REPORT
PROJECT: 137404.6.04.03

DESIGN BRIEF
1515 EARL ARMSTRONG PLAZA
RIVERSIDE SOUTH

Prepared for URBANDALE CORPORATION
by IBI GROUP

DECEMBER 2022

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1 INTRODUCTION

1.1 Scope

The purpose of this Design Brief is to provide stakeholder regulature 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

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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 mehtodolgy 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 which is 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. 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

is is the design brief for site plan. Please clarify statement.

mparison 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”. When site plans are developed for Parts 1 to 3 the pressure can be determined at each building to determine if pressure reducing control is required.

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

This catchbasin should connect to the storm sewer. Please review and revise.

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. Adjacent to building “L” a sanitary catchbasin is shown which is placed under a trash compactor. The sanitary catchbasin will only collect potential leakage from the trash compactor and is located on an elevated pad so that no surface drainage will enter. There is no flow allocation for this catchbasin.

No external sanitary flows entering the subject lands. All sewers are 200 mm in diameter with the peak sanitary flow of 5.01 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 which is a public right of way which outlets to 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 drains 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 ICD's will be placed in the first upstream MH from the outlet. Temporary ICD's are proposed on MH 108 and MH 57 with sizing calculations included in **Appendix C**.

4.5 Site Plan Drainage

The subject site will be limited to a release rate established using the criteria described in Table 4.1, Summary of Minor System Capture, from Assessment of Adequacy of Public Services 1515 Earl Armstrong Plaza Riverside South Report by IBI Group dated May 2022. Allowances from that report are as follows:

Table: 4.1 Summary of minor system capture, Assessment of Adequacy of Public Services

DRAINAGE AREA ID	GENERATED FLOW ON CATCHMENT (L/S) DURING TARGET MINOR SYSTEM STORM	MINOR SYSTEM CAPTURE (L/S) DURING 100 YEAR 3 HOUR CHICAGO STORM
2-CC_Part 1	529	609
2-CC_Part 2	272	313
2-CC_Part 3	343	394
2-CC_Part 4	105	237

This limitation will be achieved through a combination of inlet control devices (ICD's) at inlet locations 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 (609l/s + 131 l/s + 394 l/s) 1316 l/s. The other system is the public subdivision street, "Street 1", which has been modelled and is discussed in section 4.6 of this report.

ows generated that are in excess of the site's allowable release rate will be stored on site in ategic surface storage areas or by the use of roof top storage and gradually released into the nor system so as not to exceed the site's allocation.

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

oof drains from buildings should not discharge uncontrolled to the minor system. Please revise

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 – 0.36 hectares in total, have an average C value of 0.39. Two catchbasins, CB 65 and 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 C**.

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 prope[illegible],

$Q_{allowable}$ = 1316.00 L/s

This flow does not appear to match the SWM model. Please review and revise accordingly.

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:

$Q_{uncontrolled1}$ = **2.78** x **C** x i_{100yr} x **A** where:

C = Average runoff coefficient of uncontrolled area = 0.39

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 = 0.36 Ha

Therefore, uncontrolled release rate 1 can be determined as:

$Q_{uncontrolled1}$ = **2.78** x **C** x i_{100yr} x **A**

= 2.78 x 0.39 x 178.56 x 0.36

= **69.69 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 180.89 l/s.

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

$Q_{max\ allowable}$ = $Q_{restricted} - Q_{uncontrolled}$
= 1316.00 L/s – 180.89 L/s
= **1135.11 L/s**

Available storage cannot be verified as the ponding plan does not contain the 100 year volumes. Please update the ponding plan accordingly.

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*	0.61	180.95	115.00	177.97	115.00	33.49
MH57	0.94	222.48	265.00	218.38	265.00	30.49
MH58B*	0.41	89.46	128.00	89.07	128.00	9.49
MH62B*	0.76	154.03	265.00	152.65	265.00	15.22
MH60B*	0.86	170.71	240.00	168.93	240.00	17.49
W Swale	0.08	30.96	6.00	2.17	6.00	0.04
N Swale	0.12	4.42	8.00	4.13	8.00	0.11
Total Surface	**3.78**	**853.01**	**1027.00**	**813.30**	**1027.00**	**106.32**

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.

ease complete Flow ontrol Roof drainage declaration memo.

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	0.12	12.00	33.97	12.00	6.64
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**	**98.00**	**286.10**	**98.00**	**56.50**

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 (1027.00 l/s + 98.00 l/s + 180.89 l/s) 1135.11 l/s, which is less than the allowable release of 1316.00 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 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 the 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 4-3 and Table 4-4.**

- **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*;*
    - 100 year 3 hour Chicago storm event (10 minute time step) with 20% increase for Climate Change consideration, as per the OSDG;
    - 100 year 12 hour SCS Type II storm event
- **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 was used for impervious.
- **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 (ICD's, 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 4-2: 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 grade (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

For ease of review, the following is a reference list of the computer modeling files enclosed in digital submission.

PCSWMM

- 137404_2CHI_1515EarlArmstrongPlaza.pcz – 2 year 3 hour Chicago
- 137404_100CHI_1515EarlArmstrongPlaza.pcz – 100 year 3 hour Chicago
- 137404_120CHI_1515EarlArmstrongPlaza.pcz – 100 year 3 hour Chicago+20%
- 137404_100SCS_1515EarlArmstrongPlaza.pcz – 100 year 12 hour SCS

Table 4-3 Hydrological Parameters – Subcatchment Summary

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	0.22	MH102	MH119	0.86	307	7.13
MH102	0.10	MH103	MH102	0.86	111	9.72
MH103	0.16	EASMENT	MH103	0.86	168	79.89
MH105	0.11	EASEMENT	MH105	0.86	388	34.89
MH106	0.15	MH105	MH106	86	282	25.99

(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 4-4 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)	ICD ORIFICE SIZE (MM DIA.)		NOTES
			MINOR SYSTEM DESIGN STORM	GENERATED FLOW ON INDIVIDUAL SEGMENT SIMULATED (L/S)				
Street Segments								
MH119	Sag	18m Row, 8.5m asphalt	2	40.2	45.2	94	94	
MH102	Sag	18m Row, 8.5m asphalt	2	18.3	34.0	83	83	
MH103	Sag	18m Row, 8.5m asphalt	2	29.3	34.8	83	83	
MH105	Sag	18m Row, 8.5m asphalt	2	20.1	34.3	83	83	
MH106	Sag	18m Row, 8.5m asphalt	2	27.4	35.2	83	83	

The storage available on-site and its maximum depth and the results of the PCSWMM evaluation for Street 1 are presented in **Table 4-5**. The ponding plan is presented on **Drawing 137404-600.**

Table 4-5 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	7.13	0.14	0	0
MH102	Sag	9.72	0.15	0	0
MH103	Sag	79.89	0.28	0	0
MH105	Sag	34.89	0.23	0	0
MH106	Sag	25.99	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 4-6 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	0.14	0.15	0.01	0.32	0.00
MH102	Sag	0.15	0.06	0.00	0.00	0.00
MH103	Sag	0.28	0.12	0.00	0.00	0.00
MH105	Sag	0.23	0.08	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_100CHI_1515EarlArmstrongPlaza.pcz" enclosed in digital submission.

Table 4-7 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	0.14	0.18	0.03	0.48	0.01
MH102	Sag	0.15	0.12	0.00	0.00	0.00
MH103	Sag	0.28	0.22	0.05	0.44	0.02
MH105	Sag	0.23	0.23	0.00	0.54	0.00
MH106	Sag	0.22	0.19	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_120CHI_1515EarlArmstrongPlaza.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

Considering that this site is adding an additional 1316 l/s to the existing 1500mm diameter storm sewer, please clarify how it's possible that the HGL is lower than JLR's HGL.

The 1515 Earl Armstrong 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 HGL analysis was completed to quantity the hydraulic impacts of this connection on the Phase 4 sewer.

The minor system of the subject 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 hydraulic grade line elevations in the Phase 4 storm sewer were reviewed against underside of footing elevations from the Phase 4 detailed design. The referenced as-constructed Phase 4 drawings are enclosed in **Appendix E**. It should be noted that HGL results are presented for the 100 year 12 hour SCS Type II storm, more critical than the 100 year 3 hour Chicago storm.

Table 4-8 Phase 4 hydraulic grade line elevations

PCSWMM JUNCTION ID	DETAILED DESIGN MH ID	USF ELEVATION (M) *(EXISTING GROUND WHERE NOTED)*	HGL (M)	FREEBOARD TO USF (M) *(TO EXISTING GROUND WHERE NOTED)*
EXMHSTM	646(1)	*91.5 Existing Ground*	88.74	*2.76 to Existing Ground*
J645	645	90.41	88.90	1.51
J638	638	90.33	89.00	1.33
J639	639	90.46	89.19	1.27
J640	640	90.48	89.24	1.24
N2-10_1	591	90.71	89.47	1.24

(1) MHST48704 on geoOttawa

The freeboard to USF elevations is greater than 1.2 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.

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 an 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/1st Submission/CTR_Design Brief_2022-12-12.docx\

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.
N.T.S.	EARL ARMSTRONG/LIMEBANK PLAZA	LOCATION PLAN	FIGURE 1.1

REVISION SCHEDULE			
NO.	REVISION	DATE	BY
4	REVISIONS PER SITE PLAN	APR. 28, 2022	N
3	UPDATED ROUNDABOUT DESIGN	APRIL 25,2022	DG
2	PLAN PREPARED	2021	??
1	PLAN PREPARED	JUNE 8, 2021	N

SCHEDULE

AREA (Sq.m.)	PART	LOT	CONCESSION	PIN
25 302.4	1	PART OF LOTS 20 and 21, PART OF THE ROAD ALLOWANCE BETWEEN LOTS 20 & 21 (CLOSED BY BY-LAW 2004-361, INST. OC376539)	CONCESSION 1 (RIDEAU FRONT)	ALL OF 04331-4232
12 960.4	2	PART OF LOT 21		
16 422.5	3	PART OF LOTS 20 and 21, PART OF THE ROAD ALLOWANCE BETWEEN LOTS 20 & 21 (CLOSED BY BY-LAW 2004-361, INST. OC376539)		
6 842.0	4			

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

DATE:____________

____
T. HARTWICK
ONTARIO LAND SURVEYOR

PLAN 4R-

RECEIVED AND DEPOSITED
DATE: ____________

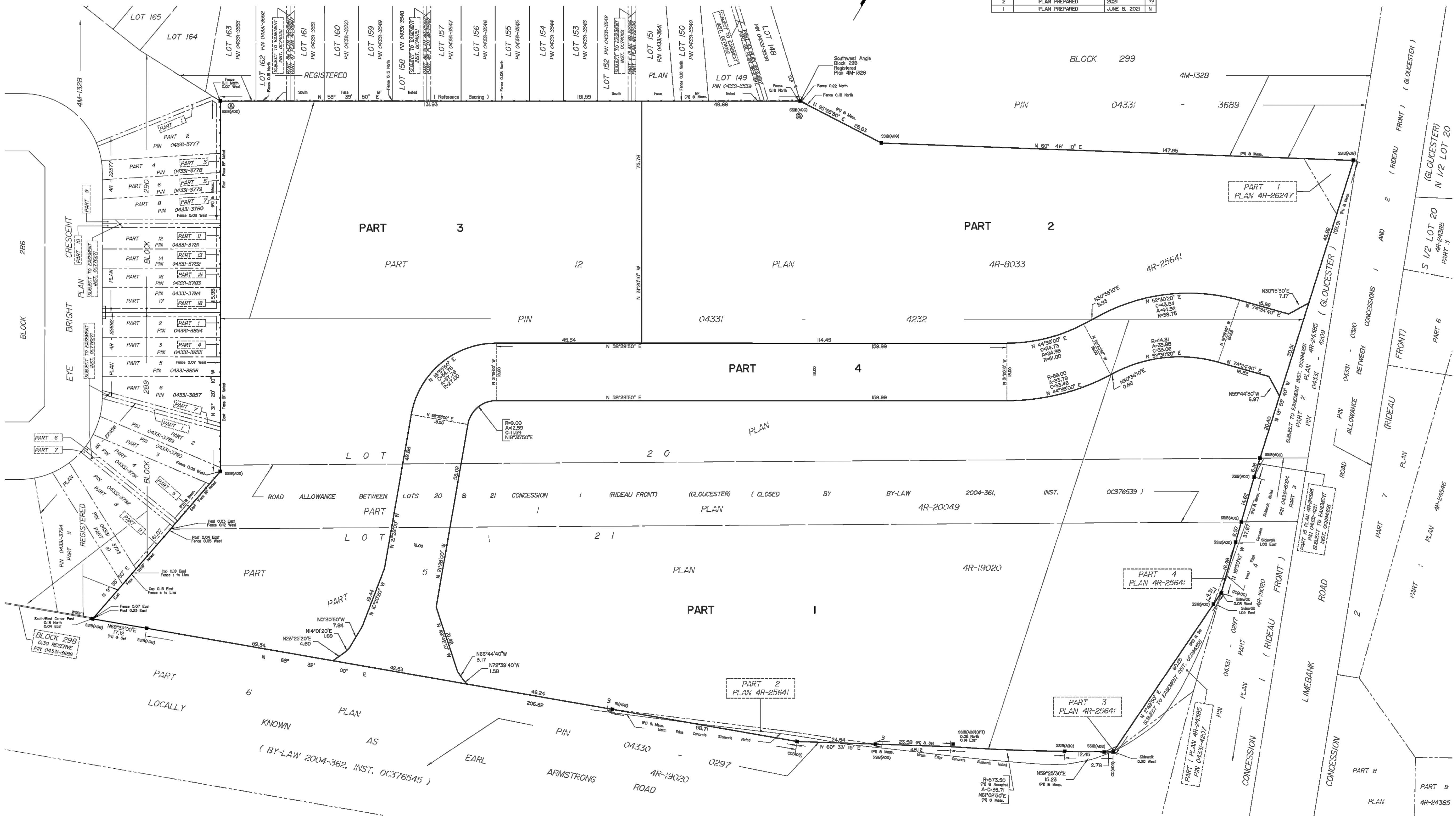
____
REPRESENTATIVE FOR LAND REGISTRAR FOR THE LAND TITLES DIVISION OF OTTAWA-CARLETON NO. 4.

PLAN OF SURVEY OF
PART OF LOTS 20 and **21**
and
PART OF THE ROAD ALLOWANCE BETWEEN LOTS 20 and **21**
(As Closed by By-Law 2004-361, Inst. OC376539)
CONCESSION 1 (RIDEAU FRONT)
Geographic Township of Gloucester
CITY OF OTTAWA
Surveyed by Annis, O'Sullivan, Vollebekk Ltd.

Scale 1 : 500

Metric

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



Surveyor's Certificate

I CERTIFY THAT :

1. This survey and plan are correct and in accordance with the Surveys Act, the Surveyors Act and the Land Titles Act and the regulations made under them.
2. The survey was completed on the __ day of _________, 2022.

____
Date

____
T. Hartwick
Ontario Land Surveyor

This plan relates to AOLS Plan Submission form number: V-

Notes & Legend

—□—	Denotes	Survey Monument Planted
—■—	"	Survey Monument Found
SIB	"	Standard Iron Bar
SSIB	"	Short Standard Iron Bar
CC	"	Cut Cross
IB	"	Iron Bar
*	"	Survey Monument (0.3 long)
(WIT)	"	Witness
(AOG)	"	Annis, O'Sullivan, Vollebekk Ltd.
Meas.	"	Measured
CLF	"	Chain Link Fence
BF	"	Board Fence
WSBF	"	Wooden Sound Barrier Fence
(P1)	"	Plan 4R-25641
(P2)	"	Plan 4R-26247

Distances shown on this plan are ground distances and can be converted to grid distances by multiplying by the combined scale factor of 0.99997.

Bearings are grid, derived from Can-Net 2016 Real Time Network GPS observations on reference points A and B, shown hereon, having a bearing of N 58°39'50" E and are referenced to Specified Control Points 01919791338 and 01919871649, MTM Zone 9 (76°30' West Longitude) NAD-83 (original).

Coordinates are derived from Can-Net 2016 Real Time Network GPS observations referenced to Specified Control Points 01919791338 and 01919871649, MTM Zone 9 (76°30' West Longitude) NAD-83 (original).

Coordinate values are to urban accuracy in accordance with O. Reg. 216/10.

. 01919791338	Northing	5006055.96	Easting	346140.91
. 01919871649	Northing	5007189.87	Easting	372435.05
. Point A	Northing	5015994.61	Easting	369749.71
. Point B	Northing	5016089.05	Easting	369904.81

Caution: Coordinates cannot, in themselves, be used to re-establish corners or boundaries shown on this plan.

ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
14 Concourse Gate, Suite 500
Nepean, Ont. K2E 7S6
Phone: (613) 727-0850 / Fax: (613) 727-1079
Email: Nepean@aovltd.com
Ontario Land Surveyors
Job No. 22110-21 Urbandale Pt Lts 20 21 C1 RF GL R D4 | N

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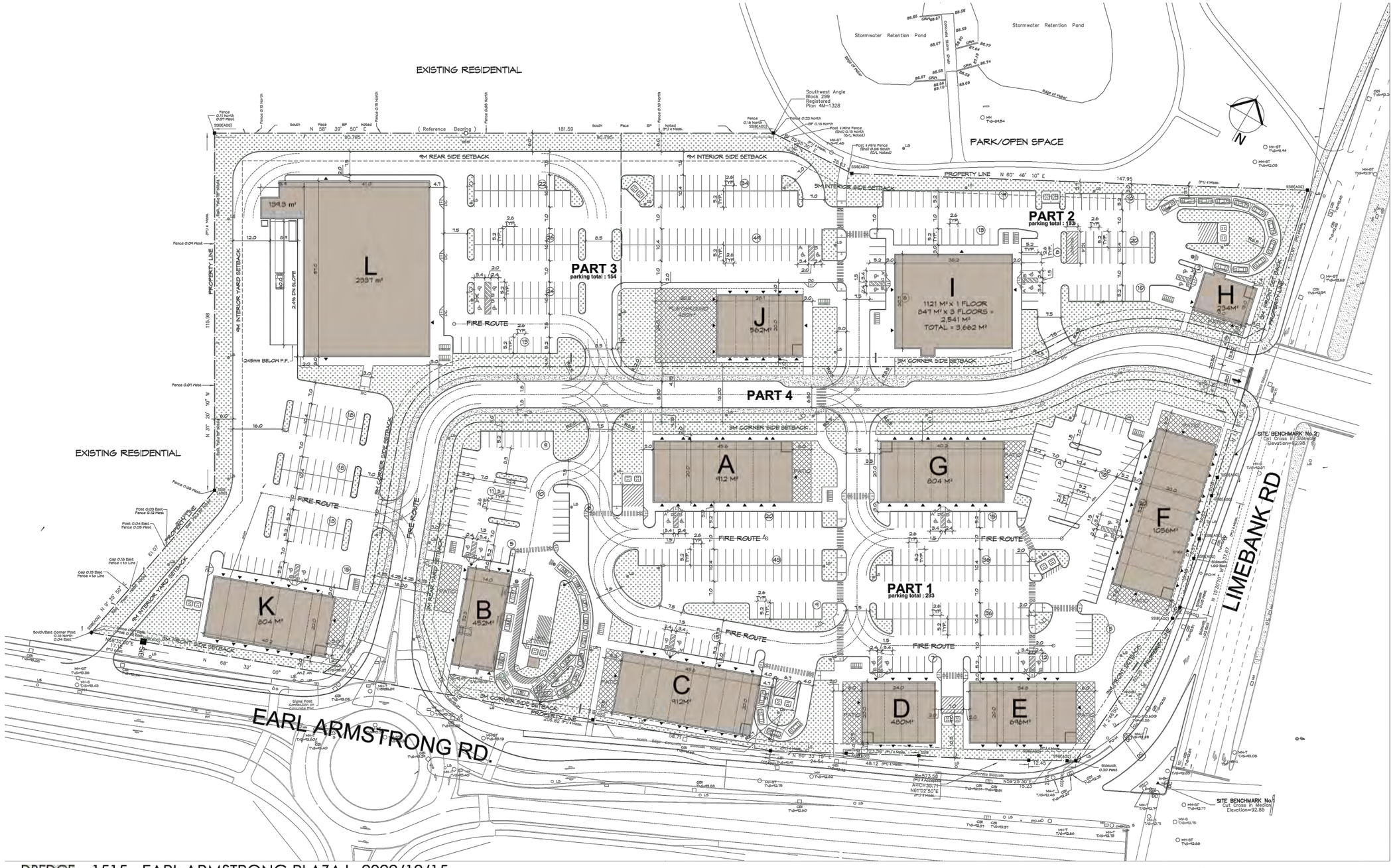
Scale	Project Title	Drawing Title	Sheet No.
NTS	EARL ARMSTRONG/LIMEBANK PLAZA	DRAFT PLAN	FIGURE 1.2

J: \137404_Earl_Armstro\7.0_Production\7.03_Design\04_Civil_LAND_Adequacy Report\137404-Fig-1.3-Site PLAN.dwg Layout Name: SITE PLAN Last Saved By: Ehenrie Last Saved At: Dec. 16, 22



DREDGE LEAHY ARCHITECTS

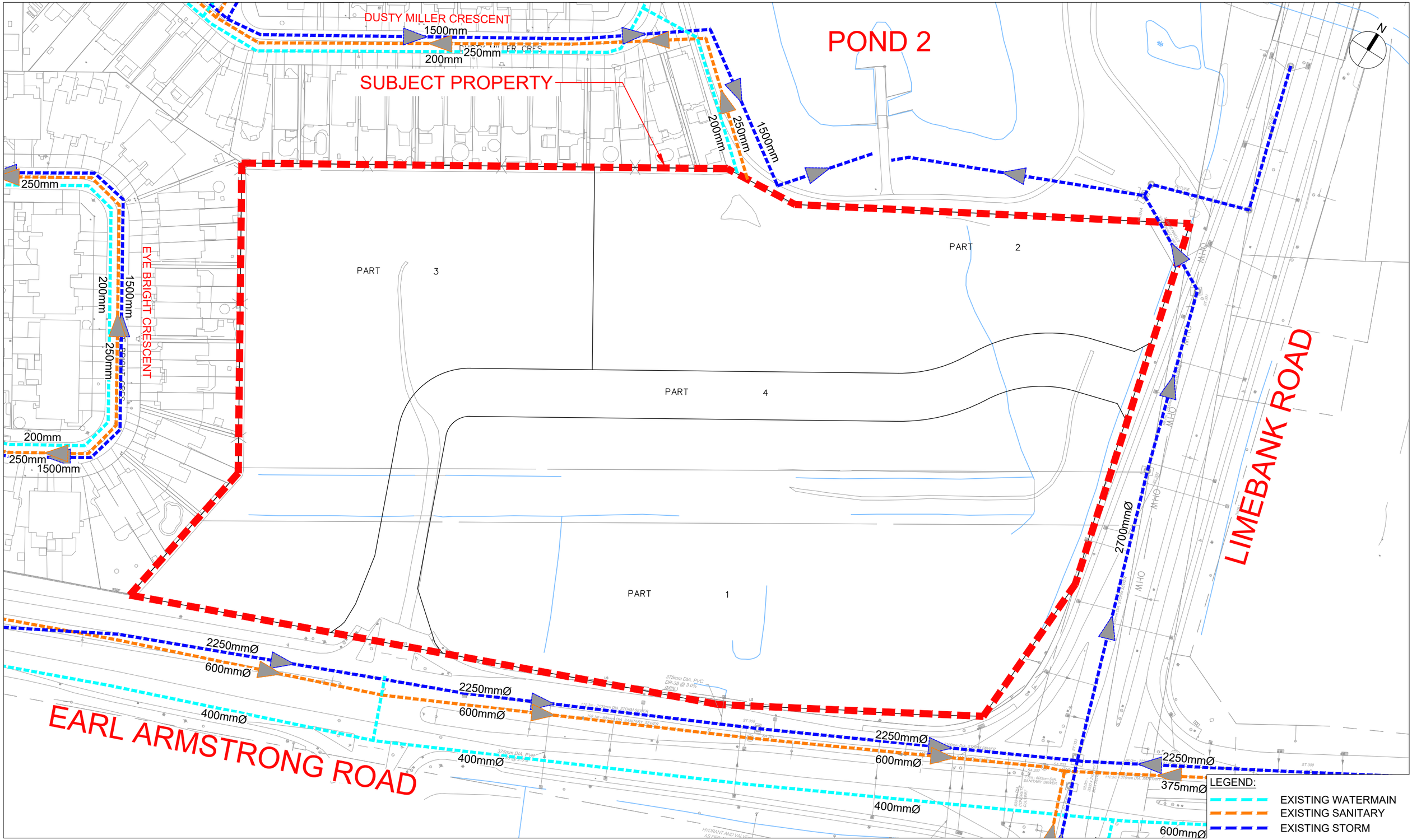
1515 - EARL ARMSTRONG PLAZA | 2022/12/15

Site Plan

Urbandale CORPORATION

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

IBI



Scale: N.T.S.

Project Title: EARL ARMSTRONG/LIMEBANK PLAZA

Drawing Title: LOCATION OF EXISTING INFRASTRUCTURE

Sheet No.: 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

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

LEITRIM ROAD REALIGNMENT
NOUVEAU TRACÉ DU CHEMIN LEITRIM

BOWESVILLE

Airport Operating Influence Zone
Zone d'influence d'exploitation de l'aéroport

Vimy Memorial Bridge /
Pont commémoratif Vimy

SPRATT

SHORELINE

CANYON WALK

EARL ARMSTRONG

MAIN STREET/
RUE PRINCIPALE

ruisseau Mosquito Creek

COLLECTOR/
COLLECTRICE 'F'

COLLECTOR/
COLLECTRICE 'G'

COLLECTOR/
COLLECTRICE 'H'

SPRATT ROAD EXTENSION/
PROLONGEMENT DE CHEMIN SPRATT

COLLECTOR/
COLLECTRICE 'I'

RIVIÈRE RIDEAU RIVER

RIDEAU RIVER

SPRATT

COLLECTOR/
COLLECTRICE 'J'

COLLECTOR/
COLLECTRICE 'A'

COLLECTOR/
COLLECTRICE 'B'

COLLECTOR/
COLLECTRICE 'C'

LIMEBANK

COLLECTOR/
COLLECTRICE 'D'

COLLECTOR/
COLLECTRICE 'E'

Town Centre Boundary
Limite du centre ville

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:

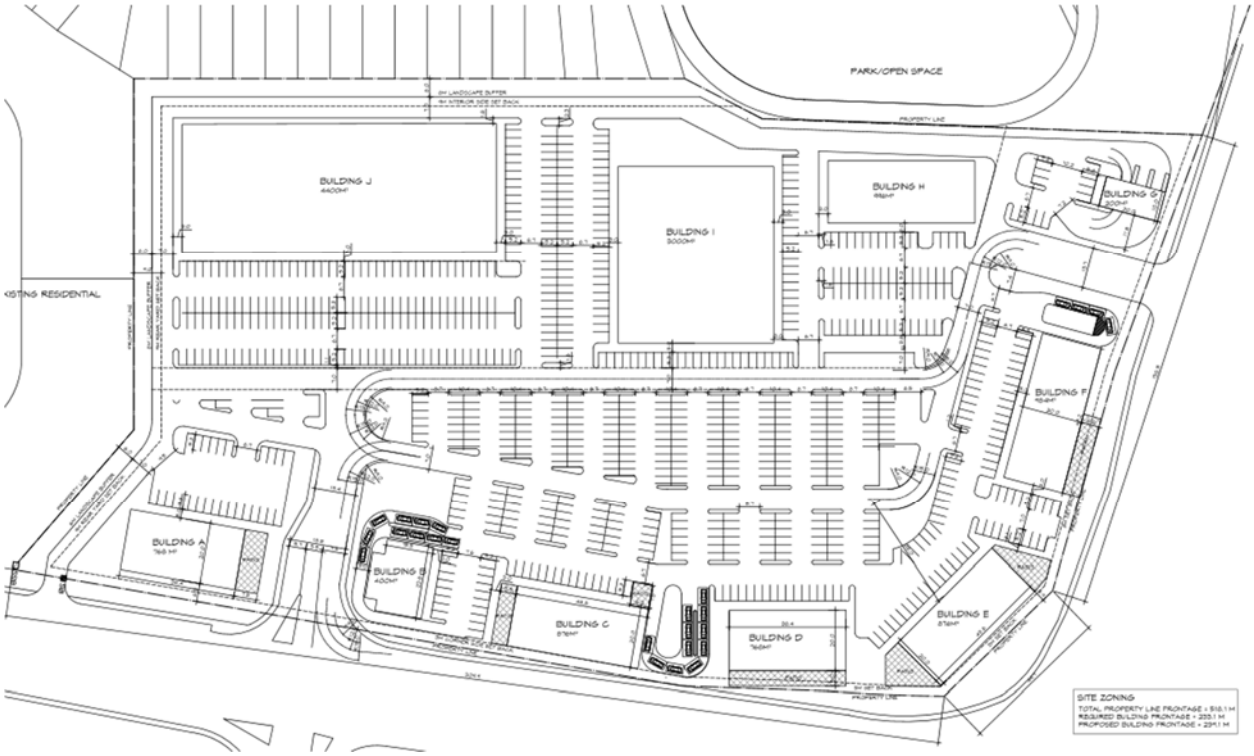
- Christa Jones, Urbandale
- Marcel Denomme, Urbandale
- Roger Tuttle, Urbandale
- Michele Dredge, Architect
- Jamie Batchelor, RVCA
- Josianne Gervais (Transportation Project Manager, City of Ottawa)
- Natasha Baird (Project Manager, City of Ottawa)
- Christopher Moise (Urban Designer, Architect, City 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
PROPERTY LINE
BUILDING J
4400M²
BUILDING I
5000M²
BUILDING H
BUILDING G
BUILDING F
BUILDING A
BUILDING B
400M²
BUILDING C
BUILDING D
BUILDING E
SITE ZONING
TOTAL PROPERTY LINE FRONTAGE = 510.1 M
REQUIRED BUILDING FRONTAGE = 255.1 M
PROPOSED BUILDING FRONTAGE = 259.1 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):**

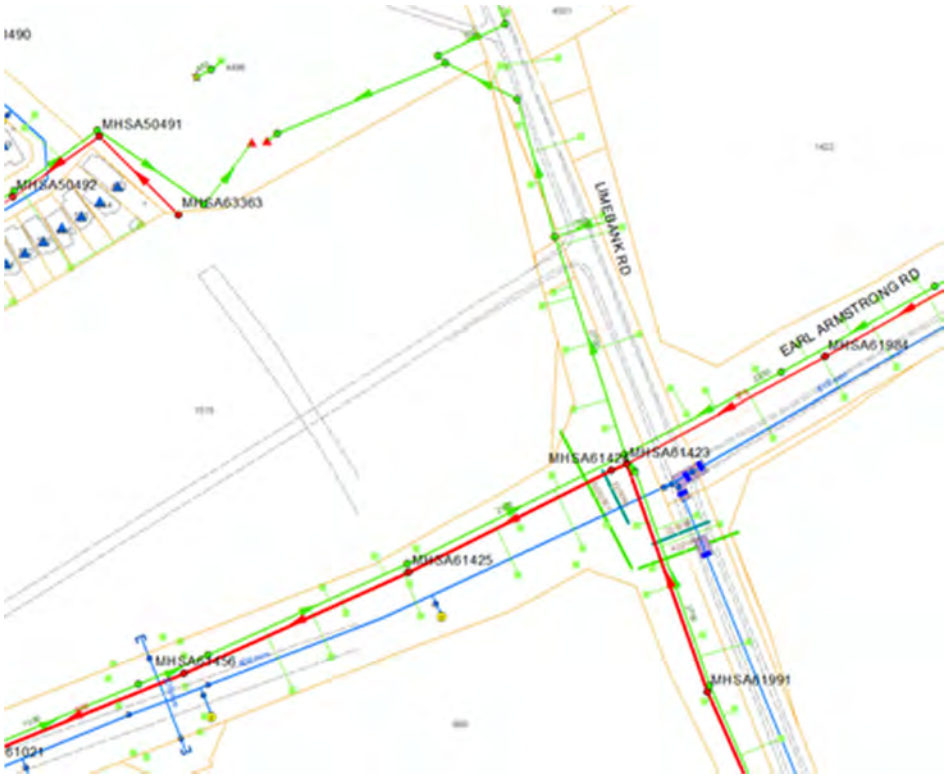
Water

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.

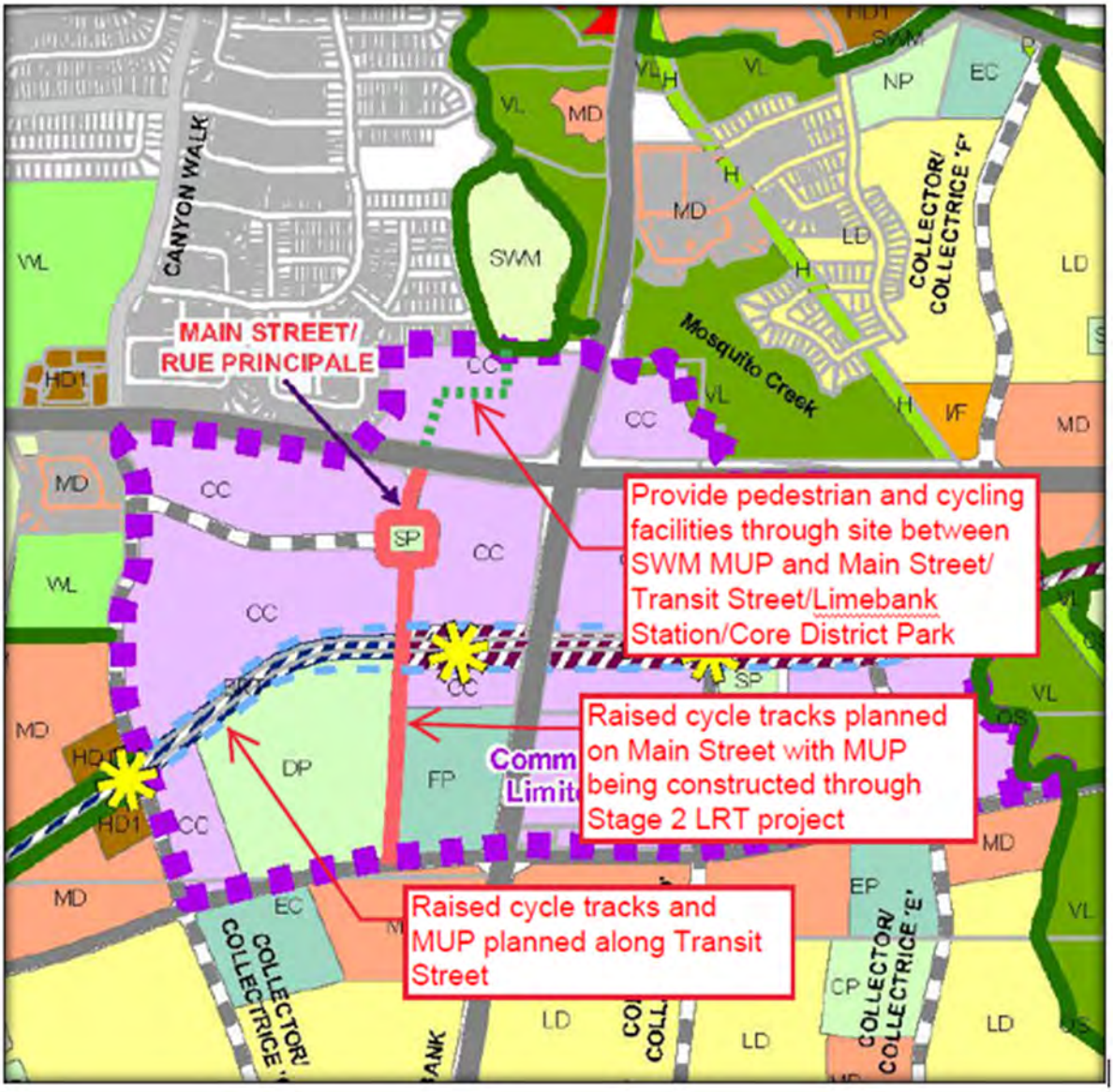
    b. The parkland dedication requirement for the proposed site plan application is approximately 0.123 ha as calculated below. In the event that the proposed land use changes or the gross land area of the site changes, the parkland dedication requirement will also change.

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

Key Policy Objectives for the City of Ottawa – as of December 2019

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			1.0 ordinary
				0.8 non-combustile
F	10,651	l/min		0.6 fire-resistive
use	11,000	l/min		

Occupancy Adjustment

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

Sprinkler Adjustment

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

Please complete FUS Classification Declaration memo and return with next submission

Exposure Adjustment

Building Face	Separation (m)	Adjacent Exposed Wall			Exposure Charge *
		Length	Stories	L*H Factor	
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			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	-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

WATER MODEL 1515 EARL ARMSTONG PLAZA

Boundary Condition 2

C-2

J8

J7

J16

J9

FH8

J12

FH7

J15

J4

FH2

J14

J6

FH4

J5

FH3

Limebank Road

FH5

J10

FH6

J11

J13

J3

FH1

J2

J1

C-1

Boundary Condition 1

Eye Bright Crescent

Earl Armstrong Road

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

386.45 kPa

385.47 kPa

391.38 kPa

389.96 kPa

388.04 kPa

386.94 kPa

384.98 kPa

384.00 kPa

385.82 kPa

383.96 kPa

384.68 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
551.21 kPa
551.21 kPa
551.21 kPa
552.68 kPa
549.25 kPa
546.80 kPa
544.84 kPa
542.39 kPa
545.82 kPa
550.23 kPa
549.25 kPa
550.72 kPa
551.70 kPa
547.78 kPa
546.80 kPa
548.27 kPa
546.31 kPa
545.33 kPa

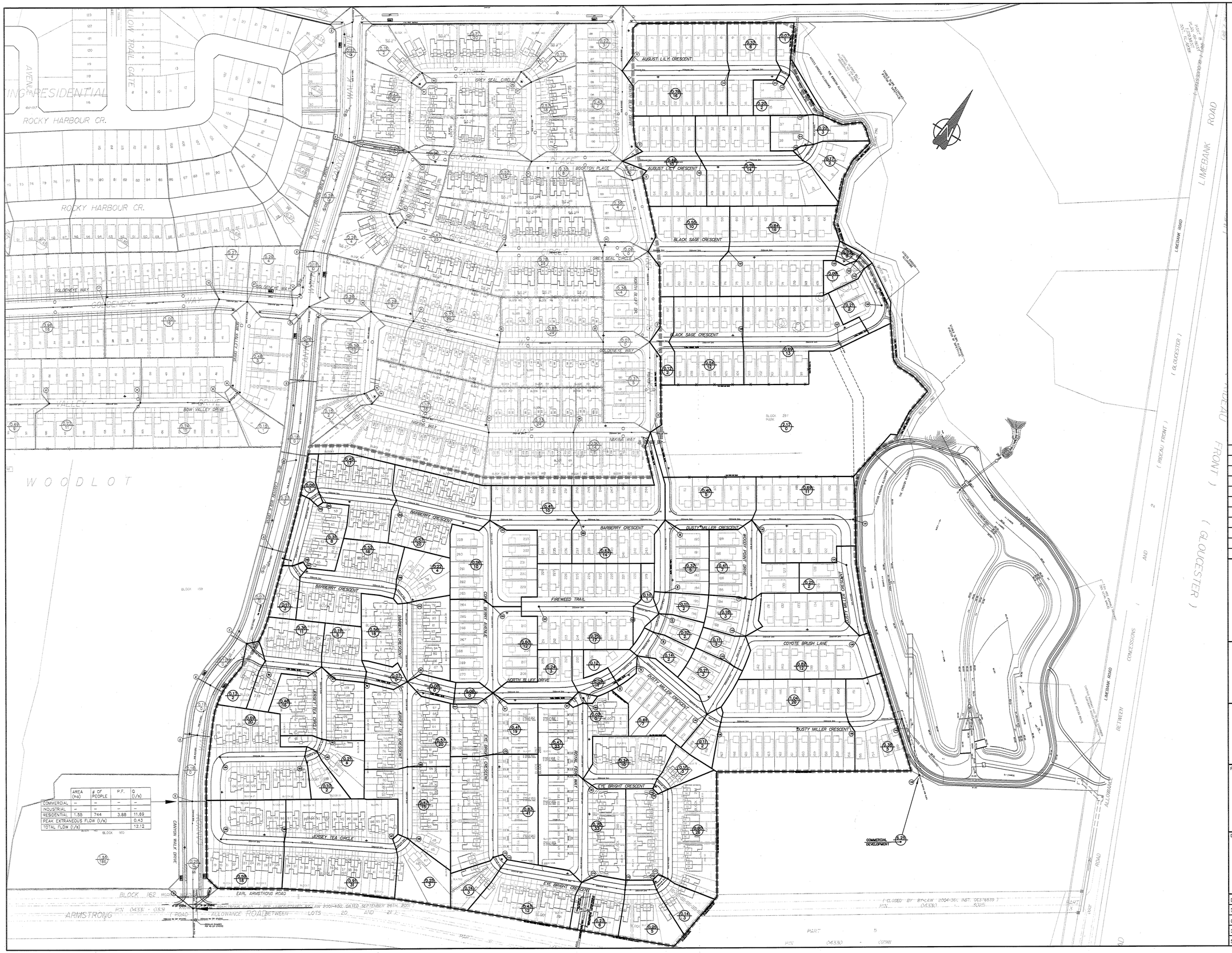
		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
1	☐	FH1	0.00	92.90	148.70	546.79
2	☐	FH2	0.00	92.40	148.70	551.69
3	☐	FH3	0.00	92.65	148.70	549.24
4	☐	FH4	0.00	93.00	148.70	545.81
5	☐	FH5	0.00	92.80	148.70	547.77
6	☐	FH6	0.00	92.75	148.70	548.26
7	☐	FH7	0.00	92.45	148.70	551.20
8	☐	FH8	0.00	92.45	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

322.39 kPa
323.37 kPa
320.43 kPa
318.96 kPa
318.96 kPa
320.43 kPa
318.96 kPa
317.00 kPa
314.55 kPa
312.58 kPa
310.15 kPa
313.57 kPa
317.98 kPa
317.00 kPa
318.96 kPa
318.47 kPa
319.45 kPa
315.53 kPa
314.55 kPa
316.02 kPa
314.06 kPa
313.08 kPa

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
- (23) SANITARY SEWER & MANHOLE
- 113 LOT NUMBER
- DRAINAGE BOUNDARY
- 0.35 / 7 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
JAN 16, 2007
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.: D2-SAN
CHECKED: L.D.	
DATE: AUDUST 2005	JOB NO.: 18418-04
SCALE: 1:1500	

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 = 6.28 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. #		RESIDENTIAL									COMMERCIAL			R+C		SEWER DATA					UPSTREAM					DOWNSTREAM				REMARKS
				NUMBER OF UNITS					CUMMULATIVE		PEAKING	POPUL.																			
		FROM	TO	SING.	Stacks	Towns	POPUL. people	AREA ha	POPUL. people	AREA ha	FACTOR	FLOW l/s	AREA ha	CUMM. AREA l/s	COMM. FLOW l/s	PEAK EXTR. FLOW l/s	PEAK DES. FLOW l/s	DIA. mm	SLOPE %	CAPAC. l/s	VEL. m/s (full)	LENGTH m	Center Line	Obvert Drop	Obvert	Invert	Cover	Center Line	Obvert	Invert	Cover	
EASEMENT		146	145								4.00		6.49	6.49	5.63	1.82	7.45	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	5			17	0.38	17	0.38	4.00	0.20		6.49	5.63	1.92	7.83	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	20			68	1.04	85	1.42	4.00	1.38		6.49	5.63	2.21	9.23	250	0.40	39.26	0.77	119.20	92.03		88.468	88.238	3.54	92.16	88.011	87.761	4.15	
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	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	7			24	0.41	24	0.41	4.00	0.39				0.11	0.50	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	3			10	0.18	34	0.59	4.00	0.55				0.17	0.72	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	2			7	0.25	7	0.25	4.00	0.11				0.07	0.18	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	12			41	0.82	48	1.07	4.00	0.77				0.30	1.07	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	2			7	0.11	88	1.77	4.00	1.43				0.50	1.93	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	3			10	0.21	99	1.98	4.00	1.60				0.55	2.15	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)	7			24	0.44	214	3.95	4.00	3.47		6.49	5.63	2.92	12.03	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	1			3	0.12	218	4.07	4.00	3.53		6.49	5.63	2.96	12.12	250	0.40	39.24	0.77	28.70	92.35	0.06	87.462	87.212	4.89	92.15	87.343	87.093	4.81	
NORTH BLUFF DRIVE	4	92	93	1			3	0.09	221	4.16	4.00	3.58		6.49	5.63	2.98	12.20	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			5	14	0.25	14	0.25	4.00	0.22				0.07	0.29	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			6	16	0.23	30	0.48	4.00	0.48				0.13	0.62	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			12	32	0.43	32	0.43	4.00	0.53				0.12	0.65	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		22	11	89	0.79	151	1.61	4.00	2.45				0.45	2.90	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	178	177			3	8	0.14	8	0.14	4.00	0.13				0.04	0.17	200	0.65	27.59	0.85	14.60	92.65		89.200	89.000	3.45	92.70	88.105	88.905	3.59	
EYEBRIGHT CRESCENT	4	177	178			26	70	0.80	78	0.94	4.00	1.27				0.26	1.53	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			3	8	0.11	86	1.05	4.00	1.40				0.29	1.69	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			10	27	0.34	113	1.39	4.00	1.84				0.39	2.23	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		18	5	62	0.47	327	3.47	4.00	5.29				0.97	6.27	250	0.40	39.24	0.77	71.00	92.55		87.937	87.687	4.61	92.26	87.693	87.403	4.61	
ROYAL FERN WAY	4	160	93					0.02	327	3.49	4.00	5.29				0.98	6.27	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			3	8	0.24	556	7.89	3.95	8.89		6.49	5.63	4.03	18.55	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	11			37	0.69	37	0.69	4.00	0.61				0.19	0.80	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	89	5			17	0.40	54	1.09	4.00	0.88				0.31	1.19	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	2			7	0.14	7	0.14	4.00	0.11				0.04	0.15	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	2			7	0.10	14	0.24	4.00	0.22				0.07	0.29	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	17			58	0.75	58	0.75	4.00	0.94				0.21	1.15	200	0.65	27.59	0.85	86.50	92.19		89.965	89.765	2.22	92.19	89.390	89.190	2.80	
FIREWEED TRAIL	4	222	223	1			3	0.10	61	0.85	4.00	0.99				0.24	1.23	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	2			7	0.11	82	1.20	4.00	1.32				0.34	1.66	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	5			17	0.32	99	1.52	4.00	1.60				0.43	2.02	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	14			48	0.63	201	3.24	4.00	3.25				0.91	4.16	250	0.40	39.24	0.77	80.50	92.45	0.05	88.629	88.579	3.62	92.42	88.507	88.257	3.91	
BARBERRY CRESCENT	4	200	201	10			34	0.41	235	3.65	4.00	3.80				1.02	4.82	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			17	46	0.45	46	0.45	4.00	0.74				0.13	0.87	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			20	54	0.57	100	1.02	4.00	1.62				0.29	1.90	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

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

Typical Comment: Street 1 does not contribute to commercial flow...only infiltration. Please revise.

SANITARY SEWER DESIGN SHEET

1515 Earl Armstrong Plaza
CITY OF OTTAWA
Urbandale Corporation

LOCATION				RESIDENTIAL										ICI AREAS						INFILTRATION ALLOWANCE			FIXED FLOW (L/s)		TOTAL FLOW	PROPOSED SEWER DESIGN						
				AREA w/ Units (Ha)	UNIT TYPES				AREA w/o Units (Ha)	POPUL				ONAL		AREA (Ha)				ICI PEAK FACTOR	PEAK FLOW (L/s)	AREA (Ha)		FLOW				CAPACITY	LENGTH	DIA	SLOPE	VELOCITY (full)	AVAILABLE CAPACITY	
STREET	AREA ID	FROM MH	TO MH		SF	TH/SD	1 Bed APT	2 Bed APT		IND		FACTOR	(L/s)	IND	CUM	COMMERCIAL IND	COMMERCIAL CUM	INDUSTRIAL IND	INDUSTRIAL CUM			IND	CUM	(L/s)	IND	CUM	(L/s)	(L/s)	(m)	(mm)	(%)	(m/s)	L/s	(%)
Part 3		BLDG K	MH100A							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	18.72	200	1.00	1.055	33.89	99.05%
Part 1		BLDG B	MH100A							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	18.90	200	1.00	1.055	33.96	99.24%
Street 1	MH100A	MH100A	MH101A							0.0	0.00	3.80	0.00			0.11	0.83			1.50	0.40	0.11	0.83	0.27		0.00	0.68	27.59	68.44	200	0.65	0.851	26.91	97.54%
Part 3		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		SAN CB	52A-54A							0.0	0.00	3.80	0.00			0.00	0.00			1.00	0.00	0.00	0.00	0.00		0.00	0.00	34.22	4.83	200	1.00	1.055	34.22	100.00%
Part 3		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	27.59	102.92	200	0.65	0.851	26.77	97.04%
Part 3		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	27.59	59.15	200	0.65	0.851	26.53	96.18%
Street 1	MH101A	MH101A	MH102A							0.0	0.00	3.80	0.00			0.02	2.14			1.50	1.04	0.02	2.14	0.71		0.00	1.75	27.59	13.72	200	0.65	0.851	25.84	93.67%
Street 1	MH102A	MH102A	MH103A							0.0	0.00	3.80	0.00			0.08	2.22			1.50	1.08	0.08	2.22	0.73		0.00	1.81	27.59	44.52	200	0.65	0.851	25.77	93.43%
Street 1	MH103A	MH103A	MH104A							0.0	0.00	3.80	0.00			0.14	2.36			1.50	1.15	0.14	2.36	0.78		0.00	1.93	27.59	84.25	200	0.65	0.851	25.66	93.02%
Part 1		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		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		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		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		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		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	27.59	52.30	200	0.65	0.851	27.18	98.52%
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	27.59	30.93	200	0.65	0.851	26.63	96.54%
Part 1	MH112A	MH112A	MH104A							0.0	0.00	3.80	0.00			0.10	2.23			1.50	1.08	0.10	2.23	0.74		0.00	1.82	27.59	49.30	200	0.65	0.851	25.77	93.40%
Part 2		BLDG H	MH107A							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	12.63	200	1.00	1.055	34.04	99.48%
Street 1	MH107A	MH107A	MH106A							0.0	0.00	3.80	0.00			0.06	0.28			1.50	0.14	0.06	0.28	0.09		0.00	0.23	27.59	23.45	200	0.65	0.851	27.36	99.17%
Street 1	MH106A	MH106A	MH105A							0.0	0.00	3.80	0.00			0.25	0.53			1.50	0.26	0.25	0.53	0.17		0.00	0.43	27.59	53.38	200	0.65	0.851	27.15	98.43%
Street 1	MH105A	MH105A	MH104A							0.0	0.00	3.80	0.00			0.07	0.60			1.50	0.29	0.07	0.60	0.20		0.00	0.49	27.59	42.15	200	0.65	0.851	27.10	98.22%
Part 2	BLDG 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	16.20	200	1.00	1.055	34.05	99.50%
Part 2		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	10.50	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	5.85			1.50	2.84	0.21	5.85	1.93		0.00	4.77	27.59	56.16	200	0.65	0.851	22.81	82.69%
Part 2 (Easement)	MH108A	MH108A	EXMHSAN							0.0	0.00	3.80	0.00			0.29	6.14			1.50	2.98	0.29	6.14	2.03		0.00	5.01	27.59	31.69	200	0.65	0.851	22.58	81.84%
																														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

File Reference: 137404-6.04.04
Date: 2022-12-16
Sheet No: 1 of 1

LEGEND

SANITARY TRIBUTARY OUTLINE

BLK H 0.22 — AREA IDENTIFICATION / AREA IN HECTARES

Project North

CLIENT

Urbandale CORPORATION

ISSUES

No.	DESCRIPTION	DATE
1	SUBMISSION 1 FOR CITY REVIEW	2022:12:16

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 22/12/16 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	ISSUE
400	1

CITY FILE No. D07-xx-xx-xxxx

CITY PLAN No. xxxxx

File Location: J:\137404_Earl_Armstro\7.0_Production\7.03_Design\04_Civil\Sheets\400 SANITARY TRIBUTARY AREA PLAN.dwg Last Saved: December 16, 2022 by Ehenrie Plotted: Friday, December 16, 2022 3:32:30 PM by Eric Henrie

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
- 137404-001 – General Plan
- 137404-200 – Grading Plan
- 137404-600 – Ponding Plan
- 137404-500 – Storm Drainage Area 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
- AREA IN HECTARES
- 0.31 | 0.45 — RUNOFF COEFFICIENT
- 586–585 — PIPE REACH, UPSTREAM MANHOLE TO DOWNSTREAM MANHOLE

7 ICD'S @ 20L/S EACH

2700mmø STORM SEWER EAST OF POND #2

COMMERCIAL 27 ICD'S @ 20L/S EACH TO 2700mmø STORM SEWER EAST OF POND #2

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 16/1/2007 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\18418D4 C D-ST.dwg

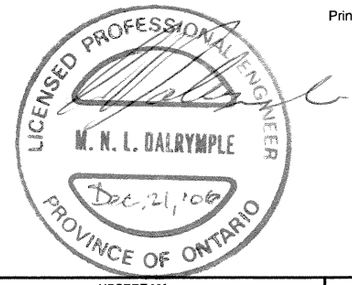
STORM DRAINAGE PLAN

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

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

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		AREAS (ha)								1:5 YR PEAK FLOW GENERATION					SEWER DATA						UPSTREAM					DOWNSTREAM			
		From	To	0.20	0.30	0.45	0.50	0.55	0.60	0.70	0.80	2.78AR	2.78AR CUMM	Time min	Intens. mm/hr	Peak Flow (l/s)	Dia (mm)	Slope %	Q full (l/s)	V full (m/s)	Length (m)	Flow Time (min)	Pr. Center Line	Obvert Drop	Obvert	Invert	Cover	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

Typical Comment:
Note: Report says roof drain for Building B is controlled and connecting to internal building plumbing. If that's the case then the 100 year flow needs to be considered to size sewers appropriately. Irregardless, roof drains should not flow uncontrolled into the minor system. Please revise.

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

STORM SEWER DESIGN SHEET

1515 Earl Armstrong Plaza
CITY OF OTTAWA
Urbandale Corporation

LOCATION				AREA (Ha)																				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	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	r PEAK OW (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	BLDGK	BLDG K	MH100										0.08	0.20	0.20	10.00	0.23	10.23	76.81	104.19	122.14	178.56	15.37	20.86	24.45	35.74	0.00	0.00	15.37	62.04	17.21	250			1.00	1.224	46.67	75.2%
Part 1	BLDGB	BLDG B	MH100										0.05	0.13	0.13	10.00	0.28	10.28	76.81	104.19	122.14	178.56	9.61	13.03	15.28	22.34	0.00	0.00	9.61	62.04	20.40	250			1.00	1.224	52.43	84.5%
Street 1		MH100	MH119											0.00	0.33	10.28	0.53	10.80	75.75	102.75	120.44	176.06	24.64	33.42	39.17	57.27	0.00	0.00	24.64	147.47	40.80	375			0.65	1.293	122.83	83.3%
Part 3	MH50	MH50	MH51		0.03								0.10	0.27	0.27	10.00	0.48	10.48	76.81	104.19	122.14	178.56	20.82	28.24	33.11	48.40	0.00	0.00	20.82	81.33	31.94	300			0.65	1.115	60.52	74.4%
Part 3	MH52	MH52	MH51										0.29	0.73	0.73	10.00	1.33	11.33	76.81	104.19	122.14	178.56	55.73	75.60	88.62	129.56	0.00	0.00	55.73	147.47	102.92	375			0.65	1.293	91.74	62.2%
Part 3	MH51	MH51	MH51B								0.19		0.11	0.64	1.64	11.33	0.51	11.84	72.06	97.67	114.46	167.28	118.30	160.34	187.90	274.61	0.00	0.00	118.30	239.80	44.76	450			0.65	1.461	121.50	50.7%
Part 3		MH51B	MH119											0.00	1.64	11.84	0.10	11.94	70.41	95.40	111.78	163.35	115.58	156.60	183.50	268.15	0.00	0.00	115.58	239.80	8.64	450			0.65	1.461	124.22	51.8%
Street 1	MH119	MH119	MH101							0.05		0.17		0.47	2.44	11.94	0.36	12.29	70.09	94.97	111.28	162.61	170.70	231.28	271.01	396.00	0.00	0.00	170.70	361.72	34.69	525			0.65	1.619	191.02	52.8%
Part 3	CB01	CB01	MH54										0.04	0.10	0.10	10.00	0.93	10.93	76.81	104.19	122.14	178.56	7.69	10.43	12.22	*17.87*	0.00	0.00	*17.87*	50.02	54.89	250			0.65	0.987	32.15	64.3%
Part 3	BLDGL	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		MH54	MH101	0.08										0.04	0.77	10.93	0.72	11.64	73.42	99.54	116.66	170.51	56.54	76.65	89.84	131.30	0.00	0.00	56.54	81.33	48.01	300			0.65	1.115	24.80	30.5%
Street 1		MH101	MH102											0.00	3.21	12.29	0.14	12.43	69.00	93.46	109.51	160.00	221.16	299.59	351.01	512.87	0.00	0.00	221.16	361.72	13.49	525			0.65	1.619	140.56	38.9%
Street 1	MH102	MH102	MH103									0.10		0.22	3.43	12.43	0.49	12.92	68.58	92.89	108.84	159.02	235.07	318.41	373.06	545.07	0.00	0.00	235.07	361.72	47.35	525			0.65	1.619	126.65	35.0%
Street 1	MH103	MH103	MH104							0.01		0.15		0.35	3.78	12.92	0.87	13.79	67.16	90.94	106.54	155.65	253.82	343.72	402.67	588.27	0.00	0.00	253.82	361.72	84.24	525			0.65	1.619	107.90	29.8%
Part 1	CBMH59	CBMH59	MH60								0.05		0.21	0.62	0.62	10.00	0.28	10.28	76.81	104.19	122.14	178.56	47.83	64.88	76.06	111.19	0.00	0.00	47.83	147.47	21.49	375			0.65	1.293	99.64	67.6%
Part 1	MH60	MH60	MH60B								0.06	0.12	0.37	1.31	1.93	10.28	0.82	11.10	75.76	102.75	120.45	176.07	146.37	198.53	232.71	340.18	0.00	0.00	146.37	361.72	79.48	525			0.65	1.619	215.35	59.5%
Part 1		MH60B	MH112											0.00	1.93	11.10	0.08	11.17	72.84	98.74	115.72	169.13	140.74	190.78	223.59	326.78	0.00	0.00	140.74	361.72	7.62	525			0.65	1.619	220.98	61.1%
Part 1	BLDGC	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	0.83	10.95	76.35	103.56	121.40	177.47	17.19	23.32	27.34	39.96	0.00	0.00	17.19	50.02	49.10	250			0.65	0.987	32.83	65.6%
Part 1	BLDGF	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	0.79	10.95	76.18	103.33	121.13	177.07	20.97	28.44	33.34	48.73	0.00	0.00	20.97	50.02	46.52	250			0.65	0.987	29.05	58.1%
Part 1	BLDGE	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	BLDGD	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	10.95	0.93	11.88	73.34	99.43	116.53	170.32	50.77	68.83	80.67	117.90	0.00	0.00	50.77	81.33	62.23	300			0.65	1.115	30.57	37.6%
Part 1		MH113	MH112											0.00	0.92	11.88	0.45	12.33	70.27	95.21	111.56	163.02	64.46	87.35	102.35	149.56	0.00	0.00	64.46	81.33	30.27	300			0.65	1.115	16.87	20.7%
Part 1	MH61	MH61	MH62				0.03		0.13				0.15	0.63	0.63	10.00	0.30	10.30	76.81	104.19	122.14	178.56	48.04	65.17	76.40	111.69	0.00	0.00	48.04	147.47	23.02	375			0.65	1.293	99.43	67.4%
Part 1	MH62	MH62	MH62B										0.45	1.13	1.75	10.30	0.65	10.94	75.68	102.65	120.33	175.89	132.55	179.78	210.74	308.06	0.00	0.00	132.55	361.72	62.80	525			0.65	1.619	229.16	63.4%
Part 1		MH62B	MH112											0.00	1.75	10.94	0.05	10.99	73.36	99.46	116.57	170.37	128.49	174.20	204.16	298.39	0.00	0.00	128.49	361.72	5.00	525			0.65	1.619	233.23	64.5%
Part 1		MH112	MH111											0.00	4.60	12.33	0.24	12.57	68.88	93.30	109.31	159.72	316.89	429.26	502.94	734.85	0.00	0.00	316.89	707.01	27.68	675			0.65	1.914	390.12	55.2%
Part 1	BLDGA	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	BLDGG	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	5.24	12.57	0.19	12.76	68.16	92.31	108.16	158.02	356.98	483.50	566.46	827.62	0.00	0.00	356.98	707.01	21.61	675			0.65	1.914	350.03	49.5%
Part 2	BLDGH	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	3.84	62.04	11.17	250			1.00	1.224	58.20	93.8%
Street 1		MH107	MH106											0.00	0.05	10.15	0.36	10.51	76.23	103.40	121.20	177.18	3.81	5.17	6.07	8.87	0.00	0.00	3.81	81.33	23.93	300			0.65	1.115	77.52	95.3%
Street 1	MH106	MH106	MH105								0.01	0.14		0.33	0.38	10.51	0.80	11.31	74.90	101.57	119.06	174.03	28.53	38.69	45.34	66.28	0.00	0.00	28.53	81.33	53.53	300			0.65	1.115	52.81	64.9%
Street 1	MH105	MH105	MH104								0.02	0.09		0.24	0.62	11.31	0.59	11.90	72.12	97.75	114.55	167.41	44.71	60.60	71.01	103.78	0.00	0.00	44.71	81.33	39.15	300			0.65	1.115	36.63	45.0%
Part 2	BLDGJ	BLDG J	104-108										0.06	0.15	0.15	10.00	0.24	10.24	76.81	104.19	122.14	178.56	11.53	15.64	18.34	26.81	0.00	0.00	11.53	62.04	17.71	250			1.00	1.224	50.51	81.4%
Part 2	BLDGI	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	8.99	250			1.00	1.224	38.98	62.8%
Part 2 (Easement)		MH104	MH108											0.00	10.09	13.79	0.46	14.24	64.79	87.69	102.72	150.04	653.54	884.60	1036.15	1513.46	0.00	0.00	653.54	936.36	56.17	750			0.65	2.053	282.82	30.2%
Part 2	MH58	MH58	MH58B								0.11	0.14	0.16	0.93	0.93	10.00	0.95	10.95	76.81	104.19	122.14	178.56	71.10	96.46	113.07	165.30	0.00	0.00	71.10	239.80	83.07	450			0.65	1.461	168.70	70.3%
Part 2		MH58B	MH108											0.00	0.93	10.95	0.08	11.02	73.35	99.44	116.54	170.33	67.90	92.05	107.89	157.69	0.00	0.00	67.90	239.80	6.72	450			0.65	1.461	171.90	71.7%
Part 2 (Easement)		MH108	EX STM											0.00	11.01	14.24	0.19	14.43	63.62	86.09	100.83	147.26	700.59	948.08	1110.42	1621.80	0.00	0.00	700.59	936.36	23.11	750			0.65	2.053	235.77	25.2%
Part 2	MH56	MH56	MH57										0.94	2.35	2.35	10.00	0.75	10.75	76.81	104.19	122.14	178.56	180.64	245.05	287.26	419.95	0.00	0.00	180.64	516.44	79.22	600			0.65	1.769	335.80	65.0%
Part 2		MH57	EX STM	0.12										0.07	2.42	10.75	0.18	10.93	74.05	100.41	117.69	172.01	179.11	242.85	284.64	416.03	0.00	0.00	179.11	516.44	19.25	600			0.65	1.769	337.33	65.3%

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

File Reference: 137404-6.04.04
Date: 2022-12-16
Sheet No: 1 of 1

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PROJECT: Earl Armstrong Plaza
DATE: 2022-12-08
FILE: 137404.6.04.04
REV #: 1
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
Taken from Table 4.2 Summary of Minor System Capture During 100 Year 3 Hour Chicago Storm
Assessment of Adequacy of Public Services 1515 Earl Armstrong Plaza Riverside South Report by IBI Group dated May 2022

Part 1	609.00
Part 2	313.00
Part 3	394.00
Q_{TOTAL} =	1316.00 L/s

It appears that the total peak flow in the model is 1147 l/s. Please clarify.

Section 4.6.3 states that the 12 hour SCS is more restrictive. Why is the 12 hour CHI used here? Please clarify.

It appears that these flow do not match the SWM model that was submitted with the application. For example, PART 1 is 531 l/s. Please clarify.

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

C =	0.39
T_c =	10 min
i_{100yr} =	178.56 mm/hr
$A_{uncontrolled}$ =	0.36 Ha
$Q_{unN+E+S}$ =	69.69 L/s

Uncontrolled Release to Street 1 ($Q_{unSTREET1} = 2.78*C*i_{100yr}*A_{uncontrolled}$)

C =	0.70
T_c =	10 min
i_{100yr} =	178.56 mm/hr
$A_{uncontrolled}$ =	0.09 Ha
$Q_{unSTREET1}$ =	31.27 L/s

Uncontrolled Release CB65 ($Q_{un65} = 2.78*C*i_{100yr}*A_{uncontrolled}$)

C =	0.70
T_c =	10 min
i_{100yr} =	178.56 mm/hr
$A_{uncontrolled}$ =	0.06 Ha
Q_{un65} =	20.85 L/s

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

C =	0.80
T_c =	10 min
i_{100yr} =	178.56 mm/hr
$A_{uncontrolled}$ =	0.07 Ha
Q_{un111} =	27.80 L/s

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

C =	0.90
T_c =	10 min
i_{100yr} =	178.56 mm/hr
$A_{uncontrolled}$ =	0.07 Ha
Q_{unBH} =	31.27 L/s

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

$Q_{uncontrolled}$ =	180.89 L/s

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

$Q_{max\ allowable}$ =	1135.11 L/s

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

Drainage Area	***MH51B****	CB50, CB52A, CB52B, CB52C, CB51, CB54	
Area (Ha)	0.61	ICD Flowrate (L/s) =	115.00
C =	1.00	Effective Restricted Flow Q_r (L/s)=	57.50

100-Year Ponding

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)
23	109.68	186.00	57.50	128.50	177.33
25	103.85	176.10	57.50	118.60	177.91
26	101.18	171.58	57.50	114.08	**177.97**
27	98.66	167.31	57.50	109.81	177.89
29	94.01	159.43	57.50	101.93	177.36

100Yr +20%

100YRQp 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m3)
205.90	148.40	**231.50**

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance	100+20 Overflow	100+20 Required	100+20 Balance
0.00	177.97	67.39	113.56	**0.00**	0.00	231.50	164.11

overflows to: W Swale

Drainage Area	***MH57***	CB56A, CB56B, CB56C, CB56D, CB56E	
Area (Ha)	0.94	ICD Flowrate (L/s) =	265.00
C =	1.00	Effective Restricted Flow Q_r (L/s)=	132.50

100-Year Ponding

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)
15	142.89	373.41	132.50	240.91	216.82
17	132.63	346.59	132.50	214.09	218.37
18	128.08	334.71	132.50	202.21	**218.38**
19	123.87	323.69	132.50	191.19	217.96
21	116.30	303.91	132.50	171.41	215.97

100Yr +20%

100YRQp 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m3)
401.65	269.15	**290.68**

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance	100+20 Overflow	100+20 Required	100+20 Balance
0.00	218.38	164.65	57.83	**0.00**	0.00	290.68	126.03

overflows to: N Swale

Drainage Area	***MH51B****		
Area (Ha)	0.61		
C =	0.87	Restricted Flow Q_r (L/s)=	57.50

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)
7	90.66	133.76	57.50	76.26	32.03
9	80.87	119.32	57.50	61.82	33.38
10	76.81	113.31	57.50	55.81	**33.49**
11	73.17	107.95	57.50	50.45	33.30
13	66.93	98.74	57.50	41.24	32.17

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	33.49	67.39	113.56	0.00

overflows to: W Swale

Drainage Area	***MH57***		
Area (Ha)	0.94		
C =	0.86	Restricted Flow Q_r (L/s)=	132.50

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)
3	121.46	272.97	132.50	140.47	25.28
5	103.57	232.76	132.50	100.26	30.08
6	96.64	217.18	132.50	84.68	**30.49**
7	90.66	203.75	132.50	71.25	29.93
9	80.87	181.75	132.50	49.25	26.60

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	30.49	164.65	57.83	0.00

overflows to: N Swale

Drainage Area	MH58B*	CB58A, CB58B, CB58C, CB58D
Area (Ha)	0.41	ICD Flowrate (L/s) = 128.00
C =	1.00	Effective Restricted Flow Q_r (L/s)= 64.00

100-Year Ponding

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)
13	155.11	176.79	64.00	112.79	87.98
15	142.89	162.87	64.00	98.87	88.98
16	137.55	156.78	64.00	92.78	**89.07**
17	132.63	151.17	64.00	87.17	88.91
19	123.87	141.19	64.00	77.19	87.99

100Yr +20%

100YRQp 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m3)
188.13	124.13	**119.17**

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	89.07	39.16	50.3	**0.00**

100+20

Overflow	Required	Balance
0.00	119.17	80.01

overflows to: OUT

Drainage Area	MH58B*	
Area (Ha)	0.41	
C =	0.81	Restricted Flow Q_r (L/s)= 64.00

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	123.10	64.00	59.10	7.09
4	111.72	103.15	64.00	39.15	9.40
5	103.57	95.62	64.00	31.62	**9.49**
6	96.64	89.22	64.00	25.22	9.08
8	85.46	78.90	64.00	14.90	7.15

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	9.49	39.16	50.3	0.00

overflows to: OUT

Drainage Area	MH62B*	CB61A, CB61B, CB62A, CB62B, CB62C, CB62D
Area (Ha)	0.76	ICD Flowrate (L/s) = 265.00
C =	1.00	Effective Restricted Flow Q_r (L/s)= 132.50

100-Year Ponding

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)
11	169.91	358.98	132.50	226.48	149.48
13	155.11	327.71	132.50	195.21	152.26
14	148.72	314.22	132.50	181.72	**152.65**
15	142.89	301.91	132.50	169.41	152.47
17	132.63	280.22	132.50	147.72	150.67

100Yr +20%

100YRQp 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m3)
377.07	244.57	**205.44**

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	152.65	92.75	61.28	**0.00**

100+20

Overflow	Required	Balance
0.00	205.44	112.69

overflows to: OUT

Drainage Area	MH62B*	
Area (Ha)	0.76	
C =	0.83	Restricted Flow Q_r (L/s)= 132.50

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)
1	148.14	259.79	132.50	127.29	7.64
3	121.46	213.00	132.50	80.50	14.49
4	111.72	195.92	132.50	63.42	**15.22**
5	103.57	181.63	132.50	49.13	14.74
7	90.66	158.99	132.50	26.49	11.13

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	15.22	92.75	61.28	0.00

overflows to: OUT

Drainage Area	MH60B*	CB59A, CB59B, CB59C, CB60A, CB60B, CB60C, CB60D, CB60E, CB60F, CB63	
Area (Ha)	0.86	ICD Flowrate (L/s) =	240.00
C =	0.90	Effective Restricted Flow Q_r (L/s)=	120.00

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)
13	155.11	333.75	120.00	213.75	166.72			
15	142.89	307.47	120.00	187.47	168.72			
16	137.55	295.97	120.00	175.97	**168.93**	355.16	235.16	**225.75**
17	132.63	285.38	120.00	165.38	168.69			
19	123.87	266.53	120.00	146.53	167.04			

Storage (m^3)					100+20		
Overflow	Required	Surface	Sub-surface	Balance	Overflow	Required	Balance
0.00	168.93	94.80	75.91	**0.00**	0.00	225.75	130.95

overflows to: OUT

Drainage Area	MH60B*		
Area (Ha)	0.86		
C =	0.72	Restricted Flow Q_r (L/s)=	120.00

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	229.51	120.00	109.51	13.14
4	111.72	192.32	120.00	72.32	17.36
5	103.57	178.29	120.00	58.29	**17.49**
6	96.64	166.35	120.00	46.35	16.69
8	85.46	147.10	120.00	27.10	13.01

Storage (m^3)				
Overflow	Required	Surface	Sub-surface	Balance
0.00	17.49	94.80	75.91	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)
9	188.25	10.47	6.00	4.47	2.41			
11	169.91	9.45	6.00	3.45	2.27			
12	162.13	9.01	6.00	3.01	**2.17**	10.82	4.82	**3.47**
13	155.11	8.62	6.00	2.62	2.05			
15	142.89	7.94	6.00	1.94	1.75			

Storage (m^3)					100+20		
Overflow	Required	Surface	Sub-surface	Balance	Overflow	Required	Balance
0.00	2.17	30.46	0.5	**0.00**	164.11	167.58	137.12

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	30.46	0.5	0.00

overflows to: N Swale

Drainage Area	N Swale
Area (Ha)	0.12
C =	0.25

Restricted Flow Q_r (L/s)= 8.00

100-Year Ponding

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)
5	242.70	20.24	8.00	12.24	3.67
7	211.67	17.65	8.00	9.65	4.05
8	199.20	16.61	8.00	8.61	**4.13**
9	188.25	15.70	8.00	7.70	4.16
11	169.91	14.17	8.00	6.17	4.07

100Yr +20%

100YRQp 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m3)
19.94	11.94	**5.73**

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	4.13	3.92	0.5	**0.00**

100+20

Overflow	Required	Balance
290.14	295.87	291.95

overflows to: OUT

Drainage Area	N Swale
Area (Ha)	0.12
C =	0.20

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)
-2	229.26	15.30	8.00	7.30	-0.88
0	167.22	11.16	8.00	3.16	0.00
1	148.14	9.88	8.00	1.88	**0.11**
2	133.33	8.90	8.00	0.90	0.11
4	111.72	7.45	8.00	-0.55	-0.13

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	0.11	3.92	0.5	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

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)
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**
26	101.18	25.32	9.00	16.32	25.45
28	96.27	24.09	9.00	15.09	25.35

100Yr +20%

100YRQp 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m3)
31.18	22.18	**33.27**

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	25.47	36.00	0	**0.00**

100+20

Overflow	Required	Balance
0.00	33.27	0.00

overflows to: OUT

Please provide calculation for roof storage volume

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 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 =	1.00	Restricted Flow Q_r (L/s)=	7.00

100-Year Ponding

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)
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**
26	101.18	19.69	7.00	12.69	19.80
28	96.27	18.74	7.00	11.74	19.71

100Yr +20%

100YRQp 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m3)
24.25	17.25	**25.88**

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	19.81	28.00	0	**0.00**

100+20

Overflow	Required	Balance
0.00	25.88	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

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)
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**
26	101.18	30.94	11.00	19.94	31.11
28	96.27	29.44	11.00	18.44	30.98

100Yr +20%

100YRQp 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m3)
38.11	27.11	**40.66**

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	31.13	44.00	0	**0.00**

100+20

Overflow	Required	Balance
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

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)
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**
26	101.18	22.50	8.00	14.50	22.62
28	96.27	21.41	8.00	13.41	22.53

100Yr +20%

100YRQp 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m3)
27.71	19.71	**29.57**

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)	0.12		
C =	1.00	Restricted Flow Q_r (L/s)=	12.00

100-Year Ponding

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)
22	112.88	37.66	12.00	25.66	33.87
24	106.68	35.59	12.00	23.59	33.97
25	103.85	34.64	12.00	22.64	**33.97**
26	101.18	33.75	12.00	21.75	33.94
28	96.27	32.12	12.00	20.12	33.80

100Yr +20%

100YRQp 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m3)
41.57	29.57	**44.36**

Storage (m^3)					100+20		
Overflow	Required	Surface	Sub-surface	Balance	Overflow	Required	Balance
0.00	33.97	48.00	0	**0.00**	0.00	44.36	0.00

overflows to: OUT

Drainage Area	BLDG I		
Area (Ha)	0.12		
C =	0.90	Restricted Flow Q_r (L/s)=	12.00

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	27.22	12.00	15.22	6.39
9	80.87	24.28	12.00	12.28	6.63
10	76.81	23.06	12.00	11.06	**6.64**
11	73.17	21.97	12.00	9.97	6.58
13	66.93	20.09	12.00	8.09	6.31

Storage (m^3)				
Overflow	Required	Surface	Sub-surface	Balance
0.00	6.64	48.00	0	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 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

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)
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**
27	98.66	68.57	23.00	45.57	73.82
29	94.01	65.34	23.00	42.34	73.67

100Yr +20%

100YRQp 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m3)
84.38	61.38	**95.76**

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	73.82	100.00	0	**0.00**

100+20

Overflow	Required	Balance
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

Drainage Area	Tributary Area	Restricted Flow	Req Storage	Avail Storage	Overflow		100-yr + 20% Ponding	2-yr Ponding
MH51B*	0.61	115.00	177.97	180.95	0.00	***Part 3***	164.11	0.00
MH57	0.94	265.00	218.38	222.48	0.00	***Part 2 & 3***	126.03	0.00
MH58B*	0.41	128.00	89.07	89.46	0.00	***Part 2***	80.01	0.00
MH62B*	0.76	265.00	152.65	154.03	0.00	***Part 1***	112.69	0.00
MH60B*	0.86	240.00	168.93	170.71	0.00	***Part 1***	130.95	0.00
W Swale	0.08	6.00	2.17	30.96	0.00	***Part 2***		
N Swale	0.12	8.00	4.13	4.42	0.00	***Part 2 & 3***		
Total Surface	3.78	1027.00	813.30	853.01	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	0.12	12.00	33.97	48.00	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	1.00	98.00	286.10	400.00	0.00			
Total	**4.78**	**1125.00**	**1099.40**	**1253.01**	**0.00**			
	Max Allowable	**1135.11**						
	Remaining Cap.	**10.11**						

Proportionate Flow by Area

	Restricted Flow	Unrestricted	Total	Per AoA
Part 1	554.00	97.90	651.90	609.00
Part 2	288.50	49.26	337.76	313.00
Part 3	282.50	33.72	316.22	394.00
Total	1125.00	180.89	1305.89	1316.00

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PROJECT: Earl Armstrong Plaza
DATE: 2022-12-09
FILE: 137404.6.04.04
REV #: 1
DESIGNED BY: SEL

UNDERGROUND STORAGE CALCULATIONS - PATHWAYS BLOCK 204

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-MH51	13.25	200	0.031	0.42
CB51	MH51-MH51B	150.00	200	0.031	4.71
CB54	CB51	26.30	200	0.031	0.83
MH50	MH51	31.94	750	0.442	14.11
MH52	MH51	102.92	750	0.442	45.47
MH51	MH51B	44.76	750	0.442	19.77
				Total	85.82

Structure Storage ***MH51B****

	Base	Top	Height	diameter	X-sec Area	Volume
CB50	91.970	93.37	1.40	600	0.360	0.50
CB52A	91.100	92.50	1.40	600	0.360	0.50
CB52B	91.100	92.50	1.40	600	0.360	0.50
CB52C	91.100	92.50	1.40	600	0.360	0.50
CB51	91.350	92.75	1.40	600	0.360	0.50
CB54	91.100	92.50	1.40	600	0.360	0.50
MH50	89.552	93.33	3.78	1500	1.767	6.68
MH51	89.195	92.79	3.60	1500	1.767	6.35
MH51B	88.904	92.79	3.89	1500	1.767	6.87
MH52	89.939	92.67	2.73	1500	1.767	4.83
					Total	27.75

TOTAL **MH51B*** **113.56**

Structures should not include .30m sump as after the first rainfall the sumps are full. Similar to SWM modeling when using hotstart files. Similarily the structure storage should remove a minimum of 0.45m for MH cap thickness and frame and cover and adjusters. Please review and revise accordingly.

Pipe Storage ***MH57***

From	To	Length	Diameter	X-sec Area	Volume
CB56A	MH56-MH57	7.57	200	0.031	0.24
CB56B	MH56-MH57	12.68	250	0.049	0.62
CB56C	CB56B	16.62	250	0.049	0.82
CB56D	MH56-MH57	7.57	200	0.031	0.24
CB56E	MH56-MH57	12.77	300	0.071	0.90
MH56	MH57	79.22	750	0.442	35.00
ECB/TCB LEADS		20.69	200	0.031	0.65
				Total	38.46

Structure Storage ***MH57***

	Base	Top	Height	diameter	X-sec Area	Volume
CB56A	90.650	92.05	1.40	600	0.360	0.50
CB56B	90.650	92.05	1.40	600	0.360	0.50
CB56C	90.650	92.05	1.40	600	0.360	0.50
CB56D	90.650	92.05	1.40	600	0.360	0.50
CB56E	90.500	91.90	1.40	600	0.360	0.50
MH56	87.650	92.16	4.51	1500	1.767	7.97
MH57	87.139	92.16	5.02	1500	1.767	8.87
					Total	19.36

TOTAL **MH57** **57.83**

Please review all pipe lengths as this one appears to conflict with engineering drawings

Pipe Storage	*MH58B**				
From	**To**	**Length**	**Diameter**	**X-sec Area**	**Volume**
CB58A	MH58-MH59*	7.48	200	0.031	0.23
CB58B	MH58-MH59*	6.51	200	0.031	0.20
CB58C	MH58-MH59*	18.40	200	0.031	0.58
CB58D	MH58-MH59*	6.44	200	0.031	0.20
MH58	MH58B*	83.07	675	0.358	29.73
ECB/TCB LEADS		11.22	200	0.031	0.35
				Total	31.30

Structure Storage		*MH58B**				
	Base	**Top**	**Height**	**diameter**	**X-sec Area**	**Volume**
CB58A	90.600	92.00	1.40	600	0.360	0.50
CB58B	90.600	92.00	1.40	600	0.360	0.50
CB58C	90.700	92.10	1.40	600	0.360	0.50
CB58D	91.050	92.45	1.40	600	0.360	0.50
MH58	87.900	92.45	4.55	1500	1.767	8.04
MH58B*	87.360	92.42	5.06	1500	1.767	8.94
					Total	19.00

TOTAL	**MH58B***	**50.30**

Pipe Storage	*MH62B**				
From	**To**	**Length**	**Diameter**	**X-sec Area**	**Volume**
CB61A	MH61-MH62	7.62	200	0.031	0.24
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
MH61	MH62	23.02	675	0.358	8.24
MH62	MH62B*	62.80	675	0.358	22.47
ECB/TCB SUBDRAIN		18.30	250	0.049	0.90
ECB/TCB LEADS		52.97	200	0.031	1.66
				Total	35.23

Structure Storage		*MH62B**				
	Base	**Top**	**Height**	**diameter**	**X-sec Area**	**Volume**
CB61A	91.050	92.45	1.40	600	0.360	0.50
CB61B	91.000	92.40	1.40	600	0.360	0.50
CB62A	91.150	92.55	1.40	600	0.360	0.50
CB62B	91.200	92.60	1.40	600	0.360	0.50
CB62C	91.150	92.55	1.40	600	0.360	0.50
CB62D	91.200	92.60	1.40	600	0.360	0.50
MH61	88.670	92.61	3.94	1500	1.767	6.96
MH62	88.370	92.69	4.32	1500	1.767	7.63
MH62B*	87.960	92.73	4.77	1500	1.767	8.43
					Total	26.05

TOTAL	**MH62B***	**61.28**

Pipe Storage	*MH60B**				
From	**To**	**Length**	**Diameter**	**X-sec Area**	**Volume**
CB59A	CBMH59	17.91	200	0.031	0.56
CB59B	CBMH59	22.59	200	0.031	0.71
CB59C	CBMH59	14.14	200	0.031	0.44
CB60A	CB60B	9.63	200	0.031	0.30
CB60B	MH60-MH60B*	14.05	200	0.031	0.44
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	12.82	200	0.031	0.40
CBMH59	MH60	21.49	750	0.442	9.49
MH60	MH60B*	79.48	750	0.442	35.11
				Total	48.57

Structure Storage		*MH60B**				
	Base	**Top**	**Height**	**diameter**	**X-sec Area**	**Volume**
CB59A	91.050	92.45	1.40	600	0.360	0.50
CB59B	93.000	94.40	1.40	600	0.360	0.50
CB59C	91.080	92.48	1.40	600	0.360	0.50
CB60A	91.440	92.84	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	91.250	92.65	1.40	600	0.360	0.50
CB60E	91.200	92.60	1.40	600	0.360	0.50
CB60F	91.250	92.65	1.40	600	0.360	0.50
CB63	91.400	92.80	1.40	600	0.360	0.50
CBMH59	88.780	92.45	3.67	1500	1.767	6.49
MH60	88.490	92.72	4.23	1500	1.767	7.48
MH60B*	87.970	92.69	4.72	1500	1.767	8.34
					Total	27.34

TOTAL	**MH60B***	**75.91**

RUNOFF COEFFICIENT CALCULATION SHEET

RESTRICTED - Stm Drainage Areas

MH50-East ECB	Area (m^2)	C
Softscape	290	0.20
Hardscape	17	0.90
Total	307	**0.24**

CB54	Area (m^2)	C
Softscape	666	0.20
Hardscape	1242	0.90
Total	1908	**0.66**

CB56E	Area (m^2)	C
Softscape	536	0.20
Playground	475	0.60
Hardscape	3204	0.90
Total	4215	**0.78**

CB58C	Area (m^2)	C
Softscape	345	0.20
Hardscape	1082	0.90
Total	1427	**0.73**

CB58D	Area (m^2)	C
Softscape	293	0.20
Hardscape	757	0.90
Total	1050	**0.70**

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

MH61-EastECB	Area (m^2)	C
Softscape	550	0.20
Hardscape	745	0.90
Total	1295	**0.60**

CB65	Area (m^2)	C
Softscape	224	0.20
Hardscape	382	0.90
Total	606	**0.64**

CB111	Area (m^2)	C
Softscape	165	0.20
Hardscape	581	0.90
Total	746	**0.75**

CB60B	Area (m^2)	C
Softscape	229	0.20
Hardscape	361	0.90
Total	590	**0.63**

CB59B	Area (m^2)	C
Softscape	173	0.20
Hardscape	357	0.90
Total	530	**0.67**

CBMH59-ECBs	Area (m^2)	C
Softscape	386	0.20
Hardscape	147	0.90
Total	533	**0.39**

CB60A	Area (m^2)	C
Softscape	211	0.20
Hardscape	1021	0.90
Total	1232	**0.78**

RESTRICTED - SWM Collective Areas

MH51B*	Area (ha)	C
MH50-East ECB	0.03	0.25
Parking Lots	0.58	0.90
Total	0.61	**0.87**

MH57	Area (ha)	C
CB56E	0.42	0.80
Parking Lots	0.52	0.90
Total	0.94	**0.86**

MH58B*	Area (ha)	C
CB58D	0.11	0.70
CB58C	0.14	0.80
Parking Lots	0.16	0.90
Total	0.41	**0.81**

MH62B*	Area (ha)	C
ECBs	0.03	0.40
CB61B	0.13	0.60
Parking Lots	0.60	0.90
Total	0.76	**0.83**

MH60B*	Area (ha)	C
ECBs	0.05	0.40
CB59B + CB60B	0.11	0.70
CB60A	0.12	0.80
Parking Lots	0.58	0.90
Total	0.86	**0.72**

UNCONTROLLED

East Uncontrolled	Area (m^2)	C
Softscape	884	0.20
Hardscape	197	0.90
Total	1081	**0.33**

North Uncontrolled	Area (m^2)	C
Softscape	386	0.20
Hardscape	36	0.90
Total	422	**0.26**

South Uncontrolled	Area (m^2)	C
Softscape	1336	0.20
Hardscape	758	0.90
Total	2094	**0.45**

Uncontrolled E+N+S	Area (ha)	C
EAST	1081	0.33
NORTH	422	0.26
SOUTH	2094	0.45
Total	3597	**0.39**

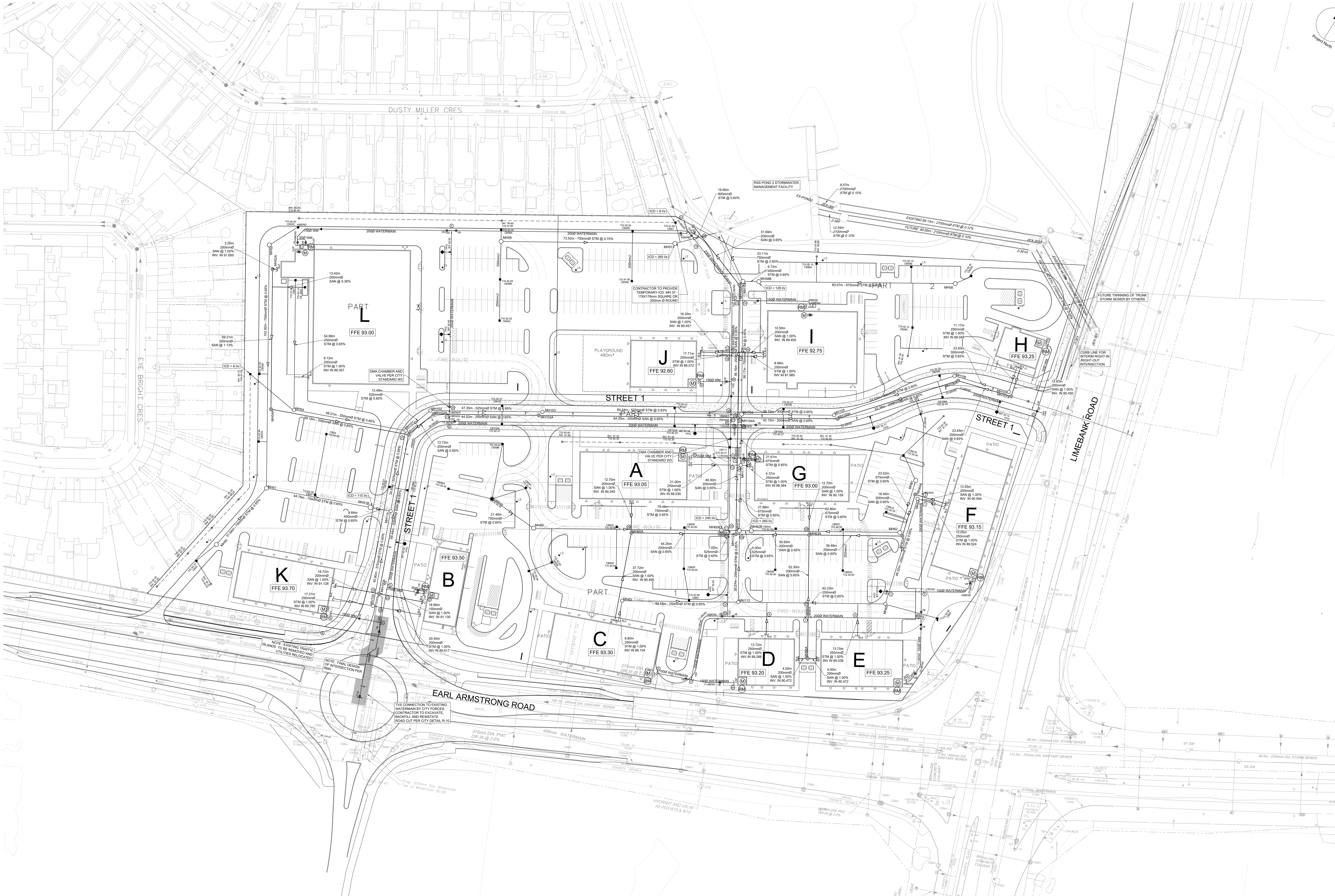
MH119 E	Area (m^2)	C
Softscape	137	0.20
Hardscape	200	0.90
Total	337	**0.62**

MH119 W	Area (m^2)	C
Softscape	70	0.20
Hardscape	102	0.90
Total	172	**0.62**

MH103 N	Area (m^2)	C
Softscape	36	0.20
Hardscape	56	0.90
Total	92	**0.63**

MH105 N	Area (m^2)	C
Softscape	66	0.20
Hardscape	153	0.90
Total	219	**0.69**

MH106 N	Area (m^2)	C
Softscape	21	0.20
Hardscape	53	0.90
Total	74	**0.70**



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Urbandale CORPORATION

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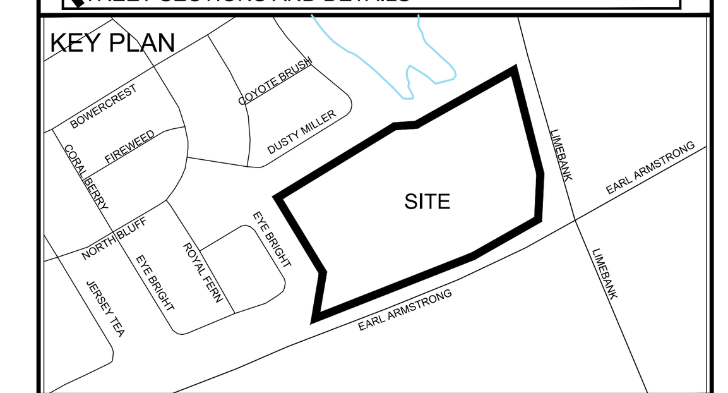
ISSUES

No.	DESCRIPTION	DATE
1	SUBMISSION 1 FOR CITY REVIEW	2022:12:16

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:
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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

GENERAL PLAN

SHEET NUMBER	ISSUE
001	1

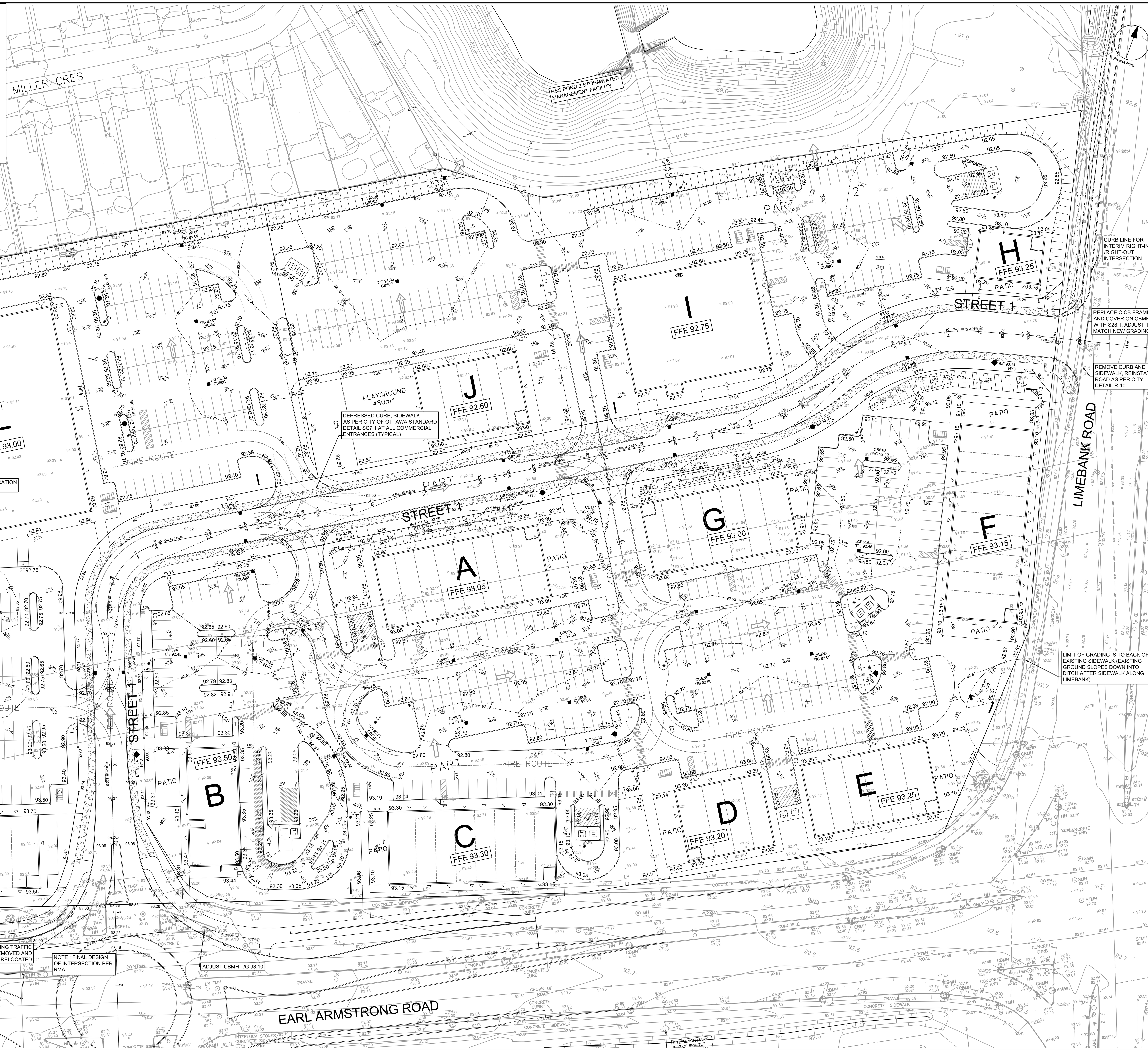
File Location: J:\137404_Earl_Armstro\7.0_Production\7.03_Design\04_CivilSheets\001 GENERAL PLAN.dwg Last Saved: December 16, 2022, by Ehenrie Plotted: Friday, December 16, 2022 3:24:24 PM by Eric Henrie

CITY FILE No. D07-xx-xx-xxxx

CITY PLAN No. xxxxx

GRADING LEGEND

- PROPOSED DITCH C/W FLOW DIRECTION AND SLOPE
- SLOPE C/W FLOW DIRECTION
- MAJOR OVERLAND FLOW ROUTE
- PROPOSED SPOT GRADE
- PROPOSED SWALE GRADE
- PROPOSED SWALE HIGH POINT GRADE
- LOT CORNER GRADE C/W EXISTING GRADE
- FULL STATIC PONDING GRADE
- TERRACING 3:1 MAXIMUM UNLESS NOTED OTHERWISE
- PRESSURE REDUCING VALVE
- FFE : FINISHED FLOOR ELEVATION
- NOISE BARRIER LOCATION



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ISSUES

No.	DESCRIPTION	DATE
1	SUBMISSION 1 FOR CITY REVIEW	2022:12:16

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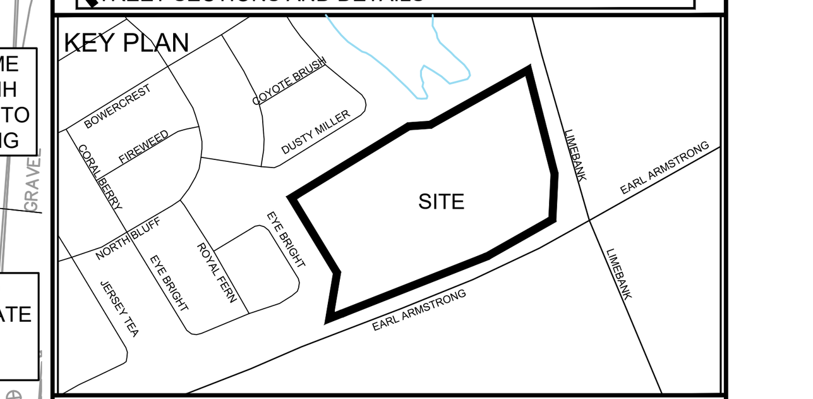
SEE 010, 011, 012 FOR NOTES, LEGEND, CB TABLE, STREET SECTIONS AND DETAILS

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
22/12/16
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	ISSUE
200	1

CITY FILE No. D07-xx-xx-xxxx

CITY PLAN No. xxxxx

File Location: J:\137404_Earl_Armstro\7.0_Production\7.03_Design\04_Civil\Sheets\200 GRADING PLAN.dwg Last Saved: December 16, 2022 by Ehenrie Plotted: Friday, December 16, 2022 3:31:33 PM by Eric Henrie

CLIENT

Urbandale CORPORATION

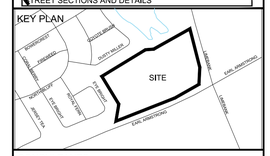
ISSUES

No.	DESCRIPTION	DATE
1	SUBMISSION 1 FOR CITY REVIEW	2022.12.16

NOT FOR CONSTRUCTION

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

KEY PLAN



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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 0 7.5 22.5 37.5m

SEAL

LICENSED PROFESSIONAL ENGINEER
S. E. LABADIE
100214983
22/12/16
PROVINCE OF ONTARIO

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

SHEET TITLE
STORM DRAINAGE AREA PLAN

SHEET NUMBER 500 | ISSUE 1

SCALE CHECK

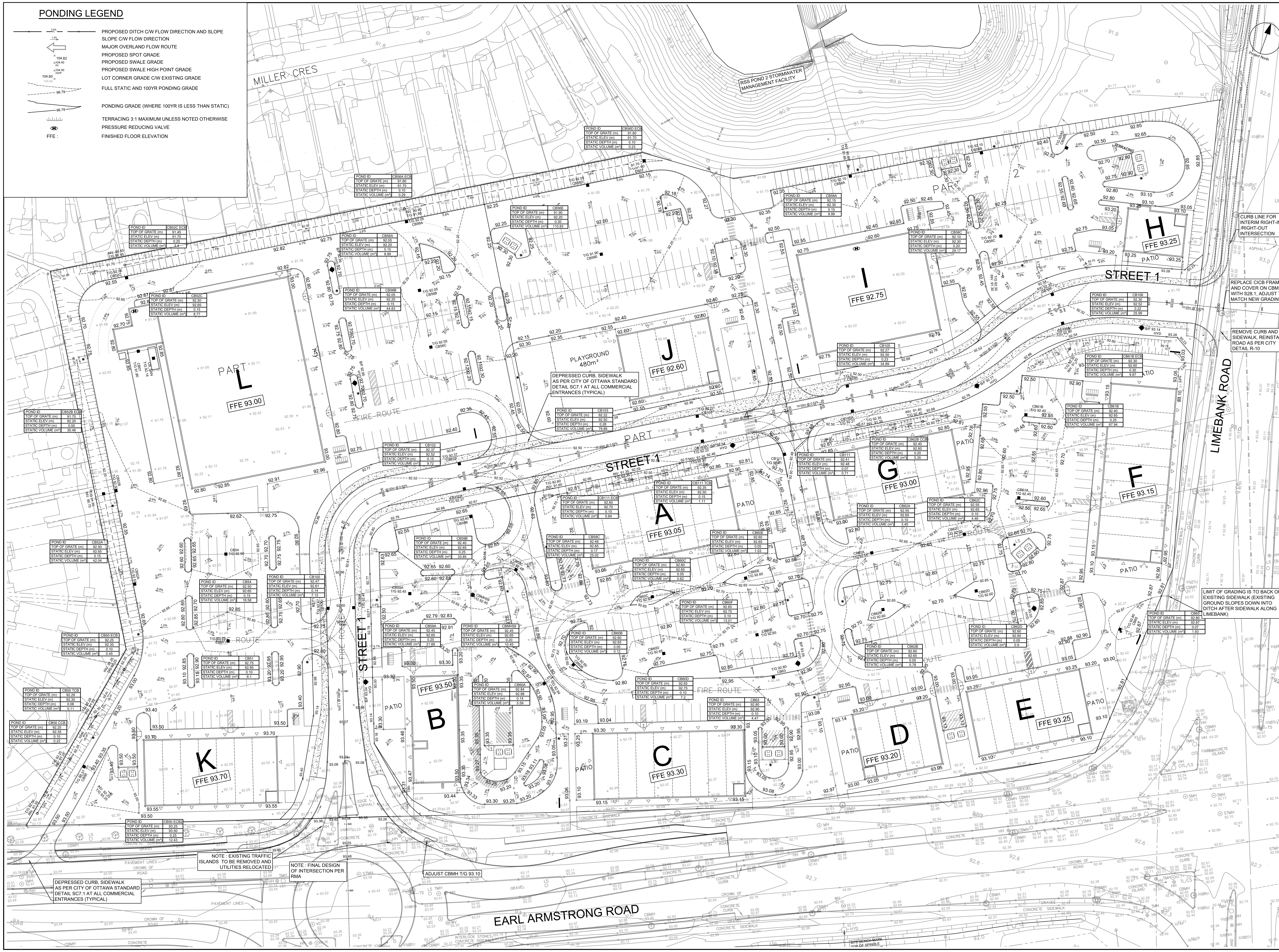
CITY FILE No. D07-XX-XX-XXXX

CITY PLAN No. xxxxx

File Location: J:\137404_Earl_Armstro\7.0_Production\7.03_Design\04_Civil\Sheets\500 STORM DRAINAGE AREA PLAN.dwg Last Saved: December 16, 2022, by Chris.Cormier Plotted: Friday, December 16, 2022 3:33:24 PM by Eric Hannie

PONDING LEGEND

- PROPOSED DITCH C/W FLOW DIRECTION AND SLOPE
- SLOPE C/W FLOW DIRECTION
- MAJOR OVERLAND FLOW ROUTE
- PROPOSED SPOT GRADE
- PROPOSED SWALE GRADE
- PROPOSED SWALE HIGH POINT GRADE
- LOT CORNER GRADE C/W EXISTING GRADE
- FULL STATIC AND 100YR PONDING GRADE
- PONDING GRADE (WHERE 100YR IS LESS THAN STATIC)
- TERRACING 3:1 MAXIMUM UNLESS NOTED OTHERWISE
- PRESSURE REDUCING VALVE
- FFE : FINISHED FLOOR ELEVATION



CLIENT

Urbandale CORPORATION

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ISSUES

No.	DESCRIPTION	DATE
1	SUBMISSION 1 FOR CITY REVIEW	2022:12:16

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

SEAL

LICENSED PROFESSIONAL ENGINEER S. E. LABADIE 100214983 22/12/16 PROVINCE OF ONTARIO

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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

PONDING PLAN

SHEET NUMBER	ISSUE
600	1

CITY FILE No. D07-xx-xx-xxxx

CITY PLAN No. xxxxx

Appendix E

- PCSWMM Schematic
- Riverside South Phase 4 Plan and Profile

1515 Earl Armstrong

Existing Pond 2

2-CC_Part2
Area: 1.25 ha
IMP: 99%

MH106
Area: 0.15 ha
IMP: 86%

MH105
Area: 0.11 ha
IMP: 86%

MH103
Area: 0.16 ha
IMP: 86%

2-CC_Part1
Area: 2.49 ha
IMP: 99%

MH102
Area: 0.1 ha
IMP: 86%

2-CC_Part3
Area: 1.62 ha
IMP: 99%

MH119
Area: 0.22 ha
IMP: 86%

Legend

Subcatchments
- Site Plans
- Street 1

Storages
- MH
- Existing Pond 2
- 100 year on-site storage

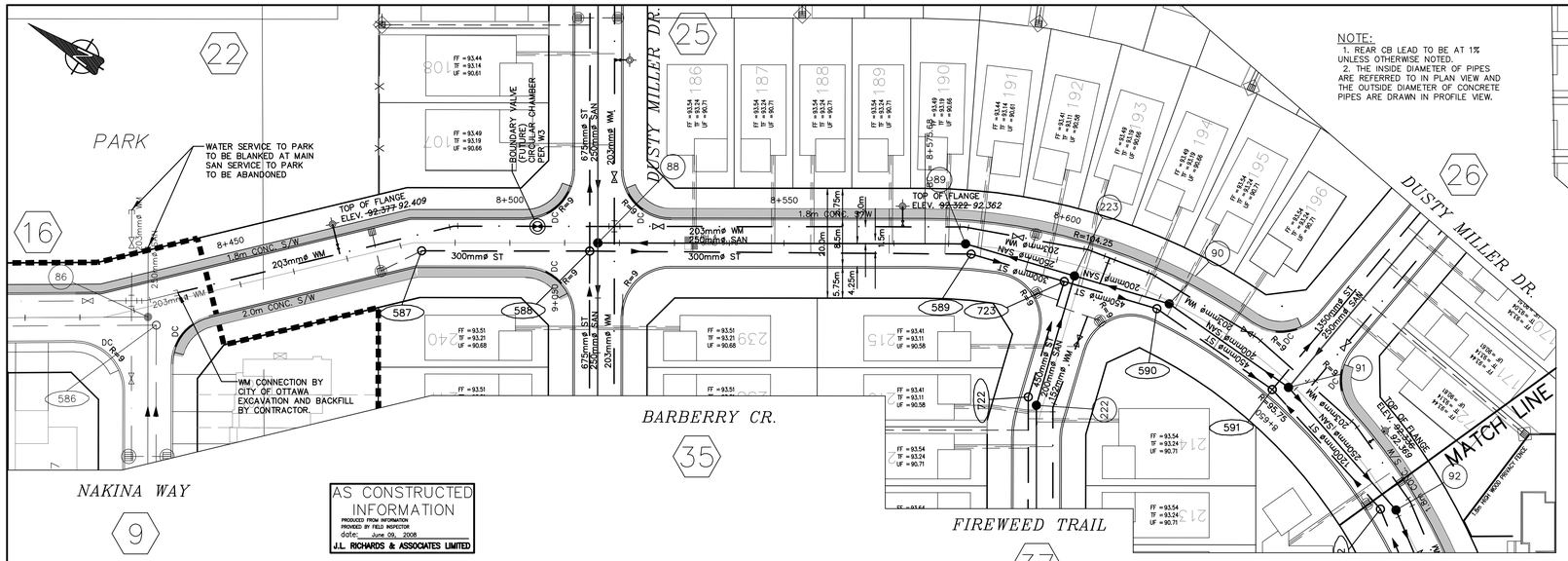
Junctions

Conduits
- STM Pipe
- Proposed STM Pipe
- Major System

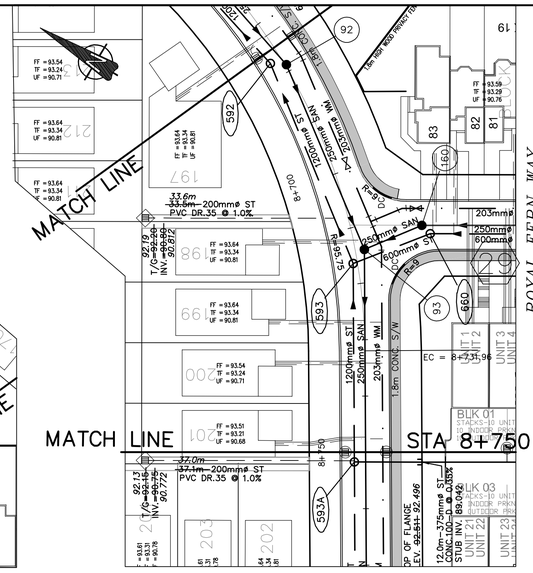
Outlets

N

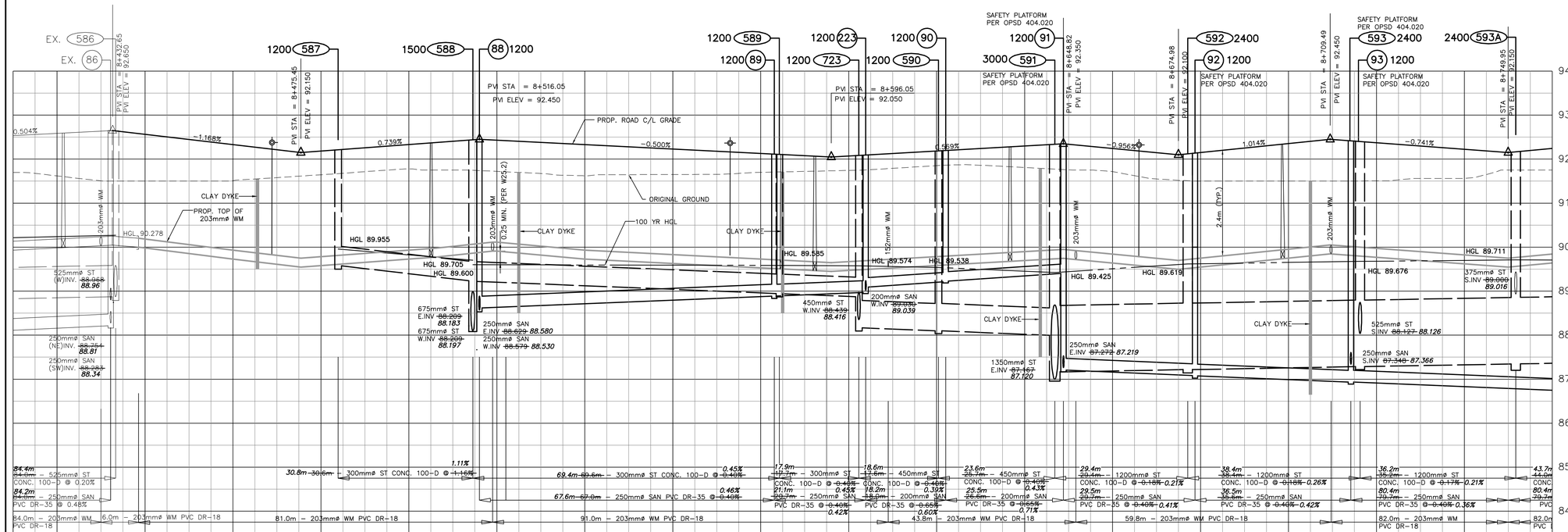
50 m



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.



NORTH BLUFF DRIVE



LEGEND

- EXISTING CATCH BASIN
- PROPOSED CATCH BASIN
- INTERCONNECTED ROADWAY CB C/W ONE 19.8L/S IPEX TYPE "A" ICD (OR CITY APPROVED EQUIVALENT)
- CATCH BASIN MANHOLE WITH INDIVIDUAL 74.0 L/S IPEX CUSTOM MADE ICD (OR CITY APPROVED EQUIVALENT)
- 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 WITH INDIVIDUAL 13.4 L/S IPEX CUSTOM MADE ICD (OR CITY APPROVED EQUIVALENT)
- PROPOSED WATERMAIN, VALVE & HYDRANT
- EXISTING WATERMAIN, VALVE & HYDRANT
- EXISTING SANITARY SEWER & MANHOLE
- EXISTING STORM SEWER & MANHOLE
- PROPOSED SANITARY SEWER & MANHOLE
- PROPOSED STORM SEWER & MANHOLE
- PROPOSED CATCH BASIN & LEAD
- ACCESS EASEMENT
- LOT NUMBER
- 2.0m CONC. SIDEWALK
- PHASING LIMIT
- DRAWING NUMBER
- FF = 93.50 TF = 93.20 UF = 90.65 — FINISHED FLOOR ELEVATION, TOP OF FOUNDATION ELEVATION, 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
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J.L. Richards & Associates Limited
864 Lady Ellen Place
Ottawa, ON Canada
K1Z 5M2
Tel: 613 728 3571
Fax: 613 728 6012

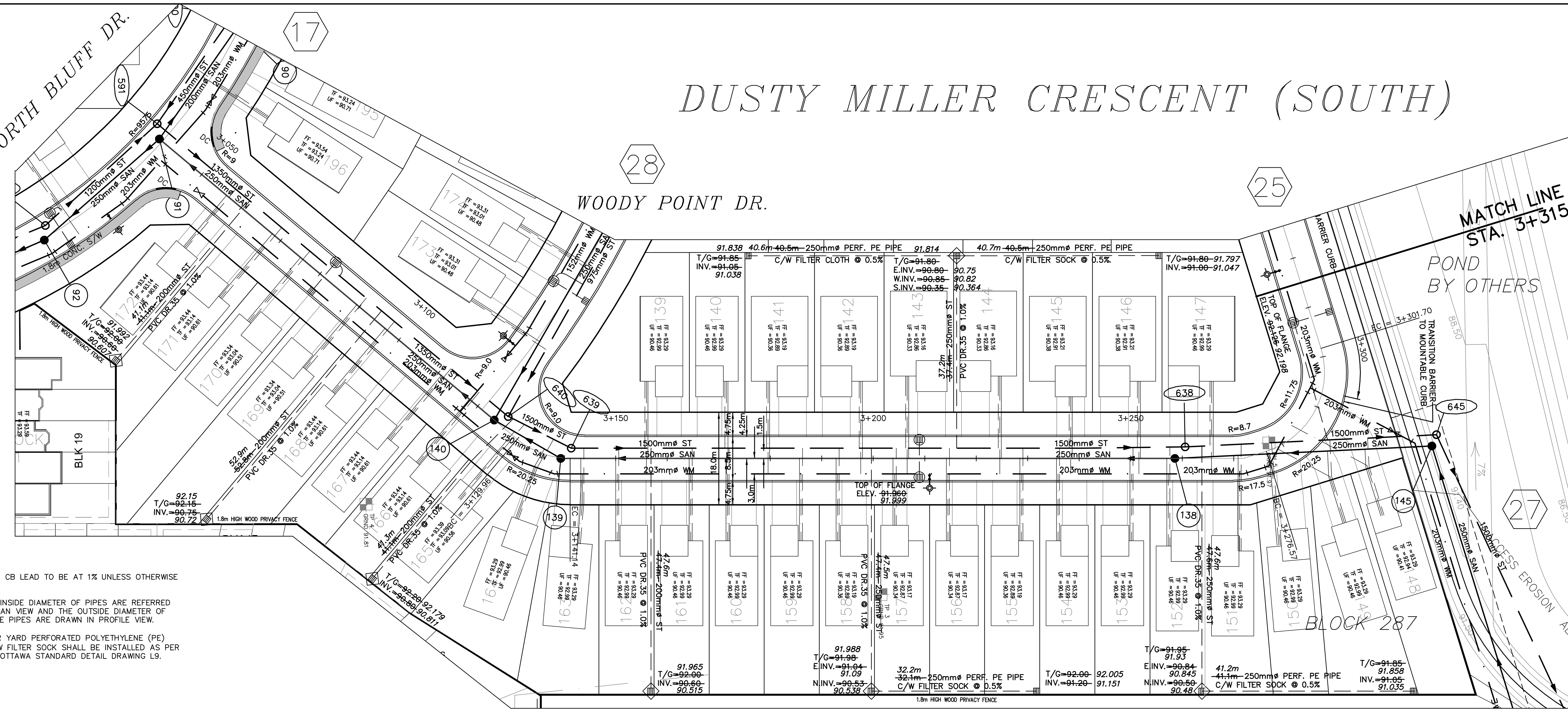
PROJECT:
RIVERSIDE SOUTH
PHASE 3
URBANDALE CORPORATION
CITY OF OTTAWA

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\18418-04 C 17-18.dwg

DUSTY MILLER CRESCENT (SOUTH)



NOTE:

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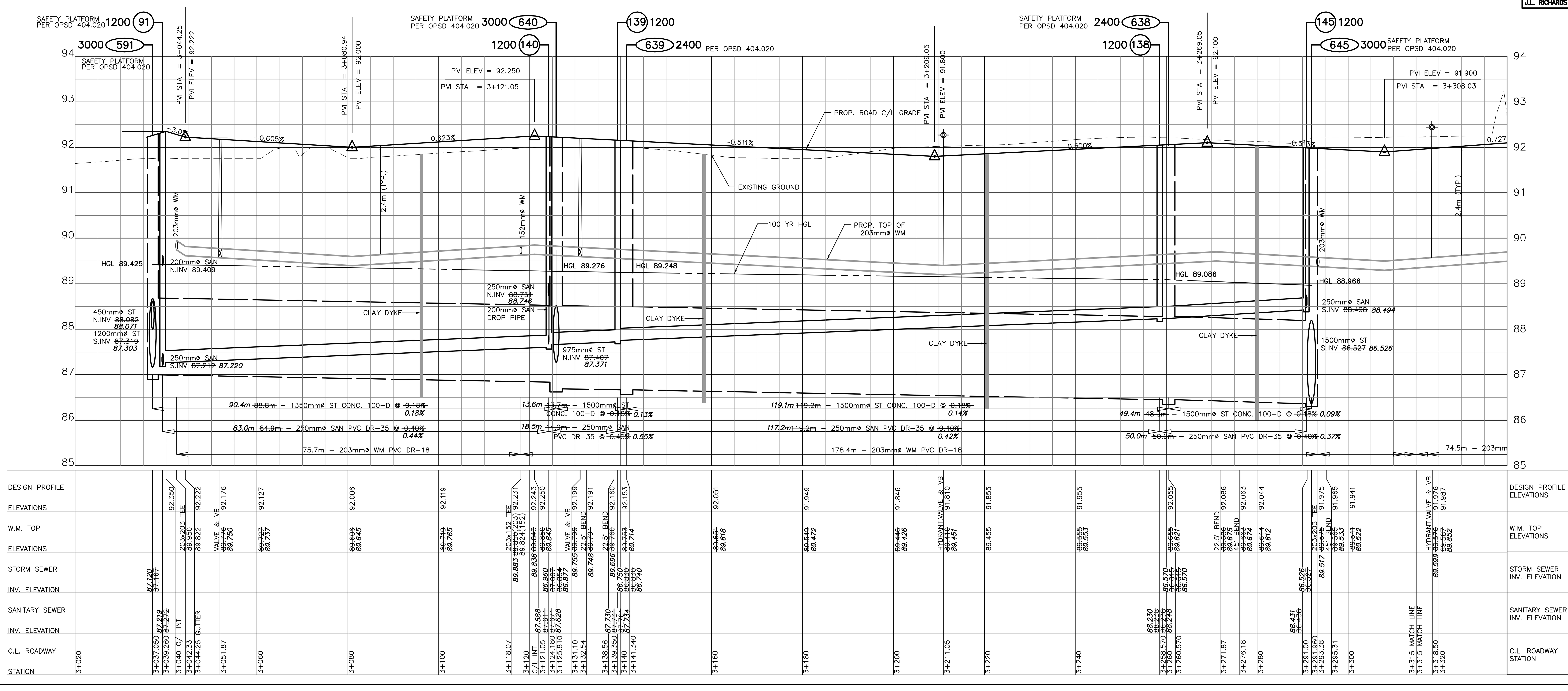
2. THE INSIDE DIAMETER OF PIPES ARE REFERRED TO IN PLAN VIEW AND THE OUTSIDE DIAMETER OF CONCRETE PIPES ARE DRAWN IN PROFILE VIEW.
3. REAR YARD PERFORATED POLYETHYLENE (PE) PIPE C/W FILTER SOCK SHALL BE INSTALLED AS PER CITY OF OTTAWA STANDARD DETAIL DRAWING L9.

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



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- CATCH BASIN WITH INDIVIDUAL 13.4 L/S IPEX CUSTOM MADE ICD (OR CITY APPROVED EQUIVALENT)
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- EXISTING WATERMAIN, VALVE & HYDRANT
- EXISTING SANITARY SEWER & MANHOLE
- EXISTING STORM SEWER & MANHOLE
- PROPOSED SANITARY SEWER & MANHOLE
- 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

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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
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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

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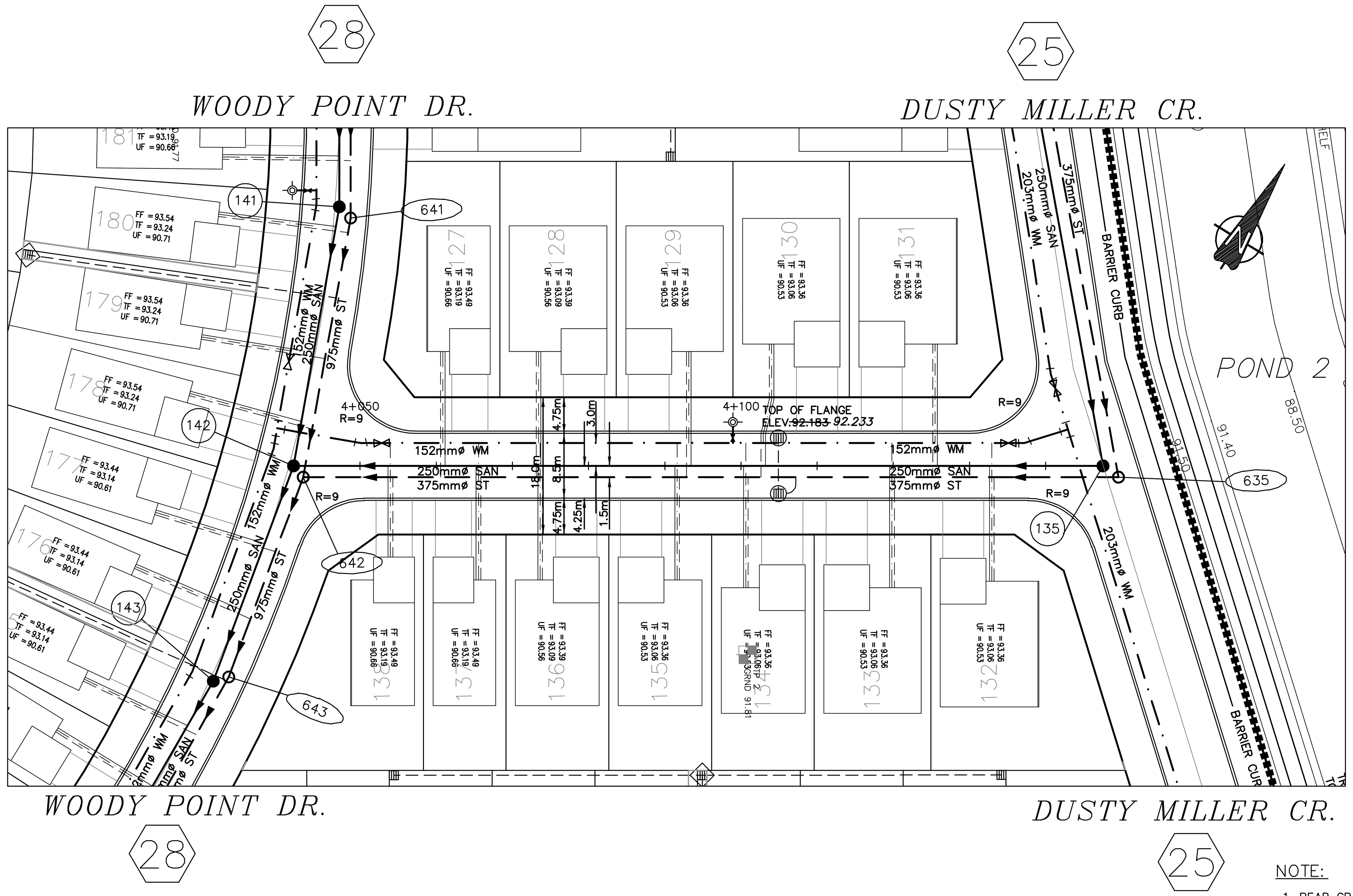
864 Lady Ellen Place
Ottawa, ON Canada
K1Z 5M2
Tel: 613 728 3571
Fax: 613 728 6012

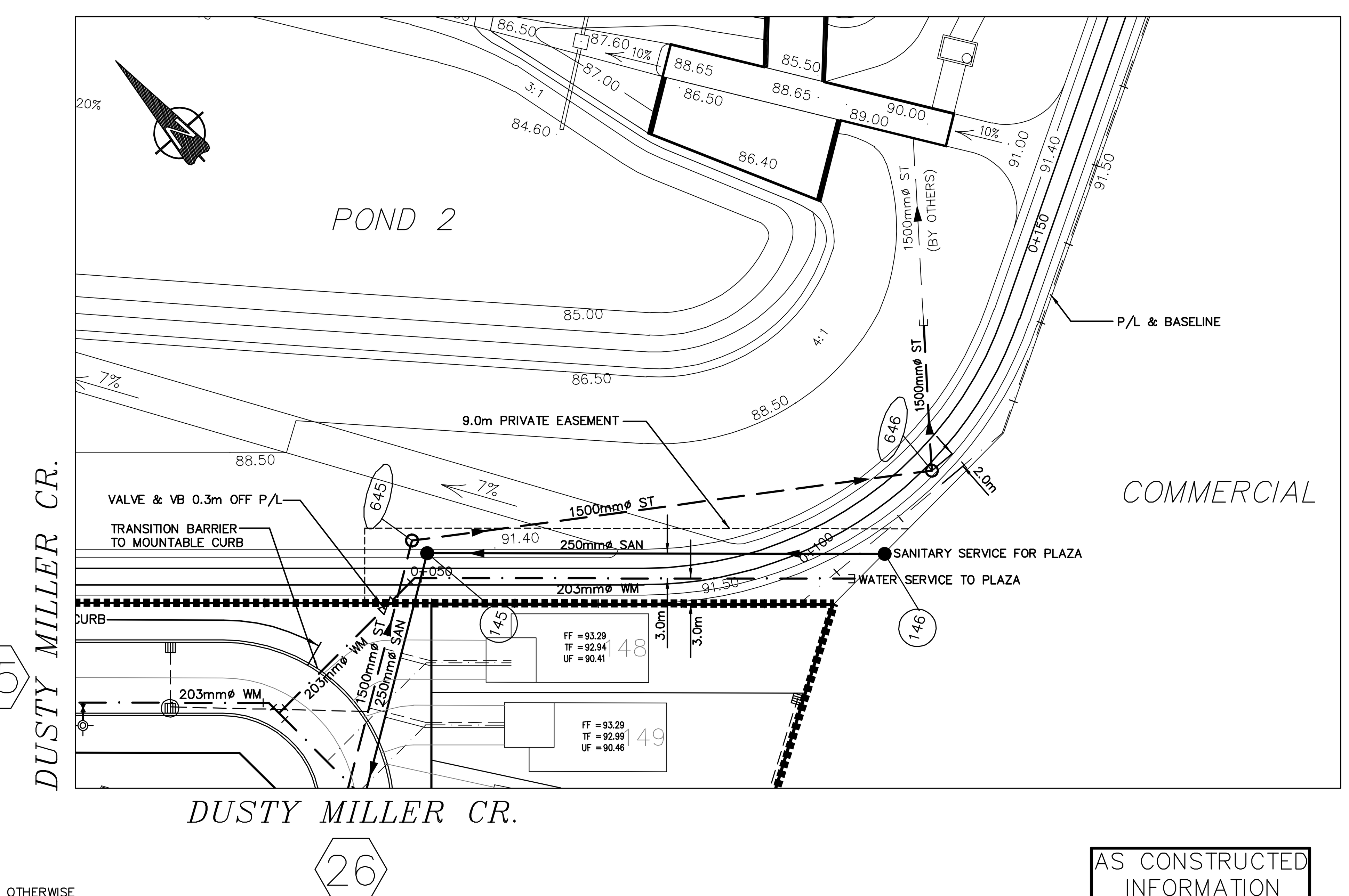
PROJECT:
RIVERSIDE SOUTH
PHASE 4
URBANDALE CORPORATION
CITY OF OTTAWA

DRAWING: V:\18418-04\LD\1841804 C 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.	DRAWING NO.: 26
CHECKED: L.D.	
PLOTTED: Sep 17, 2019	
SCALE: 1:500	JOB NO.: 18418-04





NOTE:

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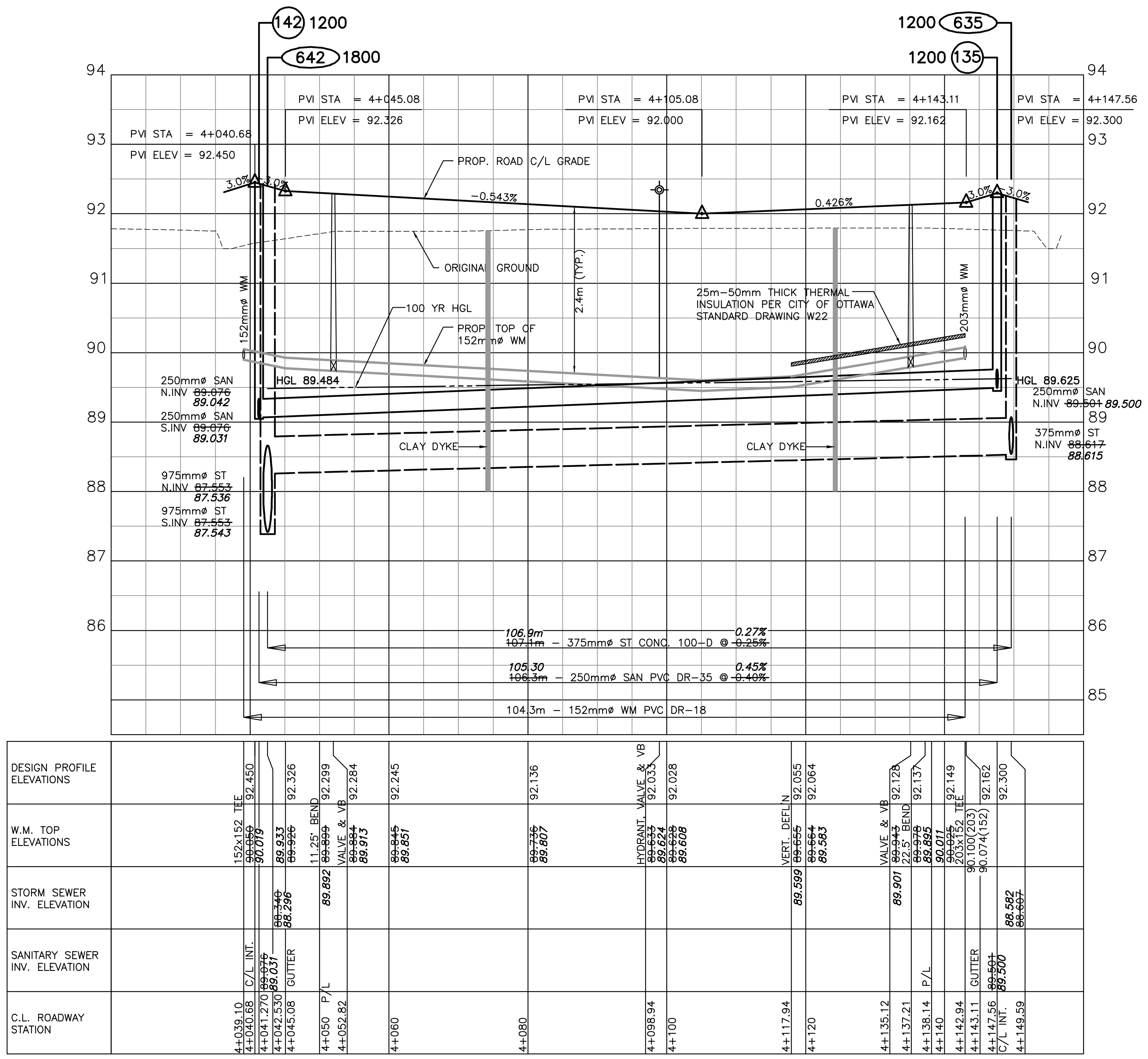
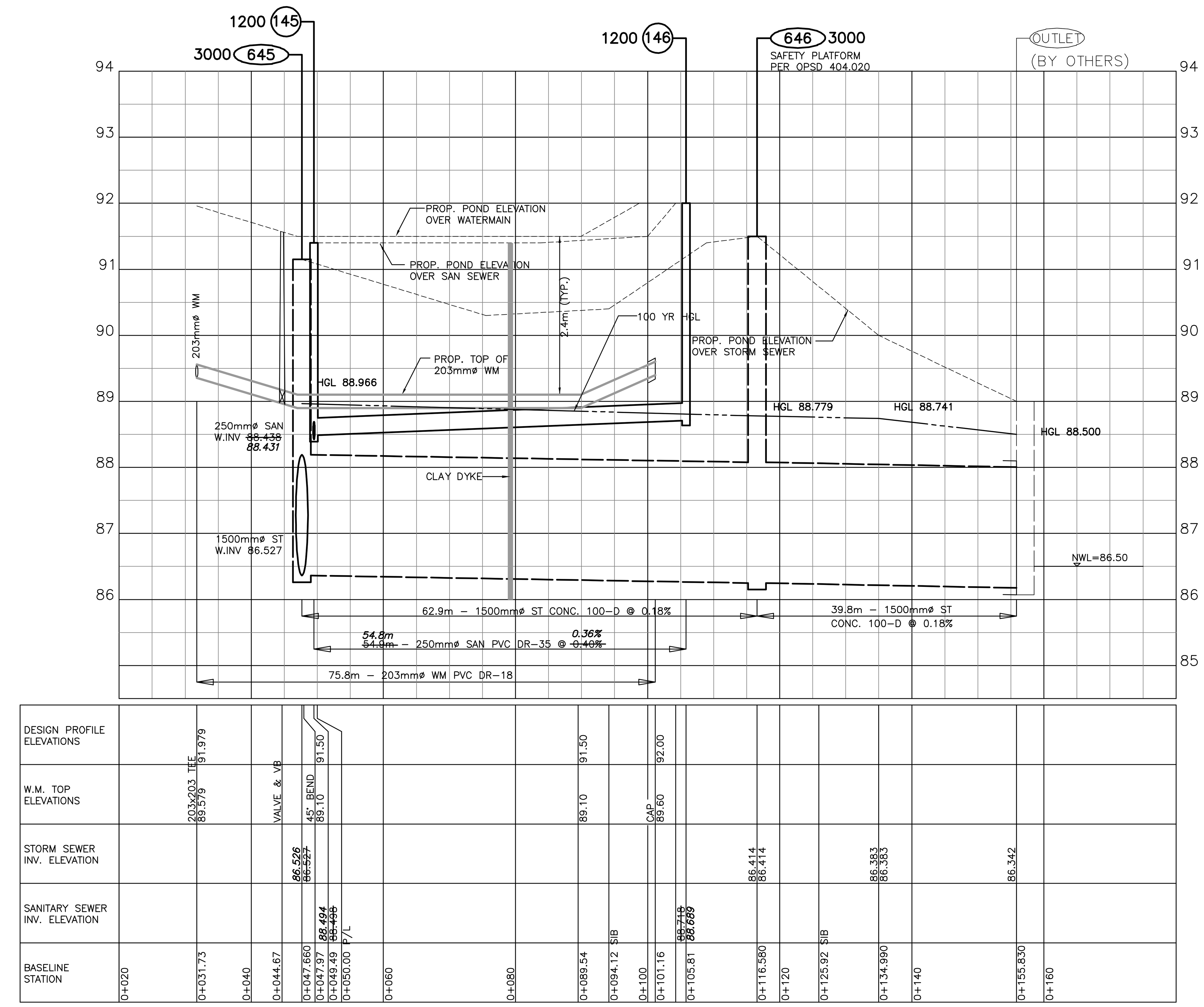
AS CONSTRUCTED INFORMATION
J.L. RICHARDS & ASSOCIATES LIMITED

COYOTE BRUSH LANE



POND AREA



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URBANDALE CORPORATION

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864 Lady Ellen Place
Ottawa, ON Canada
K1Z 5M2
Tel: 613 728 3571
Fax: 613 728 6012

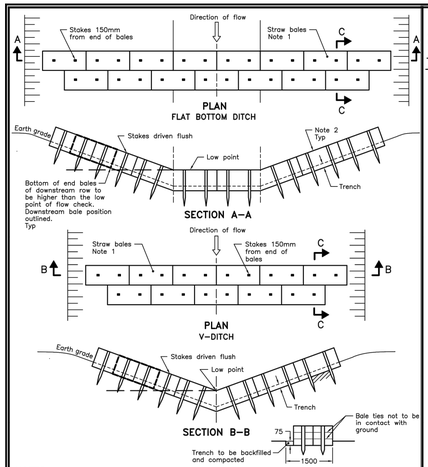
PROJECT:
RIVERSIDE SOUTH
PHASE 4
URBANDALE CORPORATION
CITY OF OTTAWA

DRAWING:
PLAN & PROFILE
COYOTE BRUSH LANE
& POND AREA

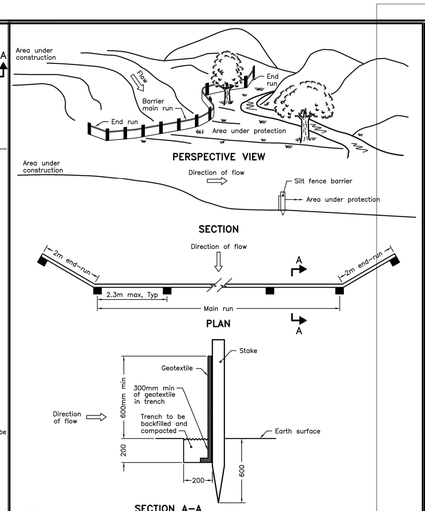
DESIGN: D.L.	REVISION NO.:
DRAWN: T.S.	
CHECKED: L.D.	DRAWING NO.: 27
DATE: Sep 17, 2019	
SCALE: 1:500	JOB NO.: 18418-04

Appendix F

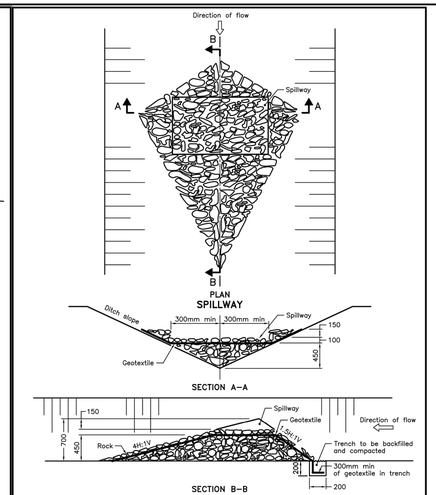
- 137404-900 – Erosion and Sedimentation Control Plan



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:

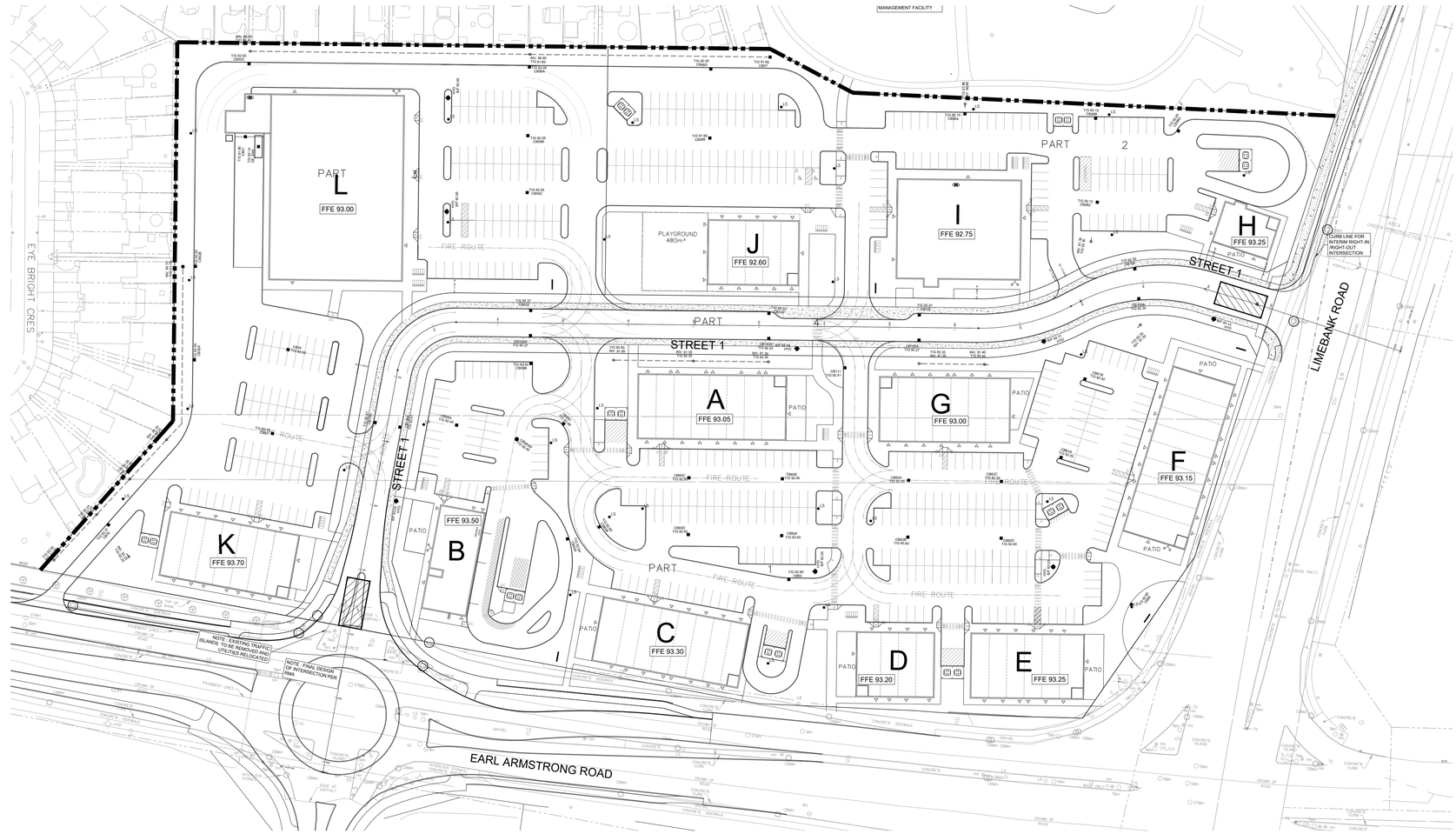
THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES, TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE RECEIVING WATERCOURSE, DURING CONSTRUCTION ACTIVITIES. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT APPROPRIATE EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES 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 (1.5 m × 15.0 m)

Project North



CLIENT

Urbandale CORPORATION

IBI Group Professional Services (Canada) Inc.
is a member of the IBI Group of companies

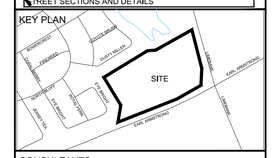
ISSUES

No.	DESCRIPTION	DATE
1	SUBMISSION 1 FOR CITY REVIEW	2022.12.16

NOT FOR CONSTRUCTION

REFER TO 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 0 7.5 15 22.5 30 37.5 m

SEAL

LICENCED PROFESSIONAL ENGINEER
S. E. LABADIE
100214983
22/12/16
PROVINCE OF ONTARIO

IBI GROUP
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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. xxxxx

CITY FILE No. D07-XX-XX-XXXX

SCALE CHECK 1:750 @ 11x17

File Location: J:\137404_Earl_Armstrong\7.0_Production\7.03_Design\04_Civil\Sheets\900 SEDIMENT - EROSION PLAN.dwg Last Saved: December 16, 2022 by Ehennie Plotted: Friday, December 16, 2022 3:35:18 PM by Eric Hennie