90.627		S90.477		1200Ø OPSD 701.010
MH66A	92.98	SW90.694 NE90.694		NW90.634		1200Ø OPSD 701.010
MH112A	92.70	SW90.068 NE89.927		NW89.828		1200Ø OPSD 701.010

Pipe Interference Table

Crossing No.	PIPE 1	PIPE 2	Clearance
1	STM Bottom 90.875	WTR Top 90.449	0.426
2	STM Bottom 90.734	SAN Top 90.517	0.217
3	STM Bottom 90.814	STM Top 90.580	0.234
4	WTR Bottom 89.831	SAN Top 89.128	0.703
5	WTR Bottom 89.868	STM Top 88.632	1.236
6	STM Bottom 91.022	WTR Top 90.260	0.762
7	WTR Bottom 90.377	STM Top 90.126	0.251
8	WTR Bottom 90.104	STM Top 89.560	0.544
9	WTR Bottom 89.650	SAN Top 89.399	0.251
10	WTR Bottom 89.818	STM Top 88.933	0.884
11	WTR Bottom 89.738	STM Top 88.598	1.141
12	WTR Bottom 89.773	SAN Top 89.278	0.495
13	WTR Bottom 90.022	STM Top 88.479	1.543
14	SAN Bottom 90.946	WTR Top 90.560	0.386
15	WTR Bottom 90.389	SAN Top 89.539	0.850
16	WTR Bottom 89.775	STM Top 89.231	0.544
17	WTR Bottom 90.455	SAN Top 89.905	0.550
18	WTR Bottom 90.152	STM Top 89.288	0.864
19	WTR Bottom 90.317	STM Top 90.026	0.291
20	WTR Bottom 91.165	SAN Top 90.665	0.500
21	STM Bottom 90.691	WTR Top 90.379	0.312
22	SAN Bottom 90.666	WTR Top 89.985	0.681
23	WTR Bottom 90.830	STM Top 89.982	0.847
24	WTR Bottom 90.793	SAN Top 90.293	0.500
25	STM Bottom 90.429	WTR Top 90.127	0.302
26	WTR Bottom 89.965	STM Top 89.392	0.574
27	SAN Bottom 89.672	WTR Top 89.172	0.500
28	SAN Bottom 89.046	STM Top 88.780	0.266
29	SAN Bottom 90.931	STM Top 90.404	0.527
30	SAN Bottom 89.815	STM Top 89.551	0.264
31	STM Bottom 92.467	SAN Top 90.371	2.096
32	SAN Bottom 89.927	STM Top 89.545	0.382
33	SAN Bottom 90.393	STM Top 89.917	0.476
34	SAN Bottom 90.360	STM Top 90.000	0.360
35	SAN Bottom 90.564	STM Top 90.249	0.315
36	SAN Bottom 89.843	STM Top 89.561	0.283
37	STM Bottom 90.399	SAN Top 89.917	0.482
38	SAN Bottom 89.474	STM Top 89.219	0.255
39	SAN Bottom 88.756	STM Top 88.376	0.380
40	SAN Bottom 89.010	STM Top 88.568	0.442

WATERMAIN SCHEDULE

	Station	Description	Finished Grade	Top of Waterain	As Built Waterain
A	0+000.00	TEE	93.291	90.891	
	0+022.28	VB	93.290	90.890	
B	0+025.36	BUILDING K CAP	93.439	91.039	
C	0+000.00	TEE	93.063	90.663	
	0+007.75	50 TEE CONNECTION	93.233	90.833	
	0+009.36	VB	93.240	90.840	
D	0+012.27	BUILDING B CAP	93.262	90.862	
E	0+000.00	TEE	92.539	90.139	
	0+001.65	V BEND	92.588	90.188	
	0+001.90	V BEND	92.595	90.350	
	0+004.10	V BEND	92.595	90.350	
	0+004.35	V BEND	92.587	90.187	
	0+012.00	DMA CHAMBER	92.813	90.413	
	0+036.83	HYD	92.547	90.147	
	0+071.65	HYD	92.559	90.159	
F	0+079.42	TEE	92.537	90.137	
I	0+000.00	TEE	92.537	90.137	
	0+001.00	22 1/2 BEND	92.39	89.990	
	0+002.72	VB	92.374	89.974	
	0+006.44	11 1/4 BEND	92.346	89.946	
	0+095.85	VB	92.47	90.070	
F	0+097.85	TEE	92.500	90.100	
	0+099.83	VB	92.534	90.134	
	0+156.35	RED 200 150	92.611	90.211	
	0+163.81	45 BEND	92.656	90.256	
	0+166.38	45 BEND	92.657	90.257	
	0+167.63	50 TEE CONNECTION	92.661	90.261	
	0+168.97	VB	92.666	90.266	
J	0+170.22	BUILDING L CAP	92.68	90.280	
K	0+000.00	TEE	92.186	89.786	
	0+010.86	VB	92.382	89.982	
	0+032.08	45 BEND	92.386	89.986	
	0+033.50	45 BEND	92.407	90.007	
L	0+037.25	BUILDING I CAP	92.594	90.194	
M	0+000.00	TEE	92.489	90.089	
	0+002.00	VB	92.637	90.237	
N	0+013.22	BUILDING J CAP	92.673	90.273	
O	0+000.00	TVS 200x50	93.101	90.701	
	0+013.14	VB	93.263	90.863	
P	0+015.49	BUILDING H CAP	93.219	90.819	
G	0+000.00	CROSS	92.392	89.992	
	0+006.00	DMA CHAMBER	92.500	90.100	
V	0+014.09	CROSS	92.674	90.274	
	0+044.95	V BEND	92.730	90.330	
	0+045.20	V BEND	92.729	90.750	
	0+047.40	V BEND	92.724	90.750	
	0+047.65	V BEND	92.723	90.323	
	0+072.09	HYD	92.835	90.435	
Q	0+081.10	TEE	92.922	90.522	
Q	0+000.00	TEE	92.922	90.522	
	0+002.37	VB	92.921	90.521	
	0+032.80	V BEND	92.968	90.568	
	0+033.05	V BEND	92.968	91.120	
	0+035.25	V BEND	92.971	91.120	
	0+035.50	V BEND	92.972	90.572	
	0+066.97	45 BEND	92.899	90.499	
	0+069.46	22 1/2 BEND	92.841	90.441	
BB	0+073.59	TEE	92.817	90.417	
	0+078.63	HYD	92.828	90.428	
	0+084.36	VB	92.851	90.451	
T	0+087.29	TEE	92.854	90.454	
	0+134.78	11 1/4 BEND	92.759	90.359	
	0+137.28	22 1/2 BEND	92.775	90.375	
	0+157.79	VB	92.681	90.281	
R	0+163.53	TEE	92.405	90.005	
V	0+000.00	CROSS	92.674	90.274	
	0+006.71	VB	92.827	90.427	
W	0+016.56	BUILDING A CAP	92.912	90.512	
V	0+000.00	CROSS	92.674	90.274	
	0+005.84	VB	92.734	90.334	
X	0+008.84	BUILDING G CAP	92.892	90.492	
Q	0+000.00	TEE	92.922	90.522	
	0+002.24	VB	92.913	90.513	
	0+008.99	45 BEND	92.895	90.495	
	0+010.24	11 1/4 BEND	92.906	90.506	
	0+011.49	22 1/2 BEND	92.920	90.520	
Y	0+036.97	TEE	93.329	90.929	
Y	0+000.00	TEE	93.329	90.929	
	0+002.27	VB	93.381	90.981	
Z	0+014.80	BUILDING C CAP	93.206	90.806	
Y	0+000.00	TEE	93.329	90.929	
	0+006.40	11 1/4 BEND	93.083	90.683	
	0+012.20	VB	92.891	90.491	
AA	0+018.20	BUILDING D CAP	93.003	90.603	
BB	0+000.00	TEE	92.817	90.417	
	0+010.68	22 1/2 BEND	93.057	90.657	
	0+013.18	45 BEND	93.100	90.700	
	0+033.62	11 1/4 BEND	93.184	90.784	
	0+034.87	22 1/2 BEND	93.168	90.768	
	0+038.34	VB	93.139	90.739	
	0+041.05	11 1/4 BEND	93.117	90.717	
	0+042.30	45 BEND	93.112	90.712	
S	0+043.67	BUILDING E CAP	93.123	90.723	
T	0+000.00	TEE	92.854	90.454	
	0+025.97	45 BEND	92.963	90.563	
	0+029.81	45 BEND	92.938	90.538	
	0+031.63	VB	92.956	90.556	
U	0+032.52	BUILDING F CAP	92.965	90.565	

NOTES :

1. ALL MATERIALS AND CONSTRUCTION IS TO BE IN ACCORDANCE WITH THE CURRENT CITY OF OTTAWA STANDARD DRAWINGS & SPECIFICATIONS OR OPSD/OPSS IF CITY DRAWINGS AND SPECIFICATIONS DO NOT APPLY.
2. THE POSITION OF UNDERGROUND AND ABOVEGROUND SERVICE, UTILITIES AND STRUCUTRES ARE NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH SERVICE, UTILITIES AND STRUCTURES IS NOT GUARENTEED. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE EXACT LOCATION, SIZE, MATERIAL AND ELEVATION OF ALL EXISTING SERVICES AND UTILITIES PRIOR TO CONSTRUCTION.
3. THE CONTRACTOR SHALL REPORT ALL CONFLICTS, DISCOVERIES OF ERROR AND DESCREPENCIES TO THE ENGINEER.
4. THE CONTRACTOR SHALL BE RESPONSIBLE TO PROTECT AND ASSUME RESPONSIBILITY FOR ALL UTILITIES WHETHER OR NOT SHOW ON THESE DRAWINGS.
5. THE CONTRACTOR SHALL BE RESPONSIBLE TO PROTECT ALL LANDS BEYOND THE SITE LIMITS. ANY AREAS BEYOND THE SITE LIMITS, WHICH ARE DISTURBED DURING CONSTRUCTION, SHALL BE REPAIRED AND RESTORED TO ORIGINAL CONDITION OR BETTER, TO THE SATISFACTION OF THE ADJACENT LAND OWNER, THE OWNER, THE OWNERS REPRESENTATIVES AND/OR THE AUTHORITY HAVING JURSIDICTION AT THE EXPENSE OF THE CONTRACTOR.
6. WHERE NECESSARY, THE CONTRACTOR SHALL IMPLEMENT A TRAFFIC MANAGEMENT PLAN TO THE SATISFACTION OF THE CITY OF OTTAWA. ALL CONSTRUCTION SIGNAGE MUST CONFORM TO THE LATEST VERSION OF THE M.T.O. MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES. ALL TEMPORARY TRAFFIC CONTROL MEASURES MUST BE REMOVED UPON THE COMPLETION OF THE WORKS.
7. SHOULD ANY BURIED ARCHAEOLOGICAL REMAINS BE FOUND ON THE PROPERTY DURING CONSTRUCTION ACTIVITIES, THE CONTRACTOR SHALL NOTIFY THE OWNER TO CONTACT THE HERITAGE OPERATIONS UNIT OF THE ONTARIO MINISTRY OF CULTURE MUST BE NOTIFIED IMMEDIATE, AND WORK WITHIN THE AREA SHALL BE CEASED UNTIL FUTHER NOTICE.
8. FOR GEOTECHNICAL INFORMATION REFER TO GEOTECHNICAL INVESTIGATION PRPOSED COMMERCAIL PLAZA RIVERSIDE SOUTH RESIDENTAIL DEVELOPMENT 1515 EARL ARMSTRONG ROAD - OTTAWA REPORT PG5304-1 REV 6 APRIL 26, 2023 PREPARED BY PATERSON GROUP.
9. FOR GEODETIC BENCHMARK AND GEOMETRIC LAYOUT OF STREET AND LOTS, REFER TO TOPOGRAPHICAL SURVEY AND PLAN OF SUBDIVISION PREPARED BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD. BENCHMARK BASED ON CAN--NET VIRTUAL REFERENCE SYSTEM NETWORK.
10. FOR SITE PLAN INFORMATION, REFER TO SITE PLAN PREPARED BY DREDGE LEAHY ARCHITECTS
11. FOR GEOMETRIC ROAD DESIGN DRAWINGS REFER TO 137404-020 PREPARED BY IBIGROUP
12. FOR NOISE ATTENUATION PLAN REFER TO ENVIRONMENTAL NOISE IMPACT ASSESSMENT 1515 EARL ARMSTONG ROAD PREPARED BY IBI GROUP
13. THESE DRAWINGS ARE NOT TO BE SCALED OR USED FOR LAYOUT PURPOSES
14. ROADWAY SECTIONS REQUIRING GRADE RAISE TO PROPOSED SUB GRADE LEVEL TO BE FILLED WITH ACCEPTABLE NATIVE EARTH BORROW OR IMPORTED OPSS SELECTED SUBGRADE MATERIAL IF NATIVE MATERIAL IS DEFICIENT AS PER RECOMMENDATION OF GEOTECHNICAL ENGINEER.
15. IN AREAS WHERE EXISTING GROUND IS BELOW THE PROPOSED ELEVATION OF SEWER AND WATERMAINS, GRADE RAISING AND FILLING IS TO BE IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE GEOTECHNICAL REPORT. AS PER CITY GUIDELINES ALL WATERMAINS IN FILL AREAS ARE TO BE TIED WITH RESTRAINING JOINTS AND THRUST BLOCKS.
16. REFER TO DRAWING 011 FOR ROADWAY CROSS SECTIONS (IF APPLICABLE).
17. THE CONTRACTOR SHALL IMPLEMENT THE EROSION AND SEDIMENT CONTROL PLAN PRIOR TO THE COMMENCEMENT OF ANY SITE CONSTRUCTION. ALL EROSION AND SEDIMENT CONTRAL MEASURES SHALL BE INSTALLED TO THE SATISFACTION OF THE ENGINEER, OR ANY REGULATORY AGENCY. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE MAINTAINED UNTIL VEGETATION IS ESTABLISH OR UNTIL THE START OF A SUBSEQUENT PHASE.
18. CONTRACTORS SHALL BE RESPONSIBLE FOR KEEPING CLEAN ALL ROADS WHICH BECOME COVERED IN DUST, DEBRIS AND/OR MUD AS A RESULT OF ITS CONSTRUCTION OPERATIONS.
19. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY ADDITIONAL BEDDING OR ADDITIONAL STRENGTH PIPE SHOULD THE MAXIMUM OPSD TRENCH WIDTH BE EXCEEDED.
20. ALL PIPE, CULVERTS, STRUCTURES REFER TO NOMINAL INSIDE DIMENSIONS.
21. SHOULD CLAY SEALS BE REQUIRED, THEY SHALL BE INSTALLED AS PER THE RECOMMENDATIONS WITHIN THE GEOTECHNICAL REPORT.
22. UNLESS SPECIFICALLY NOTED OTHERWISE, PIPE MATERIALS SHALL BE AS FOLLOWS;
    -WATERMAINS TO BE PVC DR18
    -SANITARY SEWER TO BE PVC DR35
    -PERFORATED STORM SEWERS IN REAR YARDS AND LANDSCAPE AREAS TO BE HDPE
    -STORM SEWERS 375MM DIAMETER AND LESS TO BE PVC DR35
    -STORM SEWERS 450MM DIAMETER AND GREATER TO BE CONCRETE, CLASS AS PER OPSD 807.010 OR 807.030, OR HIGHER
23. ALL CONNECTIONS TO EXISTING WATERMAINS ARE TO BE COMPLETED BY CITY FORCES. CONTRACTOR IS TO EXCAVATE, BACKFILL, COMPACT AND REINSTATE.
24. ANY WATERMAIN WITH LESS THAN 2.4M, AND ANY SEWER WITH LESS THAN 2.0M DEPTH OF COVER REQUIRES THERMAL INSULATION AS PER CITY OF OTTAWA STANDARD W22, OR AS APPROVED BY THE ENGINEER.
25. ALL FIRE HYDRANTS AS PER CITY STANDARD W19, c/w 150mmØ LEAD UNLESS OTHERWISE SPECIFIED.
26. ALL STUBBED SEWERS SHALL HAVE PRE-MANUFACTURED CAPS INSTALLED.
27. ALL CATCHBASINS SHALL HAVE A 600MM SUMP. ALL CATCHBASIN MANHOLES, AND ALL STORM MANHOLES WITH OUTLETTING PIPE SIZES LESS THAN 900MM, SHALL HAVE A 300MM SUMP.
28. ALL SANITARY MANHOLES SHALL BE EQUIPPED WITH A WATERTIGHT COVER.
29. ALL LEADS FOR STREET CATCHBASIN'S AND CURB INLET CATCHBASIN'S CONNECTED TO MAIN SHALL BE 200MMØ PVC DR35 @ MIN 2% SLOPE UNLESS NOTED OTHERWISE. ALL LEADS FOR RYCB'S CONNECTED TO MAIN SHALL BE 200MMØ PVC DR35 @ MIN 1% SLOPE UNLESS NOTED OTHERWISE.
30. UNLESS SPECIFICALLY NOTED OTHERWISE, ALL STREET CATCHBASINS SHALL BE INSTALLED WITH TWO - 3.0M MINIMUM SUBDRAINS INSTALLED LONGITUDINALLY, PARALLEL WITH THE CURB. ALL CATCHBASINS IN ASPHALT AREAS, NOT ADJACENT TO A CURB, SHALL BE INSTALLED WITH FOUR - 3.0M MINIMUM SUBDRAINS INSTALLED ORTHOGONALLY.
31. INLET CONTROL DEVICES SHALL BE INSTALLED PRIOR TO COMPLETING THE ROAD BASE (GRANULAR A).
32. ALL SEWER SERVICE LATERALS WITH MAINLINE CONNECTIONS DEEPER THAN 5.0M REQUIRE A CONTROLLED SETTLEMENT JOINT.
33. EACH BUILDING SHALL BE EQUIPPED WITH A SANITARY AND STORM SEWER BACKWATER VALVE AND CLEAN-OUT ON ITS PRIMARY SERVICE, AS PER ONTARIO BUILDING CODE REQUIREMENTS (BY OTHERS).
34. THE SUBGRADE OF ALL STRUCTURES, PIPE, ROADS, SIDEWALKS, WALKWAYS, AND BUILDINGS SHALL BE INPSECTED BY THE GEOTECHNICAL ENGINEER PRIOR TO PROCEEDING WITH CONSTRUCTION.
35. TOP COURSE ASPHALT SHALL NOT BE PLACED UNTIL THE FINAL CCTV INSPECTION AND NECESSARY REPAIRS HAVE BEEN COMPLETED TO THE SATISFACTION OF THE ENGINEER AND THE CITY OF OTTAWA.
36. ALL RETAINING WALLS GREATER THAN 1.0M IN HEIGHT SHALL BE DESIGNED BY A QUALIFIED STRUCTURAL ENGINEER.
37. ALL RETAINING WALLS GREATER THAN 0.6M IN HEIGHT REQUIRE A GUARD. ANY GUARD ON A RETAINING WALL GREATER THAN 1.0M IN HEIGHT SHALL BE DESIGNED BY THE QUALIFIED STRUCTURAL ENGINEER RESPONSIBLE FOR THE WALL DESIGN.

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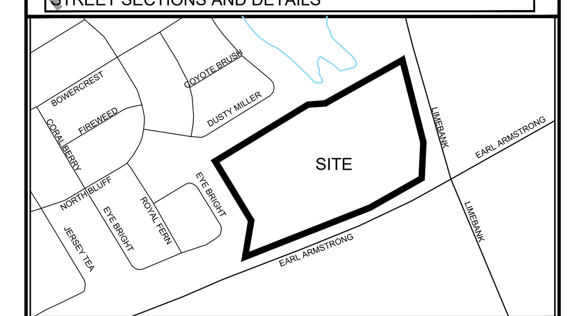
Urbandale CORPORATION

ISSUES

No.	DESCRIPTION	DATE
1	SUBMISSION 1 FOR CITY REVIEW	2022-12-16
2	ISSUED FOR COORDINATION	2023-03-09
3	REVISED AS PER CITY COMMENTS	2023-04-06
4	ISSUED FOR TENDER	2023-04-27
5	REVISED AS PER CITY COMMENTS	2023-06-13
6	REVISED PER NEW SITE PLAN	2023-06-29

NOT FOR CONSTRUCTION

SEE 010, 011, 012 FOR NOTES, LEGEND, CB TABLE, STREET SECTIONS AND DETAILS



CONSULTANTS

Owner / Applicant:
Urbandale Corporation
Architect:
Dredge Leahy Architecture Inc.
Civil Engineers:
IBI Group
Structural Engineers
Cleland Jardine Engineering Ltd
Planning:
Fotenn
Landscape Architect:
CSW Landscape Architects Ltd
Surveyor:
Annis O'Sullivan Vollebekk Ltd
Geotechnical:
Paterson and Associates
Electrical:
JRP Engineering
Mechanical:
JRP Engineering

SEAL

IBI GROUP
400 – 333 Preston Street
Ottawa ON K1S 5N4 Canada
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PROJECT
1515 EARL ARMSTRONG PLAZA

PROJECT NO:	
137404	
DRAWN BY: EH	CHECKED BY: TRB
PROJECT MGR: SEL	APPROVED BY: TRB

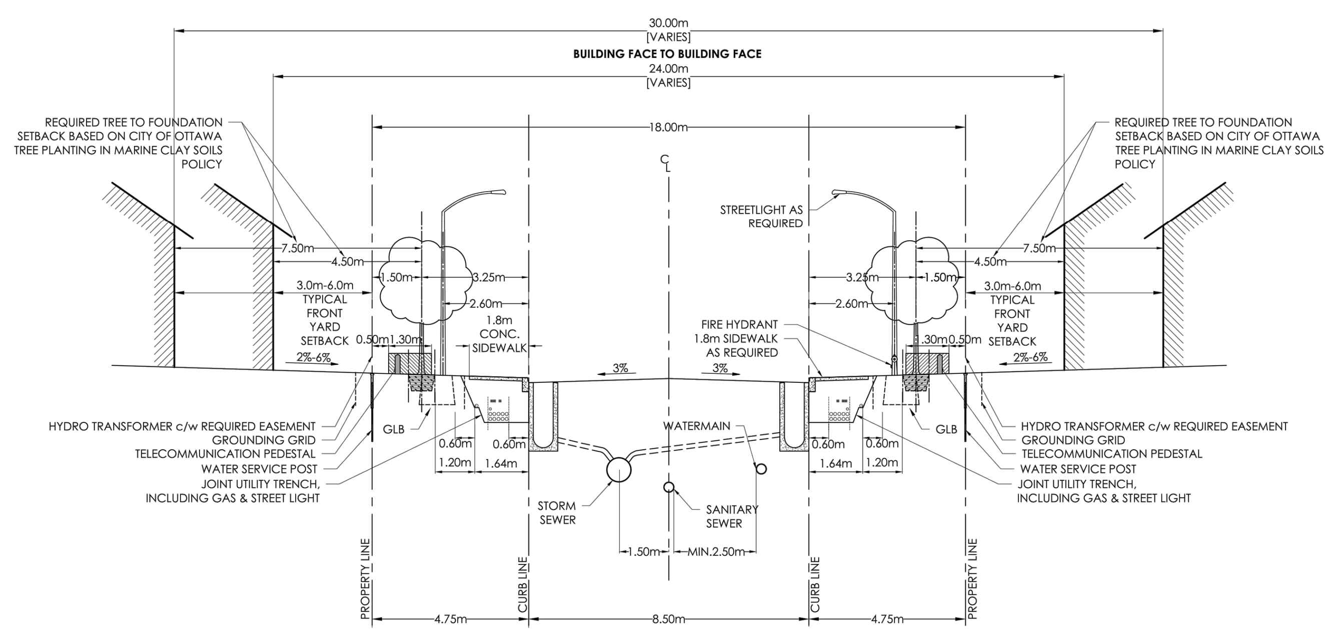
SHEET TITLE
GENERAL NOTES, LEGEND AND CB DATA TABLE

SHEET NUMBER 010 | ISSUE 1

File Location: J:\137404_Earl_Armstro\7.0_Production\7.03_Design\04_Civil\Sheets\010 NOTES-LEGEND.dwg Last Saved: June 28, 2023, by Ehenrie Plotted: Friday, June 30, 2023 2:47:19 PM by Eric Henrie

CITY FILE No. D07-12-22-0169 D07-16-22-0010

CITY PLAN No. 18900



Ottawa

18.0m ROW CROSS SECTION

REV.DATE: AUG. 2022

DWG. No. ROW-18.0

NOTES:

1. THE STANDARD ROW CROSS SECTIONS INDICATE MINIMUM DIMENSIONS THAT ARE TO BE INCORPORATED INTO THE DESIGN OF ANY NEW DEVELOPMENTS INVOLVING NEW AND EXISTING STREETS. ANY VARIATIONS TO THE STANDARD ROW CROSS SECTIONS ARE SUBJECT TO THE INFRASTRUCTURE SERVICES DEVIATION PROCESS. CONTACT THE STANDARDS UNIT AT STANDARDSSECTION@OTTAWA.CA FOR MORE INFORMATION.
2. ALL DRAWINGS SHALL BE READ IN CONJUNCTION WITH APPLICABLE CITY STANDARDS, GUIDELINES, AND POLICES, INCLUDING COORDINATED UTILITY PLANS, GRADING PLANS AND LOCAL AREA PLANS. REFER ALSO TO UTILITY PARTNER STANDARD PLANT LOCATIONS.
3. ALL CROSS SECTIONS MAY BE SUBJECT TO SUBSEQUENT TRAFFIC CALMING MEASURES, TO BE DETERMINED THROUGH PLAN OF SUBDIVISION OR SEPARATE TRANSPORTATION STUDIES.
4. TYPICAL CROSS SECTION BOULEVARD WIDTH SHALL BE MAINTAINED WHEN CONSTRUCTING CUL-DE-SACS AND CORNER LOTS, REGARDLESS OF ROADWAY GEOMETRY.
5. WATERMAINS, WATER SERVICES, AND ASSOCIATED APPURTENANCES SHALL BE CONSTRUCTED PER THE WATER DESIGN GUIDELINES.
6. WATERMAIN AND HYDRANTS TO BE INSTALLED ON SOUTH AND EAST SIDE OF ROW, WHERE POSSIBLE.
7. SEWERS AND SEWER SERVICES SHALL BE CONSTRUCTED PER THE SEWER DESIGN GUIDELINES.
8. IN-ROAD CATCH BASINS SHALL ONLY BE USED ON RESIDENTIAL ROADS WITHOUT BUS TRAFFIC OR AS OTHERWISE DIRECTED BY THE SEWER DESIGN GUIDELINES.
9. BARRIER CURB SHALL BE USED ON ALL RESIDENTIAL ROADS WITH SINGLE FAMILY DWELLINGS. MOUNTABLE CURB MAY ONLY BE USED FOR AREAS WITH FREQUENT CURB-CUTS, SUCH AS TOWNHOME DEVELOPMENTS, WITH APPROVAL FROM THE CITY.
10. WATER AND SEWER SERVICES SHALL BE LAID AS PER CITY STANDARD DETAIL DRAWINGS, THE COORDINATED UTILITY PLAN, AND IN COORDINATION WITH ALL OTHER ELEMENTS IN THE ROW.
11. WHERE LOCATING WATER AND SEWER SERVICES UNDERNEATH LANDSCAPED AREAS WOULD PREVENT THE PLANTING OF A TREE, THEY MAY BE RUN UNDERNEATH THE DRIVEWAY OR OTHER HARDSCAPED AREAS.
12. MINIMUM 1.5 M CLEARANCE, AT-GRADE, TO BE MAINTAINED AROUND WATER SERVICE POST FROM TREE, TRANSFORMER, UTILITY PEDESTAL, TRAFFIC POLE, AND STREETLIGHT.
13. UTILITY PEDESTALS ARE TO BE GROUPED TOGETHER WITH THE HYDROELECTRIC TRANSFORMER, OR ON THE HOUSE SIDE OF THE UTILITY TRENCH.
14. STREETLIGHT CABLE SHALL BE LOCATED IN JOINT USE TRENCH (JUT). WHERE NO JUT EXISTS, ENSURE CLEARANCES TO TREE, HYDRANTS, AND WATER SERVICE POST.
15. TRAFFIC SIGNAL CABLE SHALL BE LOCATED IN THE JUT OR AT THE SAME OFFSET AS STREETLIGHT POLES IN A SEPARATE TRENCH.
16. TRAFFIC COMMUNICATIONS CABLE SHALL BE LOCATED IN THE JUT OR IN A TRENCH LOCATED AT THE SAME OFFSET AS THE STREETLIGHT POLES.
17. THE PREFERRED LOCATION FOR TRAFFIC HANDHOLES IS IN HARD SURFACES. WHEN HANDHOLES ARE PLACED IN THE BOULEVARD, A CONCRETE COLLAR SHALL BE PROVIDED.
18. THE DEVELOPER SHALL SUPPLY AND INSTALL DUCTS FOR UTILITY CROSSINGS AT INTERSECTIONS.
19. TREE PLACEMENT, NUMBER, AND SPECIES SHALL BE PER CITY POLICY, THE LANDSCAPE PLAN, COORDINATED-UTILITY-PLAN, AND THE DEVELOPMENT AGREEMENTS.
20. THE HYDRO TRANSFORMER BASE SHALL BE LOCATED A MINIMUM OF 2.0 M FROM THE DRIVEWAY EDGE.

Ottawa

TITLE: STANDARD NOTES ROAD ALLOWANCE

DATE: MAR 2009
REV: SEPT 2022
DWG No: ROW-NOTES

CATCHBASIN/CATCHBASIN MANHOLE/DITCH INLET DATA

STRUCTURE ID	STORM AREA ID	STRUCTURE	FRAME & COVER	ELEVATION			OUTLET PIPE		INLET CONTROL DEVICE				COMMENTS
				TOP OF GRATE	INVERT		DIAMETER	TYPE	100yr Dynamic HEAD	RESTRICTED FLOW	ICD TYPE	ORIFICE SIZE	
					INLET	OUTLET	(mm)			(l/s)		CIRCULAR (mm dia.)	
Public Road CBs													
CB100	MH119	OPSD 705.010	S19	92.47		91.07	200	PVC DR35	1.460	27.00	IPEX MHF	102	
CB100A	MH119	OPSD 705.010	S19	92.47		91.07	200	PVC DR35	1.460	27.00	IPEX MHF	102	
CB102	MH102	OPSD 705.010	S19	92.37		90.97	200	PVC DR35	1.390	17.00	IPEX MHF	83	
CB102A	MH102	OPSD 705.010	S19	92.37		90.97	200	PVC DR35	1.390	17.00	IPEX MHF	83	
CB103	MH103	OPSD 705.010	S19	92.22		90.82	200	PVC DR35	1.430	17.00	IPEX MHF	83	
CB103A	MH103	OPSD 705.010	S19	92.22		90.82	200	PVC DR35	1.430	17.00	IPEX MHF	83	
CB105	MH105	OPSD 705.010	S19	92.27		90.87	200	PVC DR35	1.390	17.00	IPEX MHF	83	
CB105A	MH105	OPSD 705.010	S19	92.27		90.87	200	PVC DR35	1.390	17.00	IPEX MHF	83	
CB106	MH106	OPSD 705.010	S19	92.30		90.90	200	PVC DR35	1.450	18.00	IPEX MHF	83	
CB106A	MH106	OPSD 705.010	S19	92.30		90.90	200	PVC DR35	1.450	18.00	IPEX MHF	83	
Private Site Plan CBs													
CB01	MH54	OPSD 705.010	S19	91.80		89.79	200	PVC DR35					
CB01A	MH54	OPSD 705.010	S19	92.15		90.75	200	PVC DR35					
CB50	MH50	OPSD 705.010	S19	93.12		91.72	200	PVC DR35					
CB51	MH51	OPSD 705.010	S19	92.50		91.10	200	PVC DR35					
CB51A	MH51	OPSD 705.010	S19	92.55		91.15	200	PVC DR35					
CB52A	MH52	OPSD 705.010	S19	92.55		91.15	200	PVC DR35					
CB52B	MH52	OPSD 705.010	S19	92.55		91.15	200	PVC DR35					
CB52C	MH52	OPSD 705.010	S19	92.55		91.15	200	PVC DR35					
CB54	MH51	OPSD 705.010	S19	92.50		91.10	200	PVC DR35					
CB54A	MH54	OPSD 705.010	S19	92.10		90.70	200	PVC DR35	1.45	6.00	IPEX LMF	75	
CB56A	MH56	OPSD 705.010	S19	92.20		90.80	200	PVC DR35					
CB56B	MH56	OPSD 705.010	S19	92.20		90.80	200	PVC DR35					
CB56C	MH56	OPSD 705.010	S19	92.20		90.80	200	PVC DR35					
CB56D	MH56	OPSD 705.010	S19	92.20		90.80	200	PVC DR35					
CB56E	MH56	OPSD 705.010	S19	92.10		90.70	200	PVC DR35					
CB57	MH57	OPSD 705.010	S19	91.60		90.20	200	PVC DR35	1.44	6.00	IPEX LMF	75	
CB58A	MH58	OPSD 705.010	S19	92.20		90.80	200	PVC DR35					
CB58B	MH58	OPSD 705.010	S19	92.17		90.77	200	PVC DR35					
CB58C	MH58	OPSD 705.010	S19	92.15		90.75	200	PVC DR35					
CB58D	MH58	OPSD 705.010	S19	92.35		90.95	200	PVC DR35					
CB59A	CBMH59	OPSD 705.010	S19	92.60		91.20	200	PVC DR35					
CB59B	CBMH59	OPSD 705.010	S19	92.60		91.20	200	PVC DR35					
CB59C	CBMH59	OPSD 705.010	S19	92.55		91.15	200	PVC DR35					
CB60A	MH60	OPSD 705.010	S19	92.74		91.34	200	PVC DR35					
CB60B	MH60	OPSD 705.010	S19	92.60		91.20	200	PVC DR35					
CB60C	MH60	OPSD 705.010	S19	92.60		91.20	200	PVC DR35					
CB60D	MH60	OPSD 705.010	S19	92.60		91.20	200	PVC DR35					
CB60E	MH60	OPSD 705.010	S19	92.60		91.20	200	PVC DR35					
CB60F	MH60	OPSD 705.010	S19	92.60		91.20	200	PVC DR35					
CB61A	MH61	OPSD 705.010	S19	92.45		91.05	200	PVC DR35					
CB61B	MH61	OPSD 705.010	S19	92.40		91.00	200	PVC DR35					
CB62A	MH62	OPSD 705.010	S19	92.55		91.15	200	PVC DR35					
CB62B	MH62	OPSD 705.010	S19	92.55		91.15	200	PVC DR35					
CB62C	MH62	OPSD 705.010	S19	92.55		91.15	200	PVC DR35					
CB62D	MH62	OPSD 705.010	S19	92.55		91.15	200	PVC DR35					
CICB63	MH60	OPSD 705.010	S19	92.80		91.40	200	PVC DR35					
CICB111	MH111	OPSD 705.010	S19	92.55		91.15	200	PVC DR35					
MH51B	MH51B	OPSD 701.011	S24.1 & S25	See Structures Table					2.98	160.00	CUSTOM	211	
MH57	MH57	OPSD 701.011	S24.1 & S25						4.12	252.00	CUSTOM	244	
MH58B	MH58B	OPSD 701.011	S24.1 & S25						2.83	68.00	CUSTOM	138	
MH60B	MH60B	OPSD 701.011	S24.1 & S25						3.49	129.00	CUSTOM	182	
MH62B	MH62B	OPSD 701.011	S24.1 & S25						3.35	224.00	CUSTOM	242	

Revised: 2023-06-29

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ISSUES

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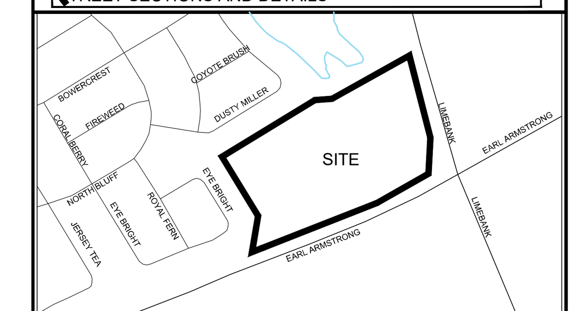
3	REVISED AS PER CITY COMMENTS	2023-04-06
4	ISSUED FOR TENDER	2023-04-27
5	REVISED AS PER CITY COMMENTS	2023-06-13
6	REVISED PER NEW SITE PLAN	2023-06-29

NOT FOR CONSTRUCTION

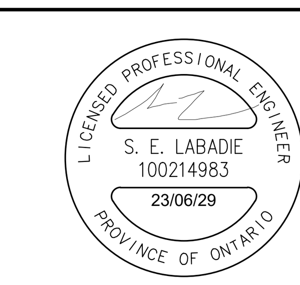
SEE 010, 011, 012 FOR NOTES, LEGEND, CB TABLE, STREET SECTIONS AND DETAILS



CONSULTANTS

Owner / Applicant:
Urbandale Corporation
Architect:
Dredge Leahy Architecture Inc.
Civil Engineers:
IBI Group
Structural Engineers
Cleland Jardine Engineering Ltd
Planning:
Fotenn
Landscape Architect:
CSW Landscape Architects Ltd
Surveyor:
Annis O'Sullivan Vollebekk Ltd
Geotechnical:
Paterson and Associates
Electrical:
JRP Engineering
Mechanical:
JRP Engineering

SEAL



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

PROJECT
1515 EARL ARMSTRONG PLAZA

PROJECT NO:
137404

DRAWN BY: EH
CHECKED BY: TRB
PROJECT MGR: SEL
APPROVED BY: TRB

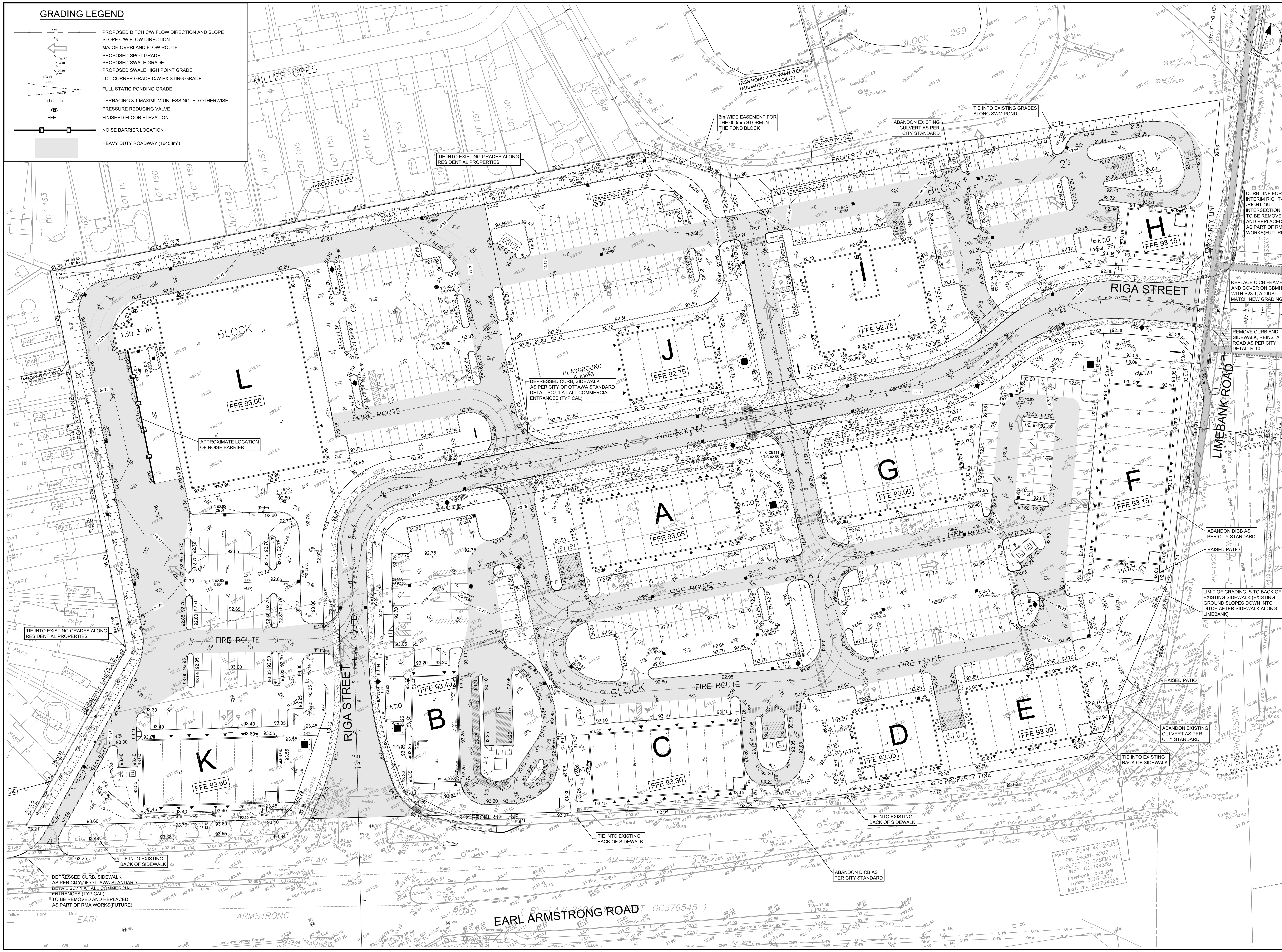
SHEET TITLE
STREET SECTIONS AND CB DATA TABLE

SHEET NUMBER 011
ISSUE 1

CITY PLAN No. 18900

CITY FILE No. D07-12-22-0169 D07-16-22-0010

File Location: J:\137404_Earl_Armstro\7.0_Production\7.03_Design\04_Civil\Sheets\011 STREET SECTIONS - CB DATA.dwg Last Saved: June 30, 2023, by Eherine Plotted: Friday, June 30, 2023 2:47:43 PM by Eric Henne



CLIENT

Urbandale CORPORATION

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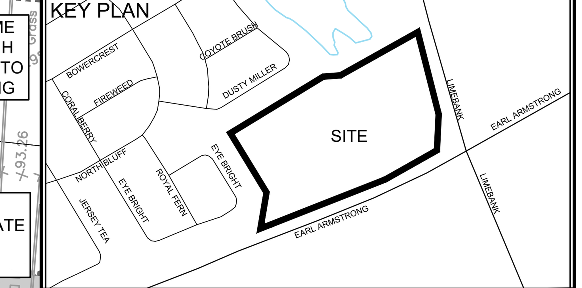
ISSUES

No.	DESCRIPTION	DATE
1	SUBMISSION 1 FOR CITY REVIEW	2022-12-16
2	ISSUED FOR COORDINATION	2023-03-09
3	REVISED AS PER CITY COMMENTS	2023-04-06
4	ISSUED FOR TENDER	2023-04-27
5	REVISED AS PER CITY COMMENTS	2023-06-13
6	REVISED PER NEW SITE PLAN	2023-06-29

NOT FOR CONSTRUCTION

SEE 010, 011, 012 FOR NOTES, LEGEND, CB TABLE, STREET SECTIONS AND DETAILS

KEY PLAN



CONSULTANTS

Owner / Applicant:
Urbandale Corporation
Architect:
Dredge Leahy Architecture Inc.
Civil Engineers:
IBI Group
Structural Engineers
Cleland Jardine Engineering Ltd
Planning:
Fotenn
Landscape Architect:
CSW Landscape Architects Ltd
Surveyor:
Annis O'Sullivan Vollebekk Ltd
Geotechnical:
Paterson and Associates
Electrical:
JRP Engineering
Mechanical:
JRP Engineering

1:500 0 5 15 25m

SEAL

LICENSED PROFESSIONAL ENGINEER
S. E. LABADIE
100214983
23/06/29
PROVINCE OF ONTARIO

IBI GROUP
Suite 500 – 333 Preston Street
Ottawa ON K1S 5N4 Canada
tel 613 225 1311 / 613 241 3300 fax 613 225 9868
ibigroup.com

PROJECT
1515 EARL ARMSTRONG PLAZA

PROJECT NO: 137404	
DRAWN BY: EH	CHECKED BY: TRB
PROJECT MGR: SEL	APPROVED BY: TRB

SHEET TITLE
GRADING PLAN

SHEET NUMBER 200 | ISSUE 1

CITY PLAN No. 18900

File Location: J:\137404_Earl_Armstro\7.0_Production\7.03_Design\04_Civil\Sheets\200 GRADING PLAN.dwg Last Saved: June 28, 2023, by Ehenrie Plotted: Friday, June 30, 2023 2:52:49 PM by Eric Henrie

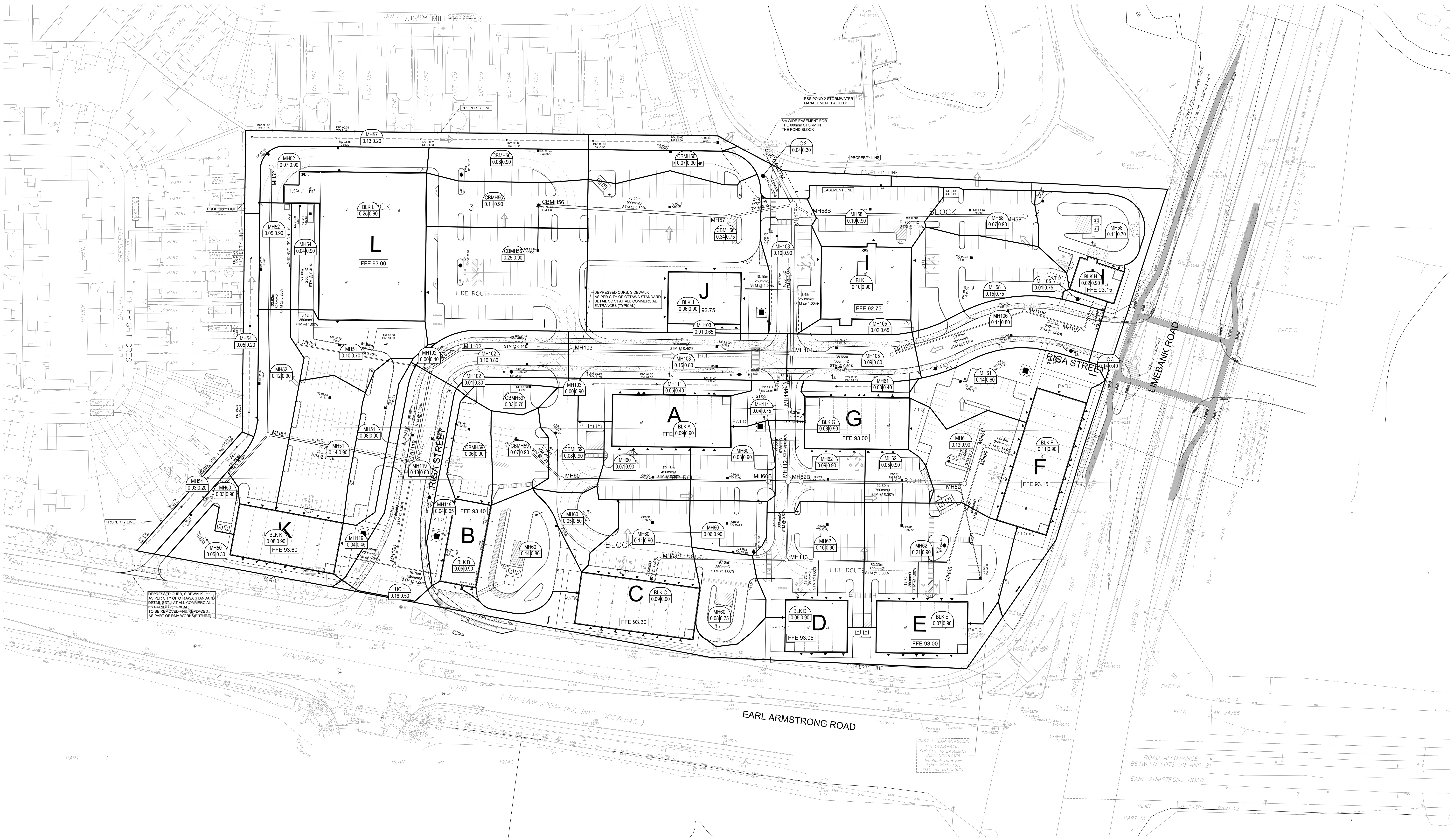
SCALE CHECK 1 in 10mm

CITY FILE No. D07-12-22-0169 D07-16-22-0010

LEGEND

STORM TRIBUTARY OUTLINE

MH58 0.10 0.90 — AREA NUMBER, COEFFICIENT, AREA (ha)



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ISSUES

No.	DESCRIPTION	DATE
1	SUBMISSION 1 FOR CITY REVIEW	2022-12-16
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NOT FOR CONSTRUCTION

SEE 010, 011, 012 FOR NOTES, LEGEND, CB TABLE, STREET SECTIONS AND DETAILS

KEY PLAN

CONSULTANTS

Owner / Applicant:
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IBI Group
Structural Engineers
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Planning:
Fotenn
Landscape Architect:
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Surveyor:
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Geotechnical:
Paterson and Associates
Electrical:
JRP Engineering
Mechanical:
JRP Engineering

1:750

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PROJECT

1515 EARL ARMSTRONG PLAZA

PROJECT NO: 137404	
DRAWN BY: EH	CHECKED BY: TRB
PROJECT MGR: SEL	APPROVED BY: TRB

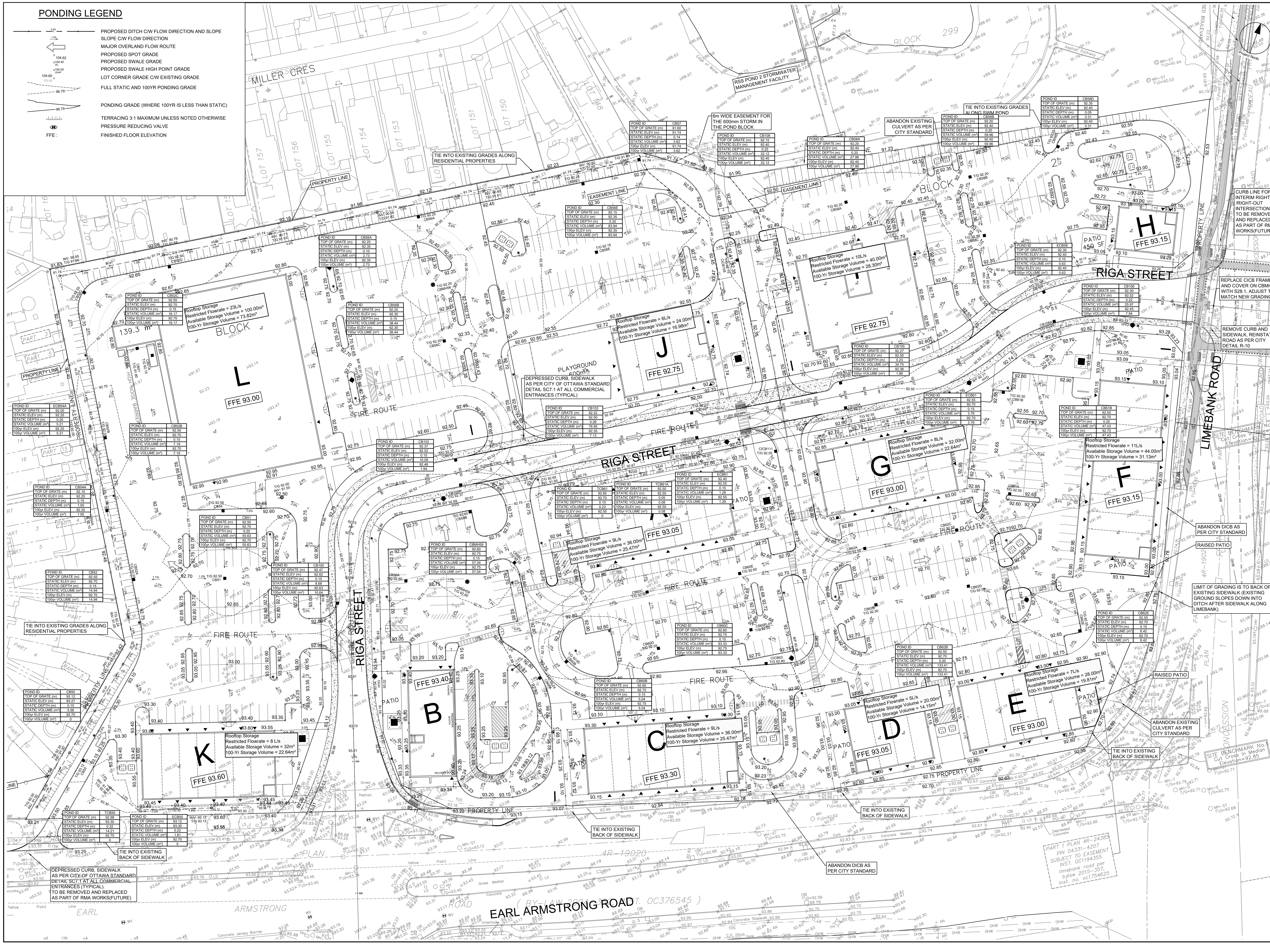
SHEET TITLE

STORM DRAINAGE AREA PLAN

SHEET NUMBER	ISSUE
500	1

CITY FILE No. D07-12-22-0169 D07-16-22-0010

CITY PLAN No. 18900



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ISSUES

No.	DESCRIPTION	DATE
1	SUBMISSION 1 FOR CITY REVIEW	2022-12-…
2	ISSUED FOR COORDINATION	2023-…
3	REVISED AS PER CITY COMMENTS	…-06
4	ISSUED FOR TENDER	2023-04-27
5	REVISED AS PER CITY COMMENTS	2023-06-13
6	REVISED PER NEW SITE PLAN	2023-06-29

NOT FOR CONSTRUCTION

SEE …010, 011, 012 FOR NOTES, LEGEND, CB TABLE, STREET SECTIONS AND DETAILS

KEY PLAN

SITE

CONSULTANTS

Owner / Applicant:
Urbandale Corporation
Architect:
Dredge Leahy Architecture Inc.
Civil Engineers:
IBI Group
Structural Engineers
Cleland Jardine Engineering Ltd
Planning:
Fotenn
Landscape Architect:
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Surveyor:
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1:500

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PROJECT

1515 EARL ARMSTRONG PLAZA

PROJECT NO:
137404

DRAWN BY:	CHECKED BY:
EH	TRB
PROJECT MGR:	APPROVED BY:
SEL	TRB

SHEET TITLE

PONDING PLAN

SHEET NUMBER	ISSUE
600	1

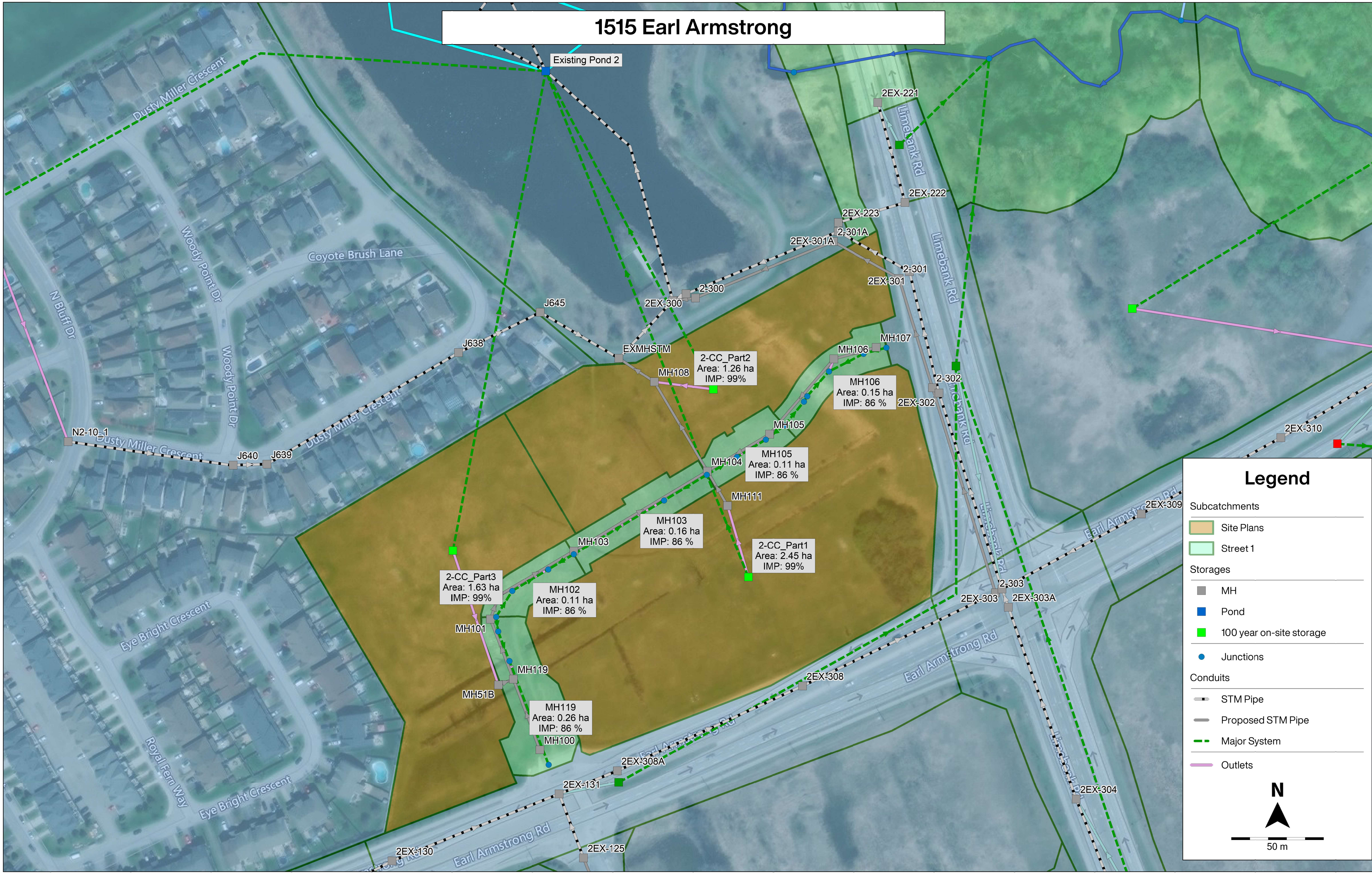
CITY FILE No. D07-12-22-0169 D07-16-22-0010

CITY PLAN No. 18900

Appendix E

- PCSWMM Schematic
- HGL Results
- Riverside South Phase 4 Plan and Profile

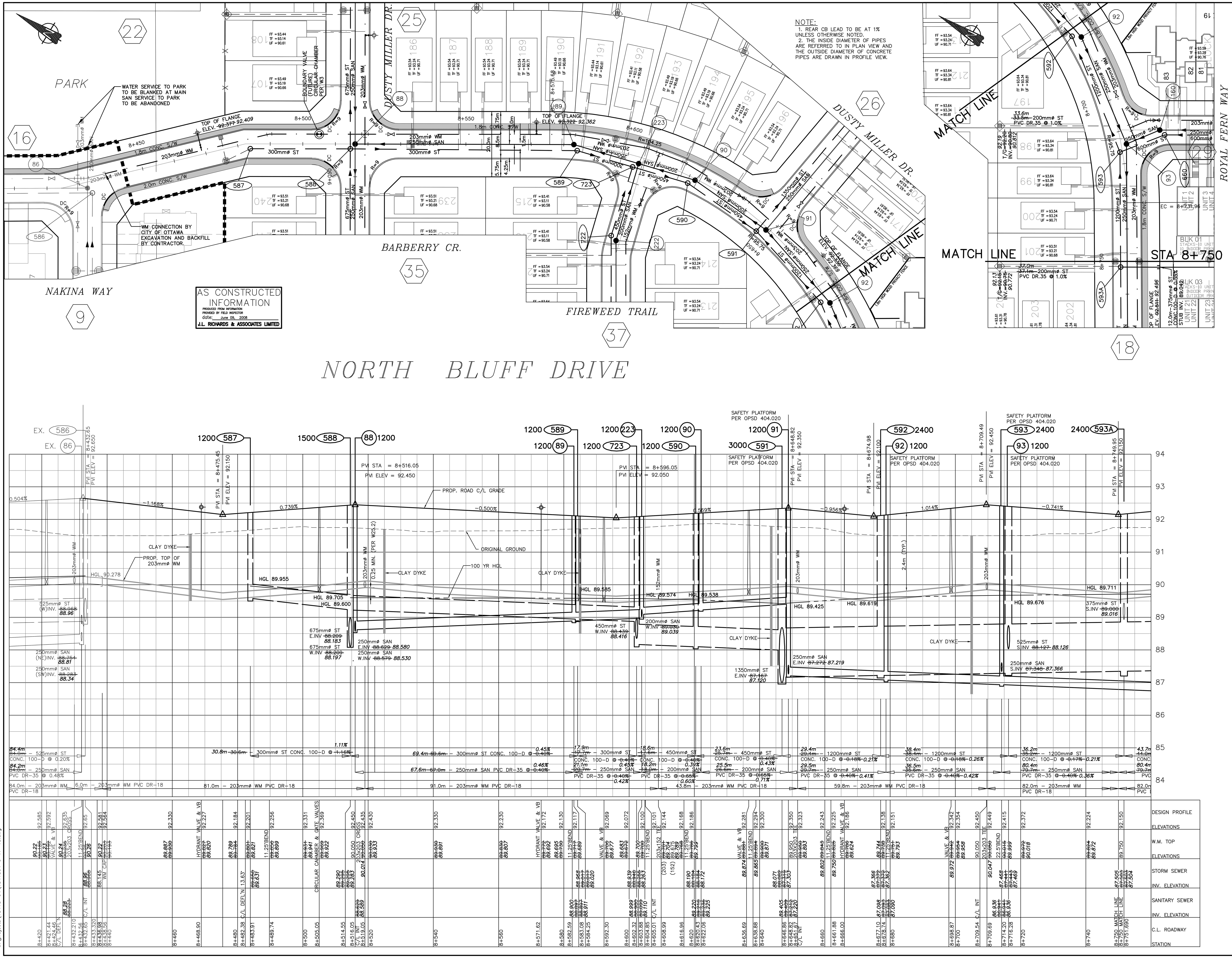
1515 Earl Armstrong



HGL Evaluation

PCSWMM JUNCTION ID	MH ID	USF, PROPOSED OR EXISTING GROUND ELEVATION (m)	100 YEAR 24 HOUR SCSTYPE II STORM		100 YEAR 24 HOUR SCSTYPE II STORM + 20%		100 YEAR 12 HOUR SCSTYPE II STORM		100 YEAR 12 HOUR SCSTYPE II STORM + 20%		100 YEAR 3 HOUR CHICAGO STORM		100 YEAR 3 HOUR CHICAGO STORM+20%	
			HGL (m)	FREEBOARD (m)	HGL (m)	FREEBOARD (m)	HGL (m)	FREEBOARD (m)	HGL (m)	FREEBOARD (m)	HGL (m)	FREEBOARD (m)	HGL (m)	FREEBOARD (m)
Existing Phase 4														
EXMHSTM	646(1)	91.70	88.86	2.84	89.25	2.45	88.74	2.96	89.15	2.55	88.64	3.06	88.96	2.74
J645	645	90.41	89.04	1.37	89.42	0.99	88.90	1.51	89.32	1.09	88.81	1.60	89.14	1.27
J638	638	90.33	89.15	1.18	89.53	0.80	89.01	1.32	89.44	0.89	88.92	1.41	89.24	1.09
J639	639	90.46	89.33	1.13	89.72	0.74	89.21	1.25	89.63	0.83	89.11	1.35	89.43	1.03
J640	640	90.48	89.39	1.09	89.77	0.71	89.26	1.22	89.68	0.80	89.16	1.32	89.48	1.00
N2-10_1	591	90.71	89.61	1.10	90.00	0.71	89.49	1.22	89.91	0.80	89.38	1.33	89.70	1.01
Proposed Street 1														
2EA-100	MH100	93.20	90.09	3.11	90.13	3.07	90.09	3.11	90.09	3.11	90.09	3.11	90.09	3.11
2EA-101	MH101	92.64	89.59	3.05	89.96	2.68	89.43	3.21	89.86	2.78	89.39	3.25	89.65	2.99
2EA-102	MH102	92.72	89.49	3.23	89.86	2.86	89.33	3.39	89.77	2.95	89.29	3.43	89.56	3.16
2EA-103	MH103	92.60	89.27	3.33	89.65	2.95	89.13	3.47	89.55	3.05	89.01	3.59	89.34	3.26
2EA-104	MH104	92.44	89.02	3.42	89.41	3.03	88.89	3.55	89.31	3.13	88.79	3.65	89.11	3.33
2EA-105	MH105	92.53	89.43	3.10	89.44	3.09	89.39	3.14	89.41	3.12	89.44	3.09	89.45	3.08
2EA-106	MH106	92.46	89.59	2.87	89.60	2.86	89.59	2.87	89.59	2.87	89.60	2.86	89.60	2.86
2EA-107	MH107	93.04	89.94	3.10	89.94	3.10	89.94	3.10	89.94	3.10	89.94	3.10	89.94	3.10
2EA-108	MH108	92.34	88.91	3.43	89.30	3.04	88.78	3.56	89.20	3.14	88.69	3.65	89.01	3.33
2EA-119	MH119	92.69	89.71	2.98	90.12	2.57	89.67	3.02	90.02	2.67	89.67	3.02	89.76	2.93

(1) MHST48704 on geoOttawa



LEGEND

- EXISTING CATCH BASIN
- PROPOSED CATCH BASIN
- INTERCONNECTED ROADWAY CB C/W ONE 19.8L/S IPEX TYPE 'A' ICD (OR CITY APPROVED EQUIVALENT)
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- PROPOSED WATERMAIN, VALVE & HYDRANT
- EXISTING WATERMAIN, VALVE & HYDRANT
- EXISTING SANITARY SEWER & MANHOLE
- EXISTING STORM SEWER & MANHOLE
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- PROPOSED STORM SEWER & MANHOLE
- PROPOSED CATCH BASIN & LEAD
- ACCESS EASEMENT
- 8 LOT NUMBER
- 2.0m CONC. SIDEWALK
- PHASING LIMIT
- 2 DRAWING NUMBER
- FF = 93.50 FINISHED FLOOR ELEVATION
- TF = 93.20 TOP OF FOUNDATION ELEVATION
- UF = 90.65 UNDERSIDE OF FOOTING ELEVATION

SEDIMENT CONTROL MEASURES

- REFER TO DETAIL ON DWG DT2 SILT FENCE BARRIER TO OPSD 219.110
- EXISTING OFF-SITE CATCH BASIN TO HAVE FILTER FABRIC

1. CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES TO PROVIDE FOR PROTECTION OF RECEIVING STORM SEWER OR DRAINAGE DURING CONSTRUCTION ACTIVITIES.
2. ANY STOCK PILE MATERIAL TO BE KEPT ON FLAT AREAS DURING CONSTRUCTION AWAY FROM DRAINAGE PATHS. IF STOCK PILE MATERIAL IS PLACED ON SLOPE AREA, SILT FENCE TO BE INSTALLED.
3. FILTER CLOTH TO BE PLACED UNDER ALL CATCH BASIN AND MANHOLE COVERS ON SITE, FOR TEMPORARY SEDIMENT CONTROL DURING CONSTRUCTION.

NO.	REVISION	DATE
9	AS CONSTRUCTED INFORMATION ADDED	09/06/08
8	SIDEWALK ADDED ON ROYAL FERN WAY	15/06/07
7	RE-ISSUED FOR TENDER	23/03/07
6	ISSUED FOR TENDER / ISSUED FOR CONSTRUCTION PART A & B	28/02/07
5	W/M SYSTEM REVISED FOR FUTURE CONVERSION TO HIGH PRESSURE	16/01/07
4	REVISED PER CITY COMMENTS FOR MOE APPROVAL	14/12/06
3	REVISED TO SUIT PHASING AND MINOR LAYOUT MODIFICATIONS	22/09/06
2	REVISED LAYOUT- RESUBMISSION TO CITY FOR REVIEW	23/06/06
1	ISSUED FOR CITY REVIEW	28/02/06

URBANDALE CORPORATION

J.L.Richards
ENGINEERS·ARCHITECTS·PLANNERS
J.L. Richards & Associates Limited
864 Lady Ellen Place
Ottawa, ON Canada
K1Z 5M2
Tel: 613 728 3571
Fax: 613 728 6012

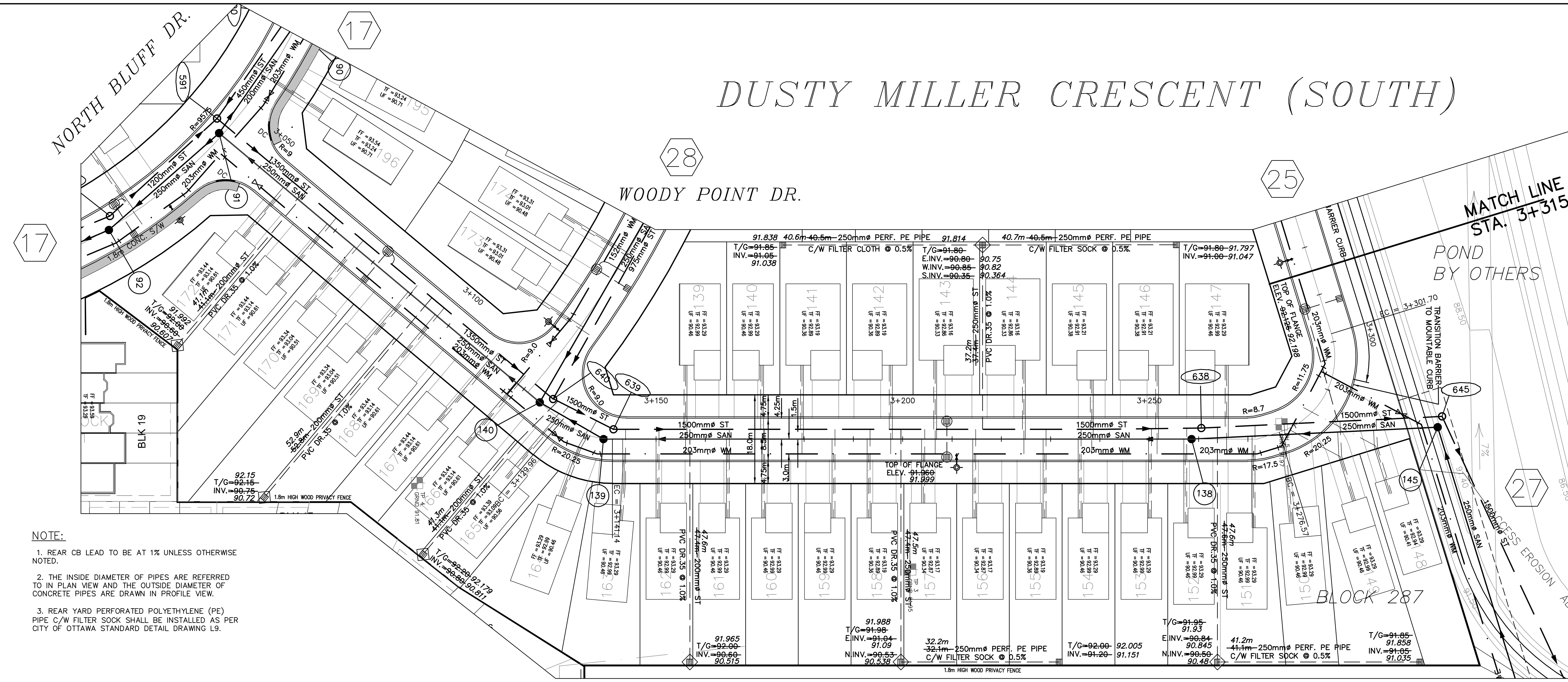
PROJECT:
RIVERSIDE SOUTH
PHASE 3
URBANDALE CORPORATION
CITY OF OTTAWA

PLAN & PROFILE NORTH BLUFF DRIVE FROM NAKINA WAY TO STA. 8+750

DESIGN: D.L.	REVISION NO.:
DRAWN: T.S.	DRAWING NO.: 17
CHECKED: L.D.	
PLOTTED: Sep 17, 2019	
SCALE: 1:500	JOB NO.: 18418-04

C:\projects\18418-04\1841804 C 17-18.dwg

DUSTY MILLER CRESCENT (SOUTH)



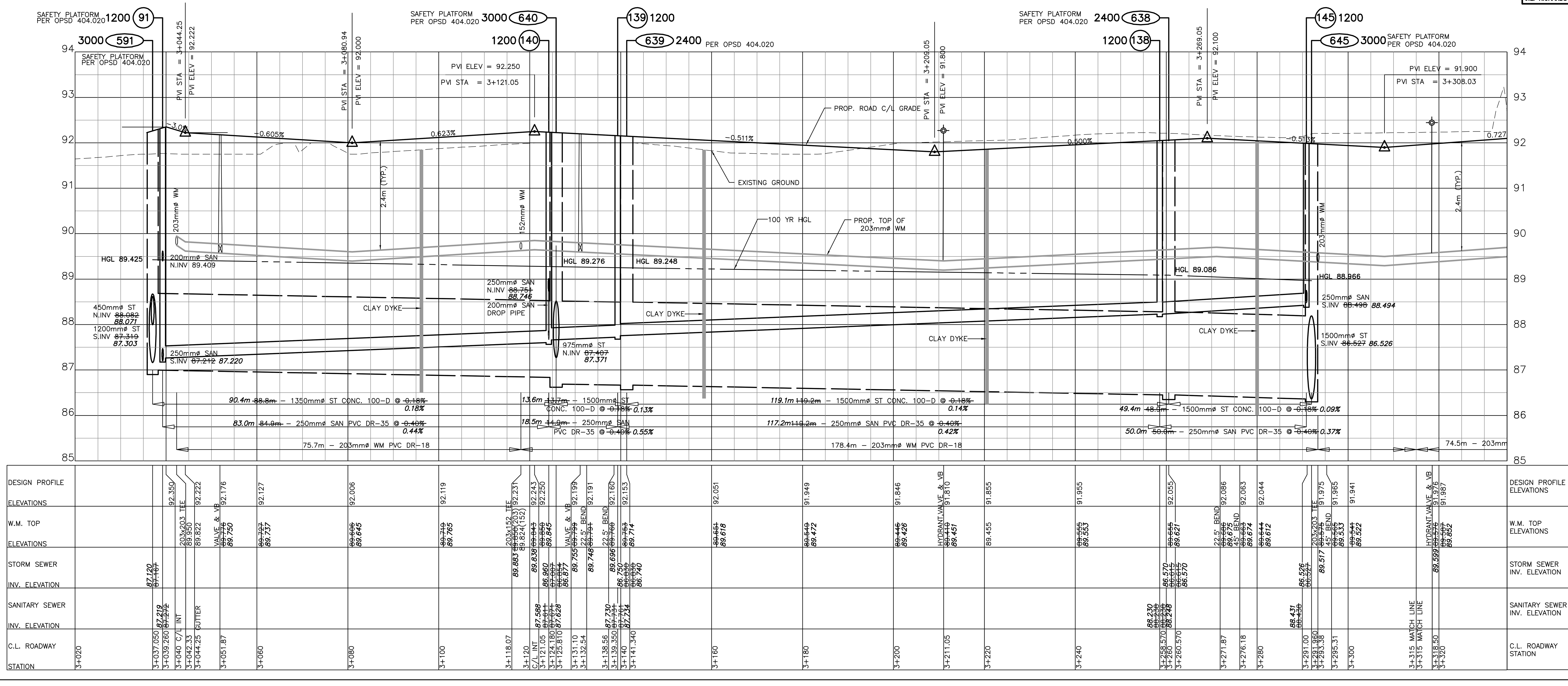
NOTE:

1. REAR CB LEAD TO BE AT 1% UNLESS OTHERWISE NOTED.

2. THE INSIDE DIAMETER OF PIPES ARE REFERRED TO IN PLAN VIEW AND THE OUTSIDE DIAMETER OF CONCRETE PIPES ARE DRAWN IN PROFILE VIEW.

3. REAR YARD PERFORATED POLYETHYLENE (PE) PIPE C/W FILTER SOCK SHALL BE INSTALLED AS PER CITY OF OTTAWA STANDARD DETAIL DRAWING L9.

AS CONSTRUCTED INFORMATION
PRODUCED FROM INFORMATION PROVIDED BY FIELD INSPECTOR
date: June 09, 2008
J.L. RICHARDS & ASSOCIATES LIMITED



LEGEND

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SEDIMENT CONTROL MEASURES

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NO.	REVISION	DATE
9	AS CONSTRUCTED INFORMATION ADDED	09/06/08
8	REVISED GRADING LOTS 148 TO 152	15/06/07
7	RE-ISSUED FOR TENDER	23/03/07
6	ISSUED FOR TENDER / ISSUED FOR CONSTRUCTION PART A & B	28/02/07
5	W/M SYSTEM REVISED FOR FUTURE CONVERSION TO HIGH PRESSURE	16/01/07
4	REVISED PER CITY COMMENTS FOR MOE APPROVAL	14/12/06
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2	REVISED LAYOUT- RESUBMISSION TO CITY FOR REVIEW	23/06/06
1	ISSUED FOR CITY REVIEW	28/02/06

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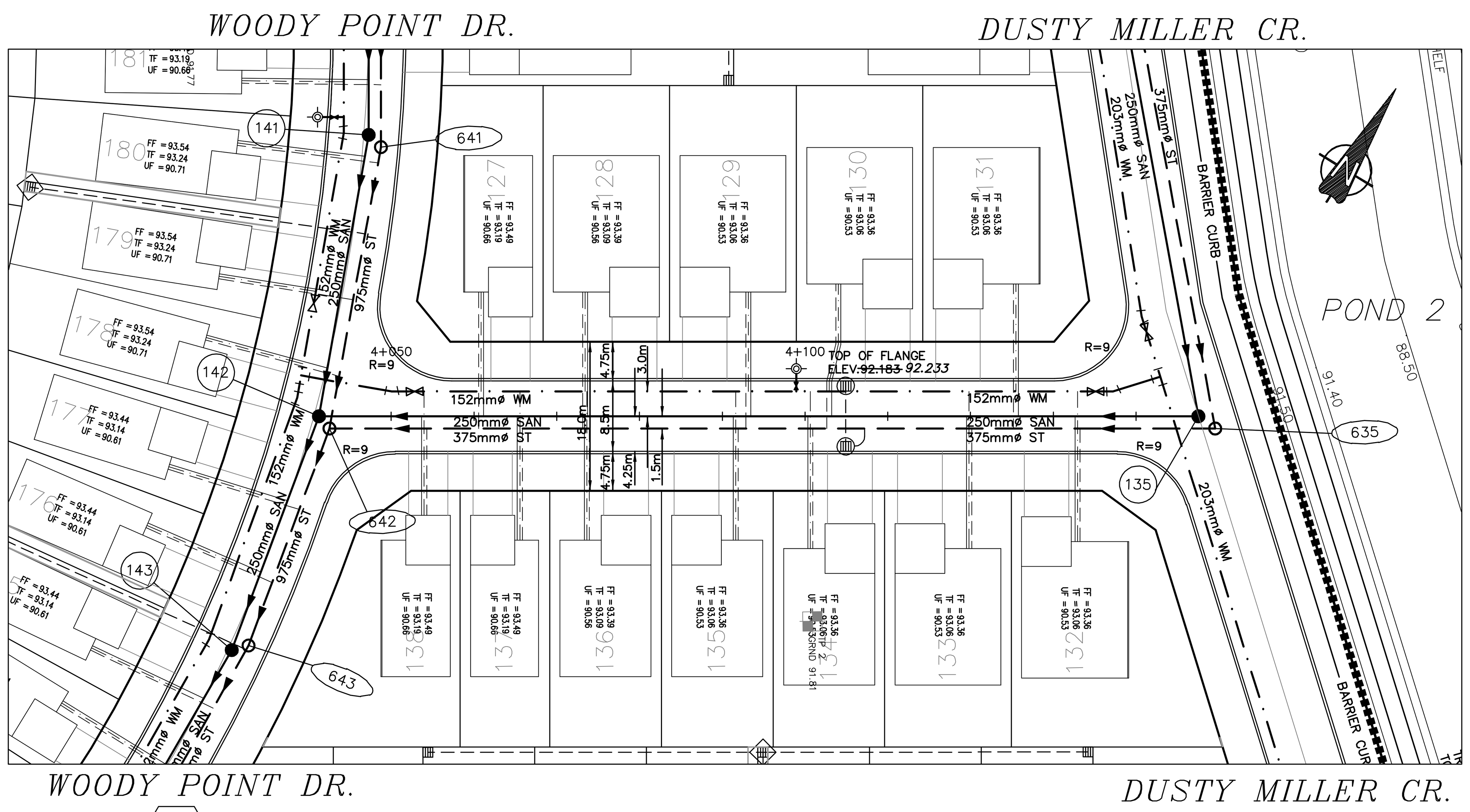
Tel: 613 728 3571
Fax: 613 728 6012

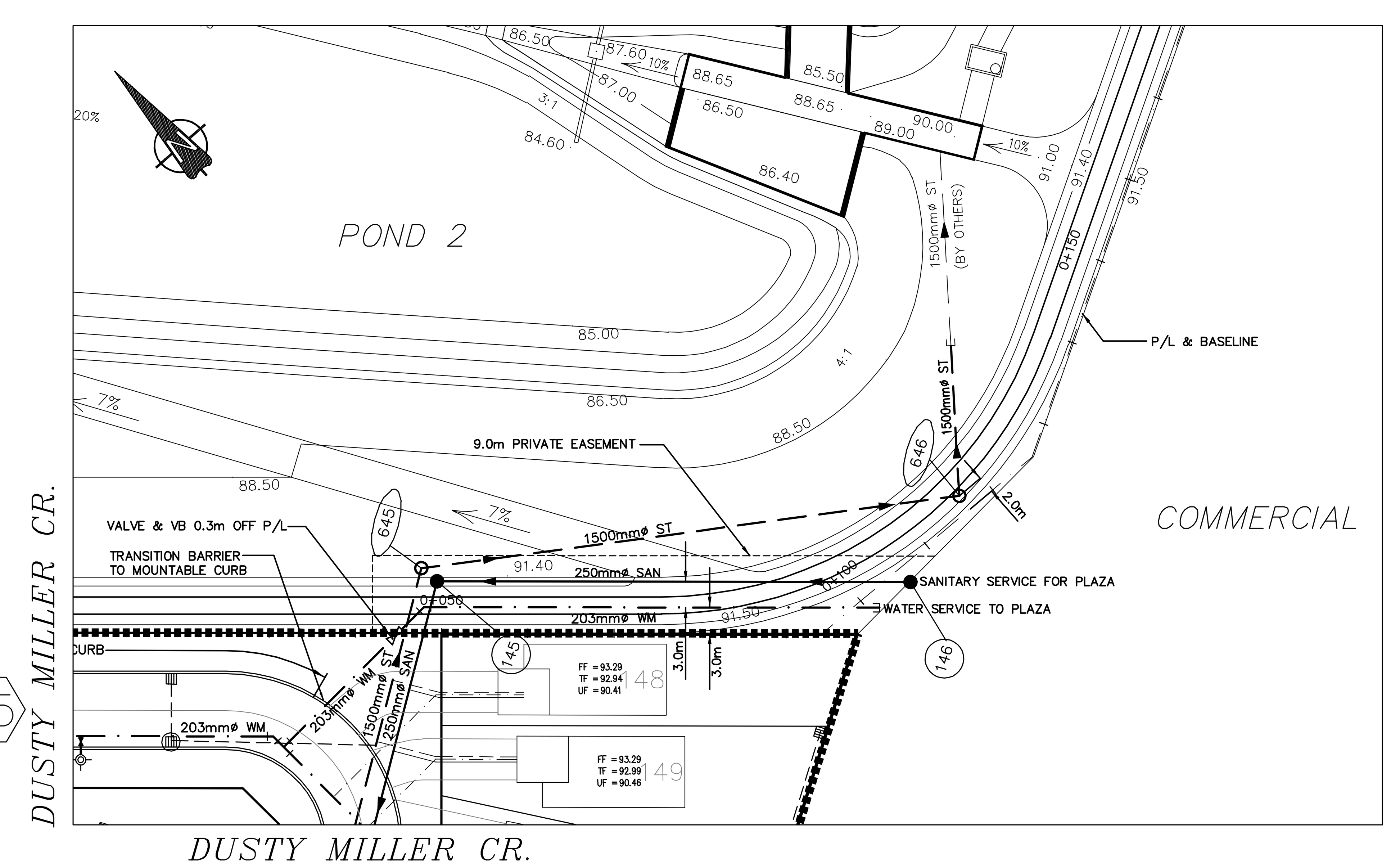
PROJECT:
RIVERSIDE SOUTH
PHASE 4
URBANDALE CORPORATION
CITY OF OTTAWA

DRAWING: V:\18418-04\LD\1841804 C 24-25-26.dwg

PLAN & PROFILE
DUSTY MILLER CRESCENT
FROM NORTH BLUFF DR.
TO STA. 3+315

DESIGN:	D.L.	REVISION NO.:	
DRAWN:	A.R.M./T.S.		
CHECKED:	L.D.	DRAWING NO.:	26
PLOTTED:	Sep 17, 2019		
SCALE:	1:500	JOB NO.:	18418-04





NOTE:

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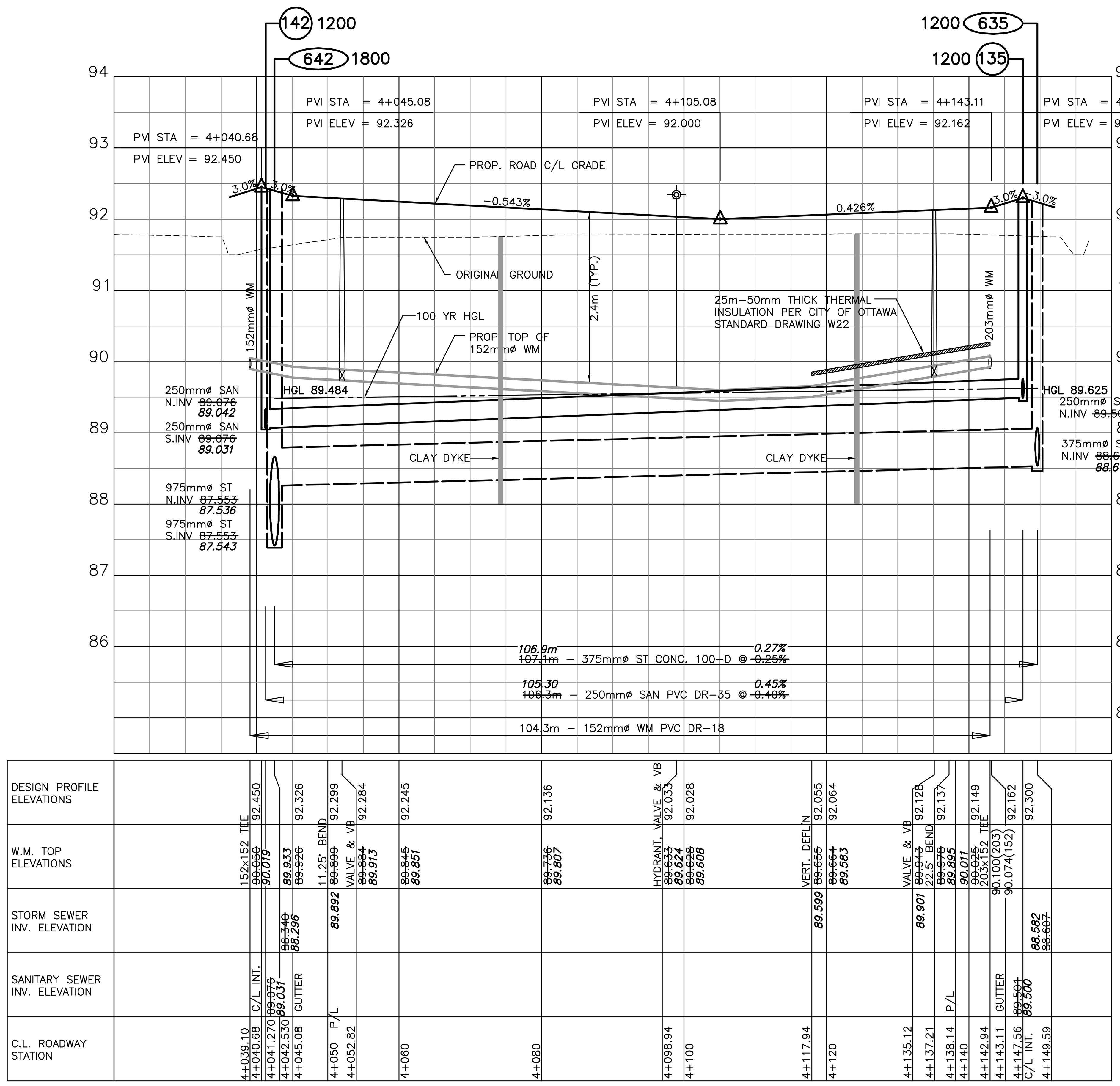
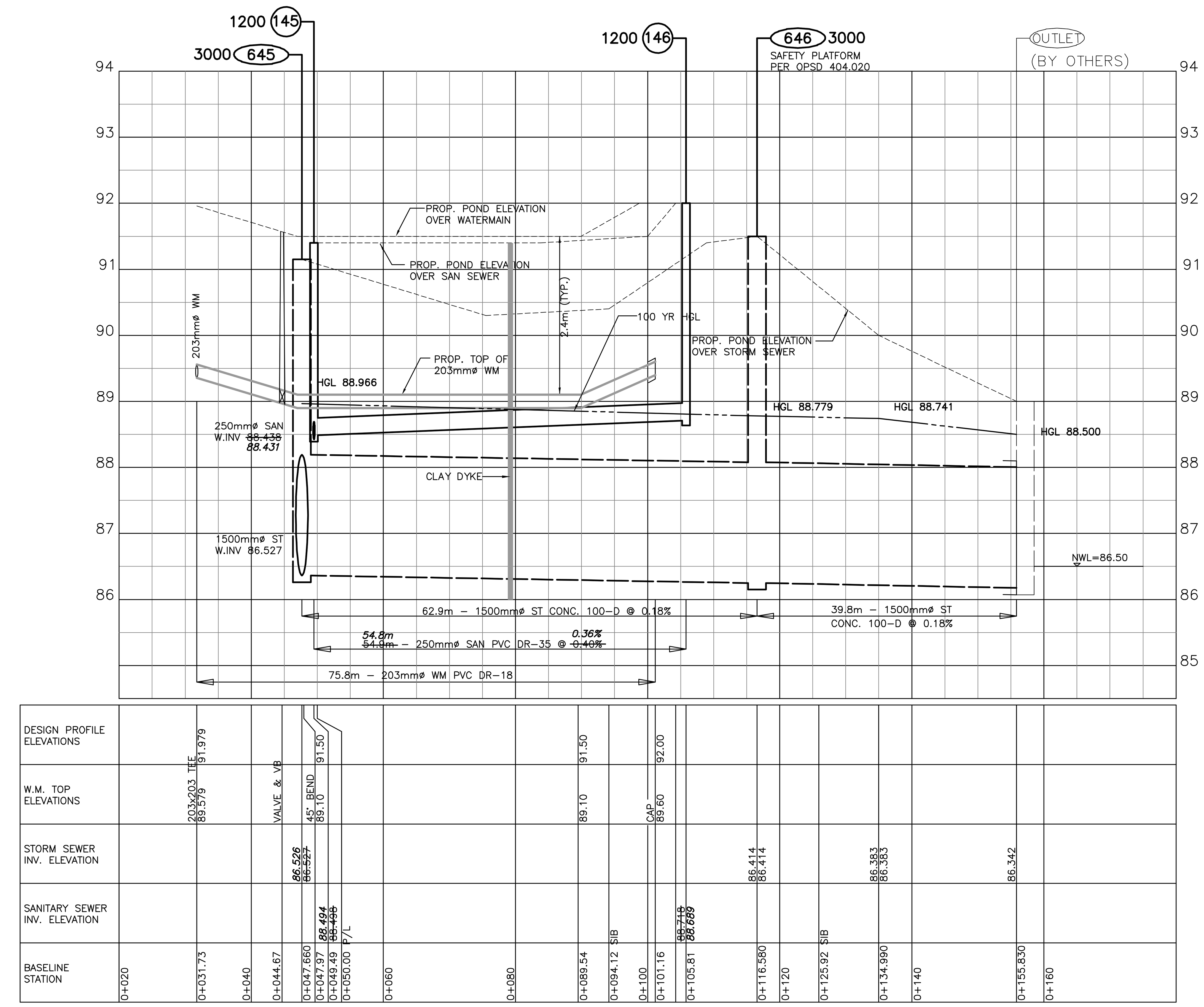
AS CONSTRUCTED INFORMATION
date: June 10, 2008
J.L. RICHARDS & ASSOCIATES LIMITED

COYOTE BRUSH LANE



POND AREA



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1	ISSUED FOR CITY REVIEW	28/02/06

URBANDALE CORPORATION

J.L. Richards
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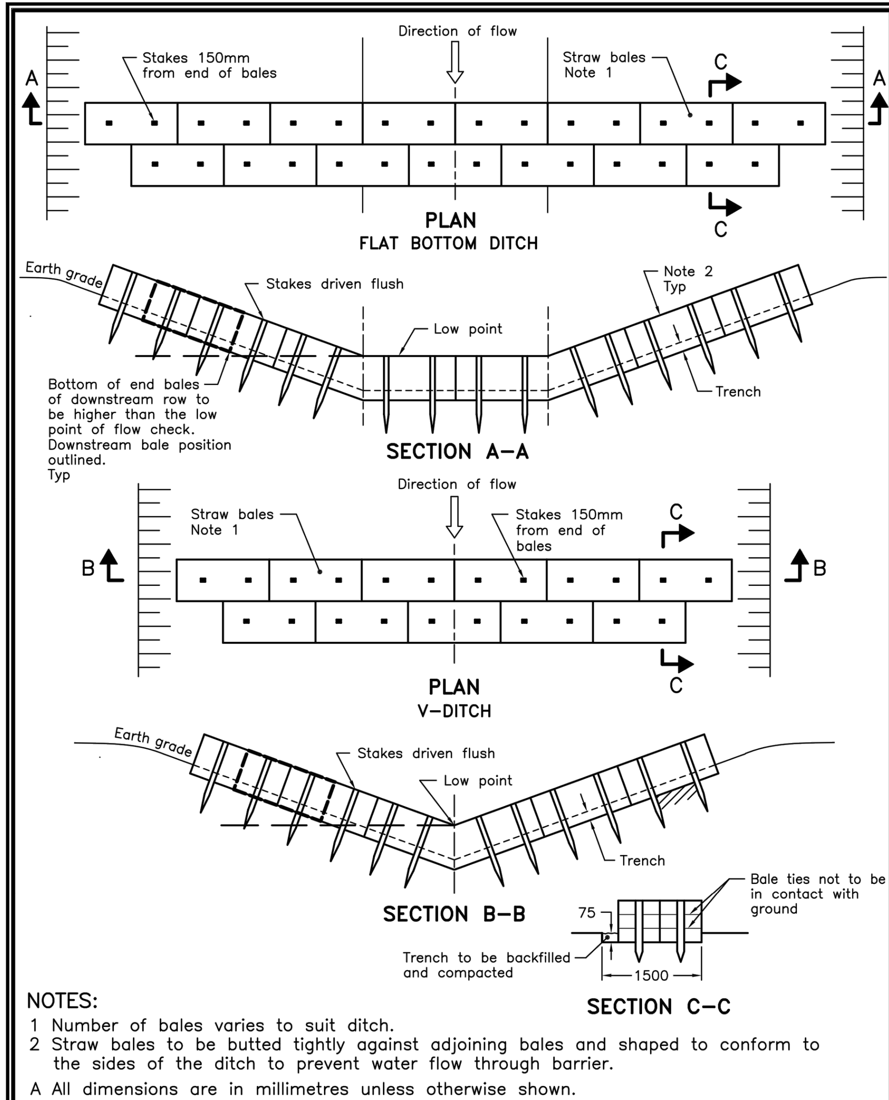
PROJECT:
RIVERSIDE SOUTH
PHASE 4
URBANDALE CORPORATION
CITY OF OTTAWA

DRAWING:
PLAN & PROFILE
COYOTE BRUSH LANE
& POND AREA

DESIGN: D.L.	REVISION NO.:
DRAWN: T.S.	DRAWING NO.:
CHECKED: L.D.	27
DATE: Sep 17, 2019	
SCALE: 1:500	JOB NO.: 18418-04

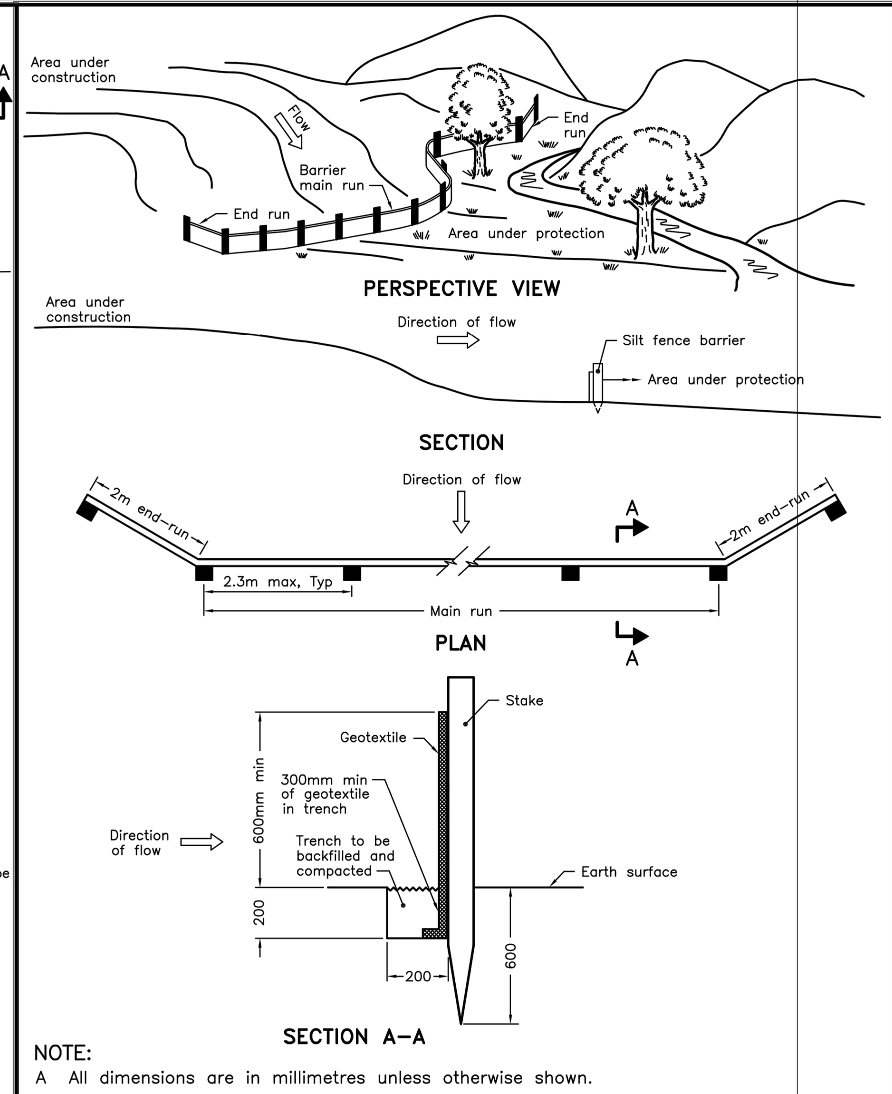
Appendix F

- 137404-900 – Erosion and Sedimentation Control Plan



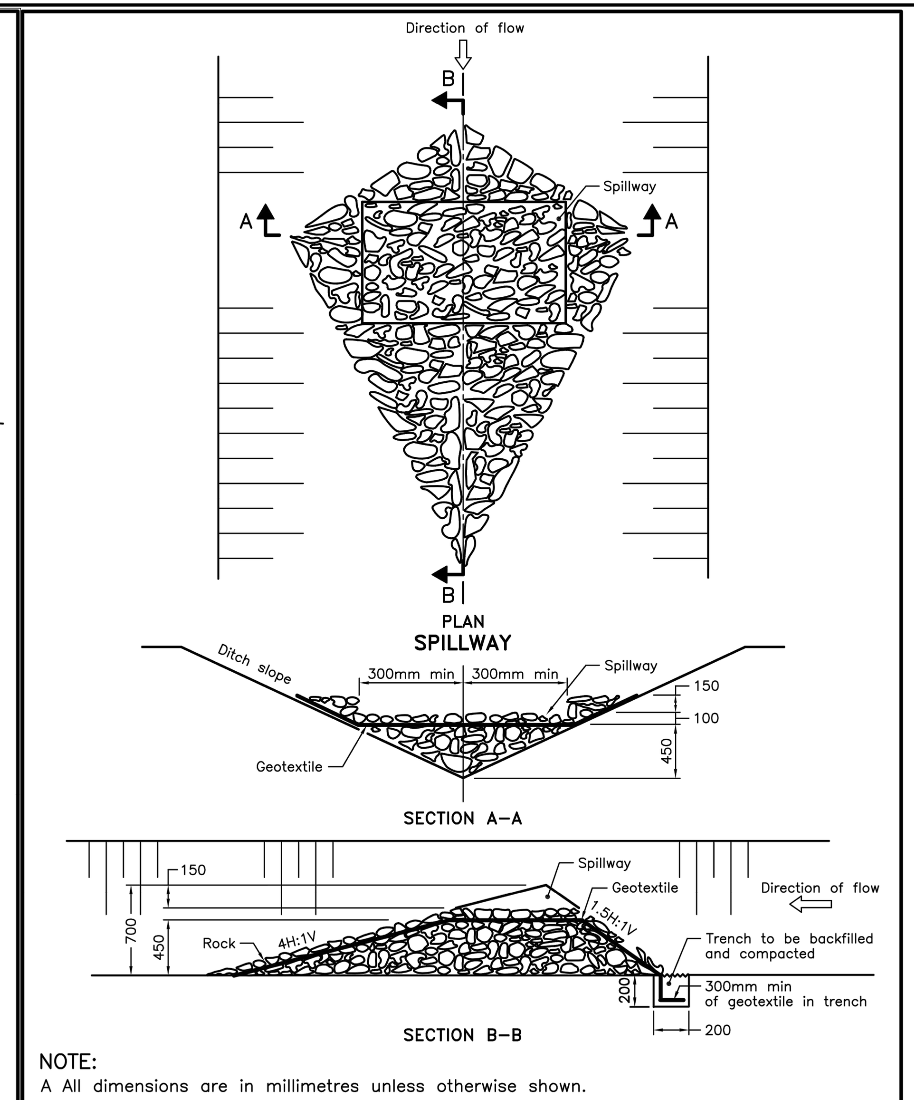
ONTARIO PROVINCIAL STANDARD DRAWING | Nov 2006 | Rev 1

STRAW BALE FLOW CHECK DAM — OPSD 219.180



ONTARIO PROVINCIAL STANDARD DRAWING | Nov 2006 | Rev 1

LIGHT-DUTY SILT FENCE BARRIER — OPSD 219.110



ONTARIO PROVINCIAL STANDARD DRAWING | Nov 2006 | Rev 1

ROCK FLOW CHECK DAM V–DITCH — OPSD 219.210

NOTES:

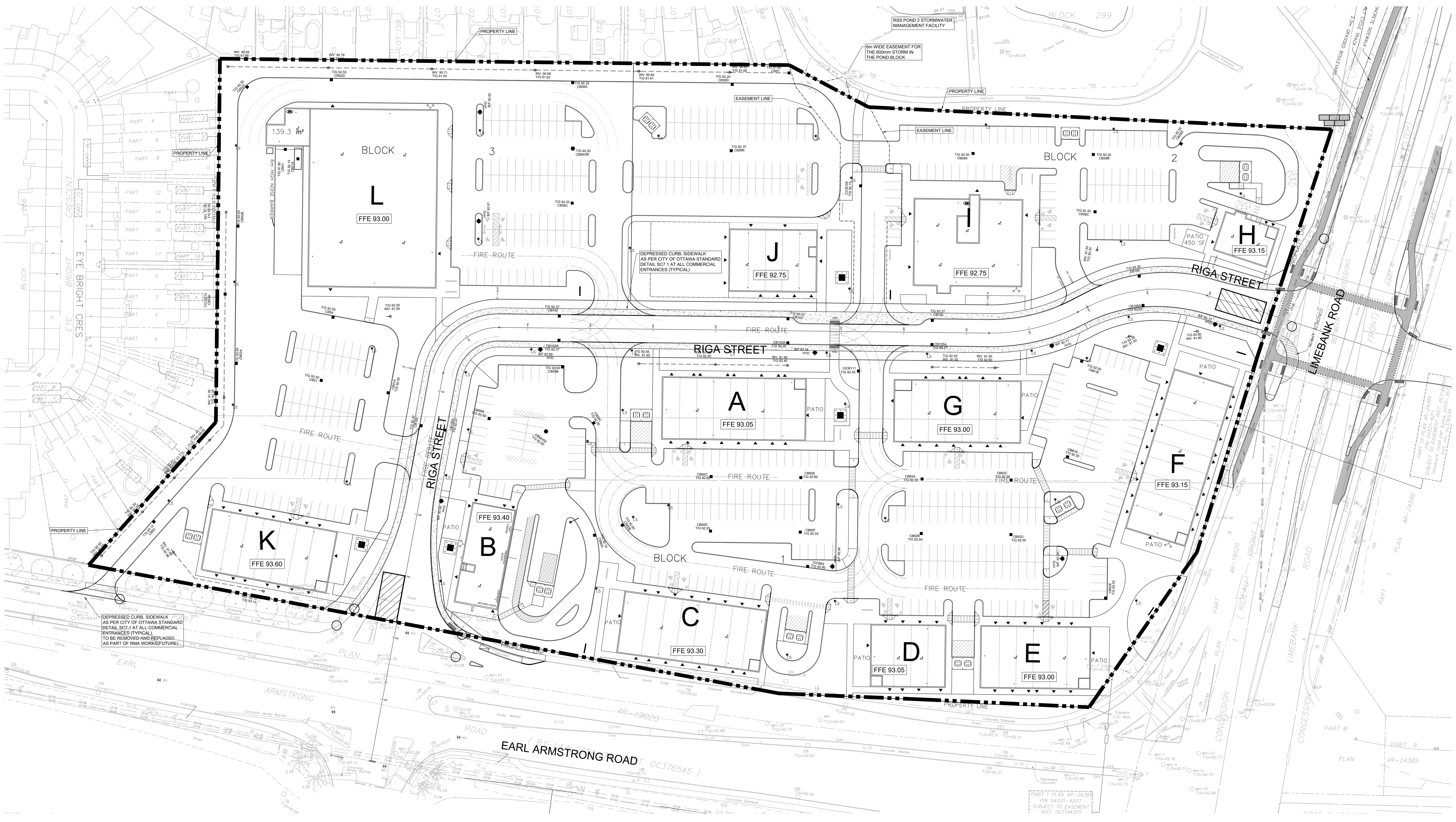
THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES, TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE RECEIVING WATERCOURSE, DURING CONSTRUCTION ACTIVITIES. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT APPROPRIATE EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES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

1. SILT FENCE TO BE ERECTED PRIOR TO EARTH WORKS BEING COMMENCED. SILT FENCE TO BE MAINTAINED UNTIL VEGETATION IS ESTABLISHED OR UNTIL START OF SUBSEQUENT PHASE.
2. STRAW BALE SEDIMENT TRAPS TO BE CONSTRUCTED IN EXISTING ROAD SIDE DITCHES. TRAPS TO REMAIN AND BE MAINTAINED UNTIL VEGETATION IS ESTABLISHED.
3. SILT SACK TO BE PLACED AND MAINTAINED UNDER COVER OF ALL CATCHBASINS. GEOTEXTILE SILT SACK IN STREET CBs TO REMAIN UNTIL ALL CURBS ARE CONSTRUCTED. GEOTEXTILE FABRIC IN RYCBs TO REMAIN UNTIL VEGETATION IS ESTABLISHED. ALL CATCHBASINS TO BE REGULARLY INSPECTED AND CLEANED, AS NECESSARY, UNTIL SOD AND CURBS ARE CONSTRUCTED.
4. CONTRACTOR TO PROVIDE DETAILS ON LOCATION(S) AND DESIGN OF DEWATERING TRAP(S) PRIOR TO COMMENCING WORK. CONTRACTOR ALSO RESPONSIBLE FOR MAINTAINING TRAP(S) AND ADJUSTING SIZE(S) IF DEEMED REQUIRED BY THE ENGINEER DURING CONSTRUCTION.
5. CONTRACTOR TO PROTECT EXISTING CATCHBASINS WITH FILTER CLOTH UNDER THE COVERS TO TRAP SEDIMENTATION. REFER TO IDENTIFIED STRUCTURES.
6. WORKS NOTED ABOVE ARE TO BE INSTALLED, INSPECTED, MAINTAINED AND ULTIMATELY REMOVED BY SERVICING CONTRACTOR.
7. THIS IS A "LIVING DOCUMENT" AND MAY BE MODIFIED IN THE EVENT THE PROPOSED CONTROL MEASURES ARE INSUFFICIENT

LEGEND :

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

Project North



CLIENT

Urbandale CORPORATION

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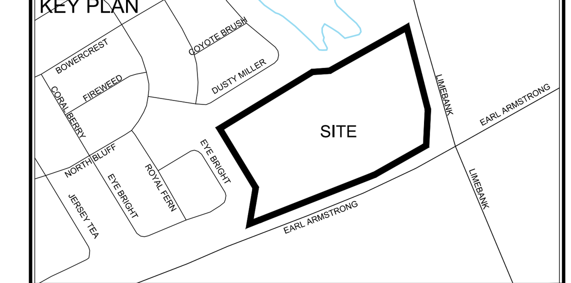
ISSUES

No.	DESCRIPTION	DATE
1	SUBMISSION 1 FOR CITY REVIEW	2022-12-16
2	ISSUED FOR COORDINATION	2023-03-09
3	REVISED AS PER CITY COMMENTS	2023-04-06
4	ISSUED FOR TENDER	2023-04-27
5	REVISED AS PER CITY COMMENTS	2023-06-13
6	REVISED PER NEW SITE PLAN	2023-06-29

NOT FOR CONSTRUCTION

SEE 010, 011, 012 FOR NOTES, LEGEND, CB TABLE, STREET SECTIONS AND DETAILS

KEY PLAN



CONSULTANTS

Owner / Applicant:
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Civil Engineers:
IBI Group
Structural Engineers
Cleland Jardine Engineering Ltd
Planning:
Fotenn
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CSW Landscape Architects Ltd
Surveyor:
Annis O'Sullivan Vollebekk Ltd
Geotechnical:
Paterson and Associates
Electrical:
JRP Engineering
Mechanical:
JRP Engineering

1:750 — 0 7.5 22.5 37.5m

SEAL

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PROJECT
1515 EARL ARMSTRONG PLAZA

PROJECT NO: 137404	
DRAWN BY: **EH**	CHECKED BY: **TRB**
PROJECT MGR: **SEL**	APPROVED BY: **TRB**

SHEET TITLE
SEDIMENT - EROSION PLAN

SHEET NUMBER	ISSUE
900	1

CITY PLAN No. 18900

SCALE CHECK 1 in 10mm

File Location: J:\137404_Earl_Armstro\7.0_Production\7.03_Design\04_Civil\Sheets\900 SEDIMENT - EROSION PLAN.dwg Last Saved: May 30, 2023 2:56:45 PM by Eric Hennie Plotted: Friday, June 30, 2023 by Ehennie

CITY FILE No. D07-12-22-0169 D07-16-22-0010