

SERVICING BRIEF

**MINTO COMMUNITIES INC.
ARCADIA RESIDENTIAL STAGES 3, 4, 5 & 6
ARCADIA COMMERCIAL STAGES 2 AND 3**

CITY OF OTTAWA

December 2016
(Revised March 2017)

Prepared for:

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JLR 26299-01

SERVICING BRIEF

MINTO COMMUNITIES INC. ARCADIA RESIDENTIAL STAGES 3, 4, 5 & 6 ARCADIA COMMERCIAL STAGES 2 AND 3

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SERVICING BRIEF

MINTO COMMUNITIES INC. ARCADIA RESIDENTIAL STAGES 3, 4, 5 & 6 ARCADIA COMMERCIAL STAGES 2 & 3

1.0 INTRODUCTION

1.1 General

Minto Communities Inc. (Minto) has retained the services of J.L. Richards & Associates Limited (JLR) to prepare a Servicing Brief for municipal infrastructure for their Arcadia development sited at 450 Huntmar Road, located in Kanata West, within the City of Ottawa. The subject site is located east of the existing residential development known as Arcadia Stages 1 and 2. The subject site, herein referred to as the Arcadia Development, consists of four (4) residential stages and (2) commercial stages. This Servicing Brief outlines the proposed servicing strategy for Minto's Arcadia Development residential Stages 3, 4, 5 and 6, and commercial Stages 2 and 3, in accordance with previous servicing studies developed for the area (presented in Section 1.4 of this Brief) and the November 2009 Servicing Study Guidelines for Development Applications in the City of Ottawa (City).

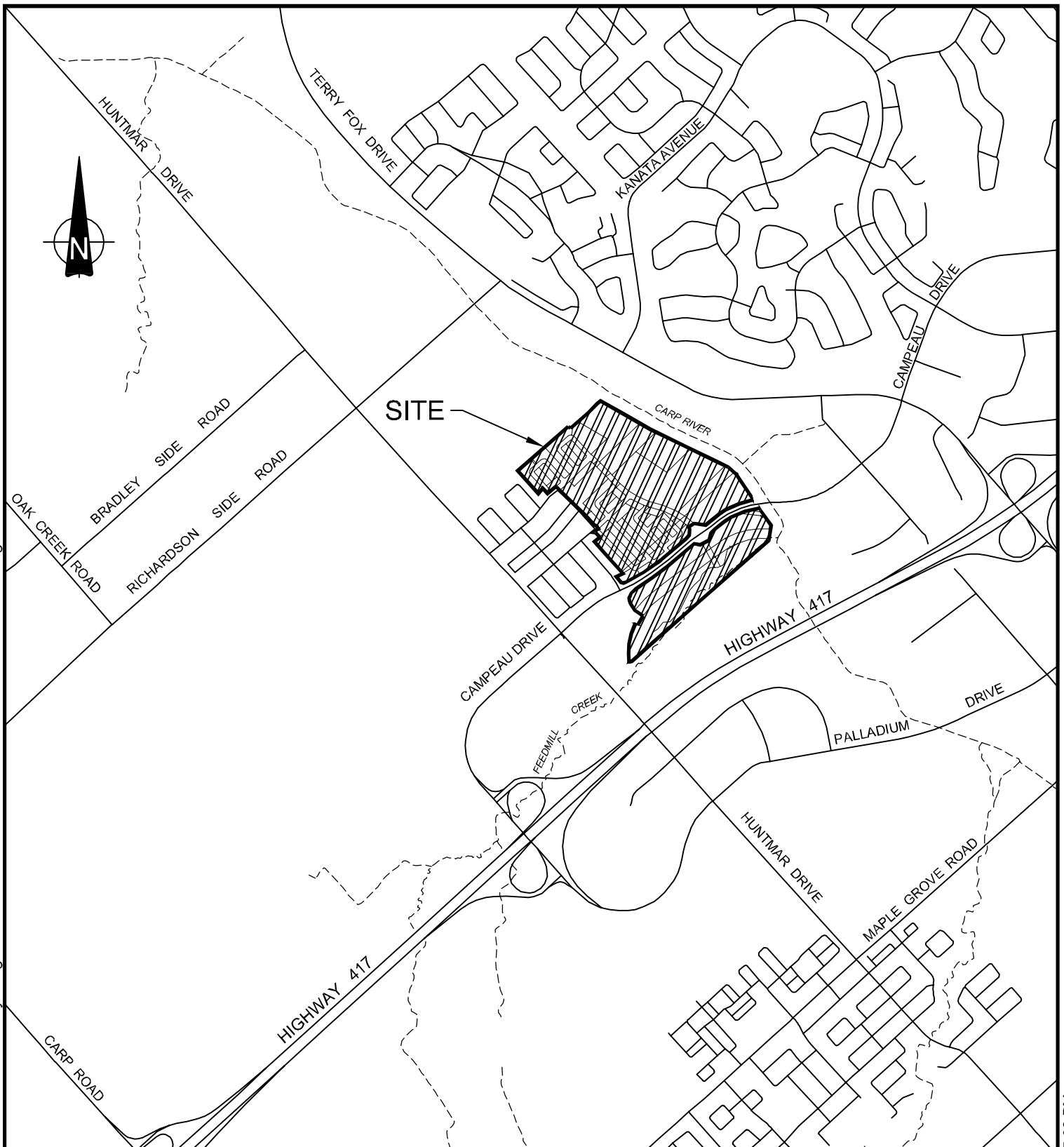
1.2 Property Description

Minto's Arcadia Development is located within the City of Ottawa's Official Plan (OP) boundary, and consists of a \pm 53 ha parcel bounded by existing residential and commercial to the west, and by the Carp River to the east, as depicted on the Location Plan in Figure 1. The Development is bisected near the south end by the future Campeau Drive extension and the future transit way. Currently, the land is undeveloped and generally drains easterly towards the Carp River. There is an existing drainage corridor within the Development that serves as the dedicated outlet for the existing stormwater management facility (SWMF) servicing existing Arcadia Stages 1 and 2 and Commercial Stage 1.

1.3 Proposed Development

The proposed Arcadia Development consists of approximately 29.5 ha of residential development which includes future Stage 5 and 6 residential blocks (Blocks 33 and 34, respectively), refer to the Draft Plan of Subdivision provided in Appendix 'A' and the Staging Plan in Figure 2. The residential portion of the development is anticipated to consist of the following units:

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PROJECT:

MINTO COMMUNITIES INC.
ARCADIA STAGE 3,4,5,6 AND COMMERCIAL STAGES 2 AND 3
450 HUNTMAR DRIVE, OTTAWA, ONTARIO

DRAWING:

LOCATION PLAN



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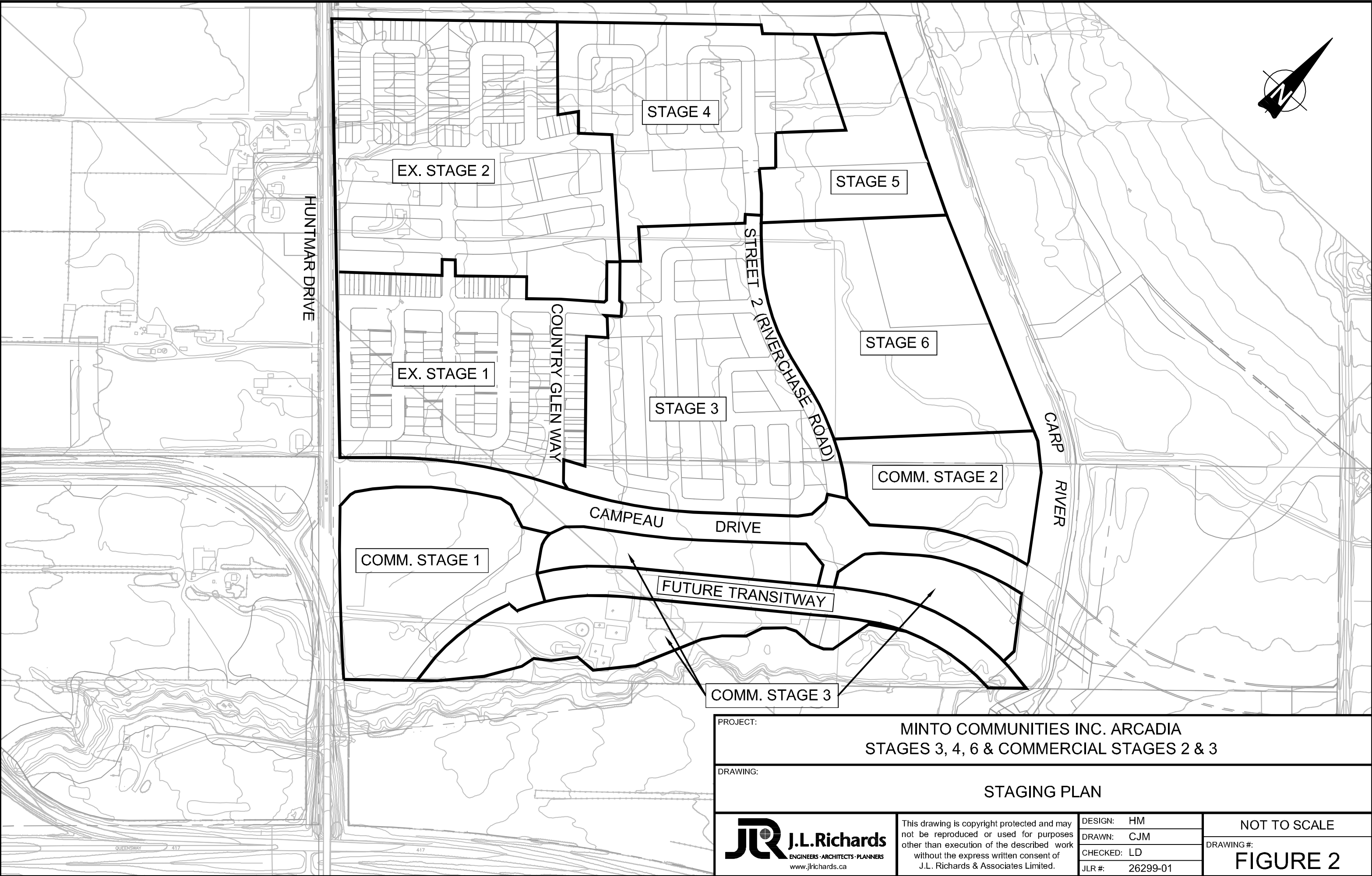
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FIGURE 1

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PROJECT:		MINTO COMMUNITIES INC. ARCADIA STAGES 3, 4, 6 & COMMERCIAL STAGES 2 & 3	
DRAWING:		STAGING PLAN	
 <div>ENGINEERS · ARCHITECTS · PLANNERS www.jlrichards.ca</div>	This drawing is copyright protected and may not be reproduced or used for purposes other than execution of the described work without the express written consent of J.L. Richards & Associates Limited.	DESIGN: HM	NOT TO SCALE
		DRAWN: CJM	
		CHECKED: LD	DRAWING #: FIGURE 2
		JLR #: 26299-01	

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Table 1: Proposed Residential Unit Breakdown

	Single	Row Town	Back-to-back Town	Condo	Total
Stage 3	88	107	42	35	272
Stage 4	58	71	0	0	129
Stage 5	41	0	0	0	41
Stage 6	133	0	0	0	133
Total	320	178	42	35	575

Based on Table 1 above, a total of 575 units are envisioned for the proposed Arcadia residential development. The commercial portion of the proposed Arcadia Development totals approximately 10.7 ha and consists of Stage 2 (Block 39) and Stage 3 (Blocks 40, 41 and 42). Blocks have also been provided for park use (2.9 ha), a future transit way (2.6 ha), stormwater management (3.3 ha) and open space (3.3 ha), as shown on the Draft Plan of Subdivision provided in Appendix 'A'.

1.4 Background Documents

The development of the Arcadia area is governed by the following background Studies and Reports:

1. Kanata West Master Servicing Study (KWMSS), Stantec/CCL/IBI, June 2006.
2. Carp River Watershed/Sub-Watershed Study, Robinson Consultants, 2004.
3. Model Calibration/Validation Exercise Carp River Restoration Plan Final Report, Greenland International Consulting Ltd., June 2011.
4. Conceptual Site Servicing Study (CSSS), Arcadia Stages 1, 2, 5 & 8, IBI Group, September 2013.
5. Arcadia Phase 1 - Site Servicing Report, IBI Group, July 2012.
6. Arcadia Phase 1 - Stormwater Management (SWM) Report, IBI Group, June 2012.
7. PCSWMM model (Existing and Future Conditions) developed by the City of Ottawa.
8. Arcadia Stage 2 Site Servicing Report, JLR, October 2014.
9. Arcadia – Stage 2 SWM Report and Stage 2 Inlet Design Brief, IBI Group, October 2014.

10. Signature Ridge Pump Station (SRPS) Hydraulic Grade Line Analysis, IBI Group, September 2014.
11. Arcadia Lands Conceptual Alternate Stormwater Servicing & Stormwater Management Strategy Technical Memorandum, JLR, August 2, 2016.

2.0 WATER SERVICING

Potable water for the Arcadia Development will ultimately be supplied by the existing 600 mm diameter watermain along Campeau Drive in accordance with the 2006 KWMSS Watermain Final Concept Drawing WM-1 (a copy of which is provided in Appendix 'B'). Specifically, potable water will be supplied from the above feedermain by connections to the following existing local watermains as shown on the JLR Conceptual Site Servicing Plan (Drawing CS1, Dated December 2016):

- One (1) - 200 mm diameter watermain stub along Paine Avenue \pm 20 m east of Clonrush Way.
- One (1) - 200 mm diameter watermain stub at Street No. 4 and Paine Avenue.
- Two (2) - 200 mm diameter watermain stubs at the intersection of Calvington Avenue and Clonrush Way.
- One (1) - 200 mm diameter and a 300 mm diameter watermain stub at the intersection of Campeau Drive and Street No. 2/No. 11.

A hydraulic network analysis (HNA) was conducted using the H2OMAP software platform for the Arcadia Development based on boundary conditions obtained from the City of Ottawa (refer to Appendix 'B' for correspondence). A conceptual 200 mm diameter water distribution system was evaluated under the following two development scenarios; 1) Interim: including only Stages 3, 4 and Commercial Stage 3, and 2) Ultimate: including all stages. The model results for both the interim and ultimate scenarios are provided in Appendix 'B'. The results of the analysis indicate that the proposed 200 mm diameter watermains will be sufficient to satisfy the peak hour maximum day plus fire flow requirements in accordance with the City of Ottawa Water Distribution Guidelines (July 2010) and Technical Bulletin ISDTB-2014-02. The model also showed that pressures in excess of 552 kPa (80 psi) are expected along the water distribution system. Consequently, pressure reducing valves will be required on all service laterals to satisfy the maximum pressure requirements of the Ontario Building Code.

The HNA will be further refined and water servicing specifics such as hydrant spacing and watermain looping will be addressed at the engineering detailed design stage. The HNA will demonstrate that the proposed water distribution system within the Arcadia Development can deliver the water demands during the peak hourly and maximum day plus fire flow conditions while meeting the pressure requirements prescribed in the City of Ottawa Water Distribution Design Guidelines (July 2010) and the Technical Bulletin ISDTB-2014-02.

3.0 WASTEWATER SERVICING

Wastewater generated in the Arcadia Development will ultimately outlet to the existing 675 mm diameter trunk sanitary sewer on Campeau Drive. This existing trunk sanitary sewer is the dedicated outlet for the Arcadia Development in accordance with the 2006 KWMSS and the IBI detailed trunk sanitary sewer design, refer to the KWMSS Drawing No. S-1 prepared by Stantec and the Drainage Area Plan (Drawing No. 501A) prepared by IBI in Appendix 'C'. Wastewater flows from the Arcadia Development will be conveyed to the 675 mm diameter trunk sanitary sewer by a connection to the existing 375 mm and 450 mm diameter sanitary sewer stubs at the Campeau Drive and Street No. 2/No. 11 intersection or via the existing 250 mm diameter sanitary sewer on Clonrush Way at Paine Avenue.

As per the IBI Campeau trunk sanitary sewer design, 32.67 ha of the Arcadia Development north of Campeau Drive was allocated to the 450 mm diameter sanitary sewer stub extending northerly along Street No. 2 (refer to the IBI Sanitary Sewer Design Sheet and External Sanitary Drainage Area Plan provided in Appendix 'C'). Additionally, 124 future Arcadia stacked townhouses (i.e., urban townhouses) fronting Campeau Drive were conceptually designed by IBI to outlet directly to the Campeau trunk sanitary sewer between MH 303A to MH 307A.

In regard to the tributary area on the south side of Campeau Drive, approximately 9.4 ha of the proposed Arcadia Development (eastern portion) was allocated to the existing 375 mm diameter sanitary sewer stub at the Street No. 11 intersection and approximately 3.6 ha of the proposed Development (western portion) was allocated to the existing 300 mm diameter sanitary sewer at the Country Glen intersection. The table below summarizes the allocated wastewater outlets for the proposed Arcadia Development.

Table 2: Allocated Peak Wastewater Flows to Campeau Trunk Sanitary Sewer

Allocated Outlet	Arcadia Development Tributary Area	Peak Flow
Tributary Area North of Campeau		
Street No. 2 – 450 mm dia. stub	32.67 ha	35.6 L/s
Campeau Drive Stacked Towns (MH 303A to MH 307A)	1.41 ha	5.0 L/s
Subtotal for development north of Campeau	34.08 ha	40.6 L/s
Tributary Area South of Campeau		
Street No. 11 – 375 mm dia. stub	9.37 ha	10.1 L/s
Country Glen – 300 mm dia. sewer	3.61 ha	3.9 L/s
Subtotal for development south of Campeau	12.98 ha	14.0 L/s
Total	47 ha	55 L/s

Although none of the proposed Arcadia development was allocated to the existing sanitary sewers within the existing Arcadia Stages 1 and 2, it is noted that these existing sewers do have residual capacity. There is a minimum residual capacity of 13.4 L/s between MHs 202A and 201A on Calvington Avenue (refer to the Arcadia Stage 2 Sanitary Sewer Design Sheet prepared by JLR provided in Appendix 'C'). However, given the elevation of the existing sanitary sewer system and the conceptual centreline of road elevations indicated on the JLR Conceptual Grading Plan (Drawing CG1, dated December 2016) for the proposed Development, it is anticipated that only the western leg of Street No. 4, located directly adjacent to Stage 2, could be serviced via the existing Stage 2 sanitary sewer on Paine Avenue.

Table 3 below summarizes the theoretical peak flows for each stage within the proposed Arcadia Development based on the unit counts indicated in Table 1.

Table 3: Conceptual Peak Flow Calculations for Arcadia Development

Stage	Population ⁽¹⁾	Area	Average Flow	Peaking Factor ⁽²⁾	Peak Flow	Infiltration Flow ⁽³⁾	Total Flow
Stage 3 Residential	796 cap	15.56 ha	350 L/cap/day	3.86	12.5 L/s	4.4 L/s	16.8 L/s
Stage 4 Residential	389 cap	5.24 ha	350 L/cap/day	4.00	6.3 L/s	1.5 L/s	7.8 L/s
Stage 5 Residential + park land	181 cap	3.32 ha	350 L/cap/day	4.00	2.9 L/s	0.9 L/s	3.9 L/s
Stage 6 Residential + park land	588 cap	8.23 ha	350 L/cap/day	3.94	9.4 L/s	2.3 L/s	11.7 L/s
Commercial Stage 2	N/A	3.56 ha	50,000 L/ha/day ⁽⁴⁾	1.5	3.1 L/s	1.0 L/s	4.1 L/s
Commercial Stage 3	N/A	7.17 ha	50,000 L/ha/day ⁽⁴⁾	1.5	6.2 L/s	2.0 L/s	8.2 L/s
TOTAL CONCEPTUAL PEAK FLOW:							52.5 L/s

Based on the conceptual peak flows summarized in Table 3 above, it is anticipated that the proposed development will generate approximately 2 L/s less than what was previously allocated for the Arcadia Development by IBI to the Campeau Drive trunk sanitary sewer.

Protection against basement flooding within the existing Arcadia Stages 1 and 2 is currently provided by an existing overflow which outlets to the existing 'interim' stormwater management facility (SWMF) located east of Clonrush Way. As per the Signature Ridge Pump Station Hydraulic Grade Line Analysis Report, protection against basement flooding for the proposed Arcadia Development is to be provided by one emergency sewer overflow to the ultimate SWMF identified in the 2006 KWMSS. Given that the proposed stormwater management strategy for the Arcadia Development deviates from that identified on the 2006 KWMSS, it is proposed that an adjustment be made to the proposed overflows as outlined in the Signature Ridge Pump Station Report. It is, therefore, proposed to maintain the existing overflow to the 'interim' SWMF south of Paine Avenue and include a second overflow at the new proposed SWMF south of Campeau Drive.

4.0 STORM SERVICING AND STORMWATER MANAGEMENT

4.1 Background

In 2006, the KWMSS was prepared on behalf of the Kanata West Owner's Group to investigate servicing requirements for a large mixed-use community in Kanata West. In terms of stormwater servicing and SWM, the KWMSS recommended that the ± 725 ha area be serviced by seven (7) water quality/quantity stormwater management facilities spread over the Kanata West Study Area. The largest facility in Kanata West, Pond 1, was identified to serve as the dedicated stormwater outlet for approximately 77 ha, which included all of the lands owned by Minto (Minto Communities and Minto Properties), the Campeau Drive right-of-way (ROW, from Huntmar Drive to the Carp River), as well as the future transit way (north of Feedmill Creek). Refer to the 2006 KWMSS Storm Sewer Minor System Drawing ST-MN and Storm Drainage Area Plan North – Pond 1 Drawing ST-PN provided in Appendix 'D' for additional details.

Pond 1 was conceptually sized within a 1.50 ha block as part of the 2006 KWMSS based on design standards that were applicable at that time. Since then, the Ottawa Sewer Design Guidelines (OSDG) were updated and re-issued in October 2012. The 2012 OSDG and subsequent Technical Bulletins provide more details in terms of modelling technique for infiltration (Horton Method), calculation of Runoff Coefficients (C-Factors) based on maximum permissible zoning, calculation of time of concentration, and assessing the performance of the infrastructure under a specific climate change event. Furthermore, the City has also developed a PCSWMM model of the Carp River and its tributary areas and has generated hydrographs at key locations that are to be matched under post-development conditions. Due to the changes to the OSDG as well as the completion of the Carp River PCSWMM model, the SWM strategy outlined in the 2006 KWMSS needed to be re-evaluated.

More recently, preliminary sizing of the ultimate Pond 1 was carried out by IBI as part of the Report entitled "Conceptual Site Servicing Study – Arcadia Stages 1, 2, 5 & 8", dated September 2013. The simulation results for this undertaking demonstrated that Pond 1 block identified in the 2006 KWMSS needed to be increased in size from 1.50 ha to 2.45 ha in order to fulfill the requirements of the 2012 OSDG. The Conceptual Site Servicing Study provided the following configuration details for Pond 1 (refer to Figure 6 Ultimate Pond Conceptual Section in Appendix 'D'):

- Bottom of facility: 92.00 m
- Permanent pool elevation: 92.65 m
- 1:100 year water surface elevation: 93.54 m

- Revised SWM Block Area: 2.45 ha

It should be noted that the 2.45 ha SWM Block was sized prior to the development of the “calibrated” PCSWMM model.

At the time of the ultimate SWMF pond preliminary design (2013), the first phase of residential development in Arcadia, known as Stage 1, was approved by the City. Given that the Carp River restoration works had yet to be implemented, Pond 1 could not be constructed at its location identified in the 2006 KWMSS as these lands were still zoned as Floodplain Hazard. As a result, an interim SWMF east of Clonrush Way was implemented to service Arcadia residential Stage 1 and the portion of the Campeau Drive ROW adjacent to Stage 1. This Interim SWMF was designed to provide water quality control for its tributary area and sized to meet the Carp River targeted hydrographs, which were developed by Greenland International Consulting Ltd. as part of their Final Report entitled “Model Calibration/Validation Exercise Carp River Restoration Plan”, dated June 2011. In 2014, JLR was retained by Minto to proceed with detailed design of residential Stage 2, located to the north of Stage 1. To support the development of Stage 2, upgrades to the Interim SWMF were carried out in order to achieve water quality control requirements as well as the targeted hydrographs. The works consisted of the addition of a sedimentation forebay on the northern side of the facility complete with inlet maintenance hole structure, refer to Interim Development Scenario Drainage Area Plan provided in Appendix ‘D’.

The detailed design for Arcadia Commercial Stage 1, located at the south-east quadrant of the Campeau Drive and Huntmar Drive intersection, was carried out by IBI in 2014. Minor system flow from this development was conveyed northerly along Country Glen Way to the existing interim SWMF. As part of this detailed design approximately 3.55 ha of the future Arcadia Commercial Stage 3 development and transit way were allocated to the Country Glen trunk storm sewer and ultimately to the interim SWMF. Refer to Storm Drainage Area Plan (Drawing No. C-500) prepared by IBI provided in Appendix ‘D’.

In August 2016, an alternate SWM solution for the Arcadia Development to that presented in the 2006 KWMSS was developed by JLR and presented to the City in the form of a Technical Memorandum entitled “Conceptual Alternate Stormwater Servicing and Stormwater Management Strategy” dated August 2, 2016. The proposed stormwater management approach consisted of two (2) wet ponds supplemented by privately owned water quality units, all of which would serve as the dedicated outlets to the Arcadia Development (residential and commercial) as well as for the future Campeau Drive ROW and transit way. The second SWMF would be located south of Campeau Drive at the eastern limit of the Arcadia Development.

As per e-mail correspondence with David Wise dated August 24, 2016, it is understood that the City is in general acceptance with the proposed alternate servicing approach which incorporates a second wet pond facility south of Campeau Drive. Refer to Appendix 'E' for a copy of the Technical Memorandum which provides the details and justifications for this second SWMF, along with the City's August 24, 2016 e-mail.

4.2 Servicing Approach

Storm and stormwater management servicing for the Arcadia Development will be designed as follows:

- The drainage system will be designed following the dual drainage principle. The minor storm sewer system will be sized to capture and convey runoff during frequent storm events while the major overland system to convey excess runoff generated from severe storm events that is not captured by the minor system.
- Storm sewers will be sized to capture and convey storm flows from the 1:2 year storm event (for local roads), the 1:5 year storm event (for collector Roads) and the 1:10 year storm event (Campeau and transit way) using the Rational Method and Intensity-Duration-Frequency (IDF) curves from the OSDG , as per Technical Bulletin PIEDTB-2016-01.
- An Inlet time of 10 minutes will be used to size all street sewers as per the OSDG.
- Runoff coefficients (C-Factors) for the residential development will be based on maximum lot coverage permitted by zoning, as per the OSDG. The C-factors for non-residential land usages will be calculated based on the ratio of pervious and impervious surfaces depicted on the proposed site plans.
- A minimum roadway sag storage of 50 m³/ha will be incorporated into the design of the subdivision as per the 2006 KWMSS.
- Storm sewer inlet control rates will be set during detailed design based on the land use type and results of the major overland flow analysis. The said control rates will be set to ensure that the street overland flow depths (static plus dynamic) are within the maximum allowable depth of 350 mm, as per Technical Bulletin PIEDTB-2016-01.

- Release rates from the SWMFs will be set so as to match the target hydrographs of the Carp River.
- To ensure that basements are protected from surcharged sewers, a hydraulic analysis will be conducted using PCSWMM to demonstrate that the minimum freeboard of 300 mm is provided to the units' underside of footing.
- Quality control will be provided to meet a MOECC Normal Level of Protection (i.e., 70% total suspended solids removal) before outletting to the Carp River in accordance with the Carp River Watershed Study and the 2006 KWMSS.

4.3 Conceptual Servicing Design

The conceptual storm servicing design for the Arcadia Development consists of a new wet SWMF located south of Campeau Drive and west of the Carp River Corridor within Block 40, as shown on the JLR Conceptual Servicing Plan (Drawing CS1, dated December 2016). The pond would discharge to the Carp River upstream of the Campeau Drive bridge crossing. This new pond would serve as the dedicated outlet for Arcadia Stage 3, Commercial Stage 2, the eastern portion of Commercial Stage 3, the Campeau Drive ROW and the future transit way. To minimize sewer size and submergence, this pond would have two inlet pipes: one inlet pipe for lands north of Campeau Drive (Stage 3 Residential, Commercial Stage 2) and the Campeau Drive ROW east of Street 2 and a second inlet pipe for the lands to the south of Campeau Drive and the Campeau Drive ROW west of Street 2.

It is noted that major system flows generated in Stage 3 are not permitted to cross Campeau Drive overland to outlet to the SWMF in accordance with the OSDG (i.e., major system flows shall not cross arterial roadways). For this reason, a spillover area northwest of the Campeau Drive/Street No. 2 intersection is proposed. Should the roadway sags of Stage 3 not offer sufficient major system storage, this spillover area would capture cascading major system flows and gradually release the flows, at a restricted rate, to the minor system. Alternatively, the Stage 3 major system flows above the 1:10 year storm event could be conveyed easterly across Street No. 2 directly to the Carp River (via ditch) in accordance with the 2006 KWMSS, which states that the ponds are to contain at least the 1:10 year storm event.

Minor system flows generated in residential Stages 4 and 5 are proposed to outlet to a new wet SWMF located within Block 37, with the exception of the western leg of Street No. 4 (within Stage 4) which would outlet to the existing 'interim' SWMF, as was conceptually designed by JLR as part of the existing Stage 2 storm sewer system.

Additionally, it is proposed to make the existing 'interim' SWMF a permanent facility that would continue to serve as the dedicated outlet for the existing Arcadia Stages 1 and 2 residential, Commercial Stage 1, the western portion of the Campeau Drive ROW and the western portion of Commercial Stage 3. The existing 'interim' SWMF would discharge to the new SWMF located within Block 37 via a culvert crossing Street No. 2 prior to outletting to the Carp River.

Major system flows in Stages 4 and 5 would be conveyed to a spillover area located within Block 36 before releasing, at a restricted rate, to the minor system. Major system flows up to the 1:100 year event within the western portion of Commercial Stage 3 would be stored onsite within Stage 3.

End of pipe treatment for Arcadia Stage 6 will be confirmed at detailed design and would be provided by either a private water quality unit outletting directly to the Carp River or by a new inlet to the SWMF at Block 37. Major system flows up to the 1:100 year storm event would be contained onsite within Stage 6.

5.0 SUMMARY OF SERVICING

Servicing of Minto's Arcadia Development will generally consist of the following as depicted on the Conceptual Servicing and Grading Plans.

5.1 Water Servicing

Potable water will be supplied to the Arcadia Development via connections to existing local watermains at the intersections of Paine Avenue and Clonrush Way, Clonrush Way and Calvington Avenue, and Street No. 2/No. 11 and Campeau Drive. Pressure reducing valves on water services will be required.

5.2 Wastewater Servicing

Wastewater servicing will be provided by connections to two existing sanitary sewer stubs located at the intersection of Street No. 2 /No. 11 and Campeau Drive as well as one connection to the existing Paine Avenue sanitary sewer.

5.3 Stormwater Servicing

End of pipe treatment for the Arcadia Development will be provided by two wet SWMFs: one located east of the existing 'interim' SWMF (which will be made permanent) and one

located south of Campeau Drive. Quantity control will be provided by street sag storage and spillover areas.

Prepared by:



Hilary MacKay, P.Eng.

Reviewed by:



Lucie Dalrymple, P.Eng.

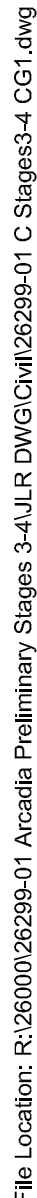


LEGEND

- PROPOSED STORM SEWER & MANHOLE
- PROPOSED SANITARY SEWER & MANHOLE
- PROPOSED WATERMAIN
- EXISTING STORM SEWER & MANHOLE
- EXISTING SANITARY SEWER & MANHOLE
- EXISTING WATERMAIN
- LIMIT OF CUT AND FILL (FROM PATERNON)
- IPGR
- HGL(u)
- HGL(l)
- PERMISSIBLE GRADE RAISE
- HGL UNDER ULTIMATE CONDITIONS
- HGL UNDER INTERM CONDITIONS (PART OF STAGE 3)

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This drawing is copyright protected and may not be reproduced or used for purposes other than execution of the described work without the express written consent of J.L. Richards & Associates Limited.		
VERIFY SHEET SIZE AND SCALES. BAR TO THE RIGHT IS 25mm IF THIS IS A FULL SIZE DRAWING.		
SCALE: 1:2000		
CLIENT: MINTO COMMUNITIES INC. 200-180 KENT STREET OTTAWA, ON K1P 0B6		
CONSULTANT: J.L. Richards ENGINEERS · ARCHITECTS · PLANNERS www.jlrichards.ca		
CONSULTANT:		
PROFESSIONAL STAMP	PROJECT NORTH	
PROJECT: MINTO COMMUNITIES INC. ARCADIA STAGES 3 & 4		
DRAWING: CONCEPTUAL SITE SERVICING PLAN		
DESIGN: HM	DRAWING #:	
DRAWN: TB	CS1	
CHECKED: LD		
JLR #:	26299-01	

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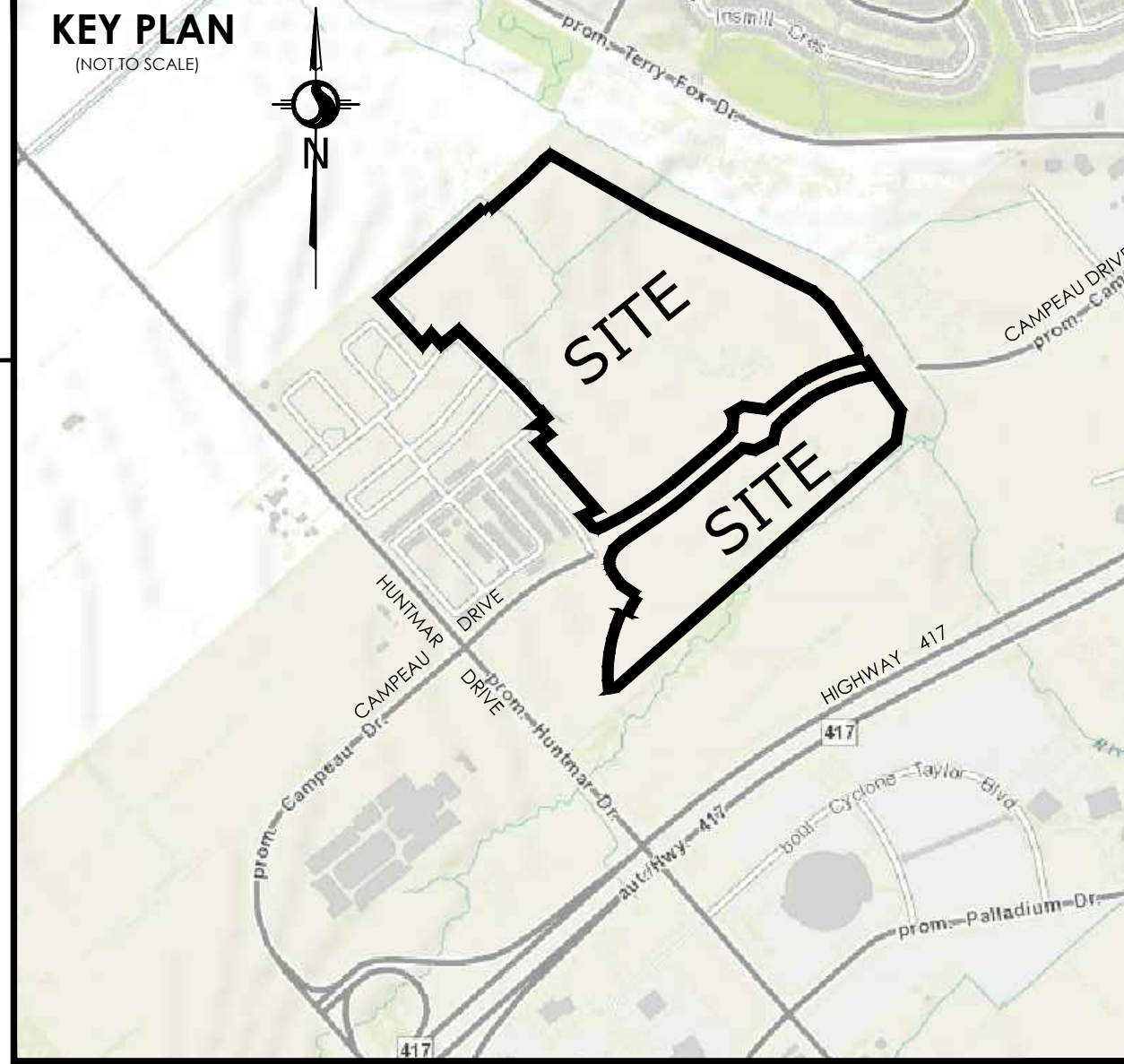
LOT DATE: December 21, 2016 9:33:26 AM

A P P E N D I X 'A'

DRAFT PLAN OF SUBDIVISION

SUBJECT TO THE CONDITIONS, IF ANY, SET FORTH IN
OUR LETTER DATED 30-
THIS DRAFT PLAN IS APPROVED BY THE CITY OF
OTTAWA UNDER SECTION 51 OF THE PLANNING ACT.
THIS DAY OF 2016.

DERIBICK MOORE, MANAGER
DEVELOPMENT REVIEW, SUBURBAN SERVICES
PLANNING, INFRASTRUCTURE AND ECONOMIC
DEVELOPMENT DEPARTMENT, CITY OF OTTAWA



DRAFT PLAN OF SUBDIVISION

PART OF LOTS 3 AND 4 CONCESSION 1 (TOPOGRAPHIC TOWNSHIP OF MARCH) CITY OF OTTAWA

Scale 1:1250
METRIC CONVERSION
DISTANCES AND COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE
CONVERTED TO FEET BY DIVIDING BY 3.2808

SCHEDULE OF LAND USE			
BLOCKS	USE	UNITS	AREA (Hq/0c)
1 TO 31	RESIDENTIAL	-	9,922,431
32 AND 33	FUTURE RESIDENTIAL	-	8,772,325
34 AND 35	PARK	-	2,877,099
36 AND 37	STORM POND	-	3,348,827
38 TO 42	COMMERCIAL	-	10,292,635
43 TO 46	OPEN SPACE	-	3,827,435
47	FUTURE TRANSIT WAY	-	2,805,422
48	WALKWAY	-	9,020,008
STREETS	STREET	-	3,407,883
TOTAL			47,821,117.67

INFORMATION: REQUIRED UNDER SECTION 51 (17) OF THE PLANNING ACT R.S.O. 1990

- SEE PLAN
- SEE PLAN
- SEE PROPOSED LAND USE SCHEDULE (ABOVE)
- SEE PLAN
- SEE PLAN
- SEE PLAN
- CITY WATER AVAILABLE
- SEE SOIL REPORT
- SEE TOPOGRAPHICAL INFORMATION
- ALL CITY SERVICES AVAILABLE
- SUBJECT TO EASEMENT PER INST. NO. OC15295157

OWNER'S CERTIFICATE
I HEREBY AUTHORIZE STANTEC GEOMATICS LTD. TO SUBMIT THIS DRAFT PLAN OF
SUBDIVISION ON MY BEHALF

DATE

SURVEYOR'S CERTIFICATE
I HEREBY CERTIFY THAT THE BOUNDARIES OF THE SUBJECT LANDS AND THEIR RELATIONSHIP TO
ADJOINING LANDS HAVE BEEN ACCURATELY AND CORRECTLY SHOWN.

DATE

BRYAN J. WEBSTER
ONTARIO LAND SURVEYOR

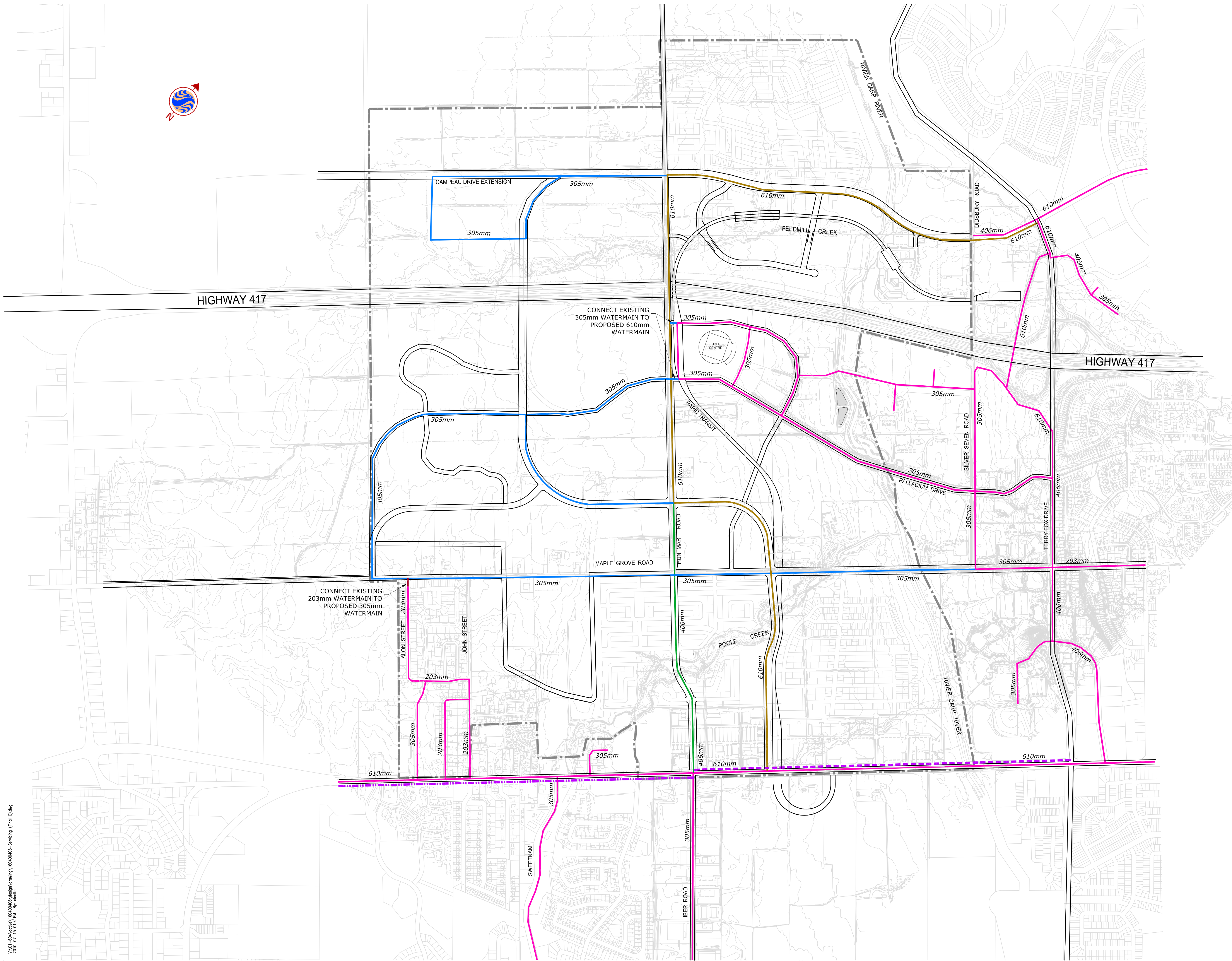
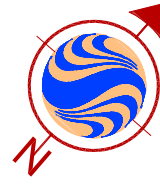


Stantec Geomatics Ltd.
CANADA LAND SURVEYORS
ONTARIO LAND SURVEYORS
1311 CLIVE AVENUE, SUITE 400
OTTAWA, ONTARIO K1C 3S4
TEL: 416 772 4400 FAX: 416 772 2799
STANTEC.COM

DRAWN: CEC CHECKED: * PM: FJ FIELD: N/A PROJECT NO.: 16161366613

A P P E N D I X 'B'

BACKGROUND WATER SERVICING DOCUMENTS & PRELIMINARY HNA RESULTS



Stantec Consulting Ltd.
1505 Laperriere Avenue
Ottawa ON Canada
K1Z 7T1
Tel. 613.722.4420
Fax. 613.722.2799
www.stantec.com

Stantec

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Legend

- KANATA--WEST CONCEPT PLAN BOUNDARY
- EXISTING WATERMAIN
- EXISTING 610mm WATERMAIN TO BE UPGRADED TO 914mm
- EXISTING 610mm WATERMAIN TO BE UPGRADED TO 762mm
- PROPOSED 610mm DIA. WATERMAIN
- PROPOSED 406mm DIA. WATERMAIN
- PROPOSED 305mm DIA. WATERMAIN
- PROPOSED 203mm DIA. WATERMAIN

Notes

INTERNAL WATERMAIN SIZE ARE EXPECTED TO VARY FROM 152mm TO 305mm.



5	REVISED FOR DEC.21/05 SUBMISSION	GBU	SJP	DEC.21/05
4	REVISED AS PER CITY COMMENTS (Sept.16/05)	GBU	MAF	OCT.28/05
3	REVISED WATER DISTRIBUTION NETWORK	GBU	S.J.P.	AUG. 09/05
2	REVISED POND 1 AREA	NI	MAF	JUNE. 09/05
1	REVISED LOTTING FOR TARTAN AND MATTAMY	BCB	SJP	JAN.18/05
Revision		By	Appd.	Date

File Name:		Dwn.	Chkd.	Dsgn.	Date
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Seals

Client/Project

Kanata West Concept Plan
Master Servicing Study

Ottawa, Ontario

Title

Watermain
Final Concept

Project No. 60400406	Scale 1:7500	0 75 225 375m	Sheet	Revision
Drawing No.				

WM-1

2 of 7

5

Ivan Dzeparoski

From: Bougadis, John <John.Bougadis@ottawa.ca>
Sent: February 22, 2017 2:52 PM
To: Ivan Dzeparoski
Cc: Hilary MacKay; Newton, Tim
Subject: RE: Arcadia Stage 3&4 Boundary Condition Clarification
Attachments: AcadiaStage3and4_Boundary Conditions_Feb222017.docx; H2OMAP Map_ 'Arcadia Stage 2_Rev2'.pdf

Hi everyone,

I added a number of future watermain within Phase 3 and Phase 4 and recomputed the boundary conditions (BC) at the requested locations (see attached). The results are comparable with JLR's ultimate conditions models for Arcadia (see attached PDF).

This issue does happen from time to time when a future "critical" watermain is not modelled when the BCs are extracted from the City's model.

Thanks

John

x14990

From: Ivan Dzeparoski [<mailto:idezeparoski@jlrichards.ca>]
Sent: Wednesday, February 22, 2017 1:29 PM
To: Bougadis, John
Cc: Hilary MacKay; Susan Murphy
Subject: RE: Arcadia Stage 3&4 Boundary Condition Clarification

Hi John,

As discussed please find attached schematic of the overall distribution network for Arcadia and HGLs at the specific nodes under Max Day plus fire conditions.

Thank you,

Ivan Dzeparoski

Ivan Dzeparoski
Water Resources Intern

J.L. Richards & Associates Limited
864 Lady Ellen Place, Ottawa, ON K1Z 5M2

From: Bougadis, John [<mailto:John.Bougadis@ottawa.ca>]
Sent: February 22, 2017 10:43 AM
To: Ivan Dzeparoski
Cc: Hilary MacKay
Subject: RE: Arcadia Stage 3&4 Boundary Condition Clarification

Hi Ivan,

Could you send me the following:

- Ultimate water distribution network, with sizes, for Arcadia.
- EPANet Model schematic
- HGLs at the nodes under Max day plus fire conditions.

My goal is to review this sometime this week.

Thanks

John
x14990

From: Ivan Dzeparoski [<mailto:idzeparoski@jlrichards.ca>]
Sent: Tuesday, February 21, 2017 3:35 PM
To: Bougadis, John
Cc: Hilary MacKay
Subject: Arcadia Stage 3&4 Boundary Condition Clarification

Hi John,

As per our conversation please find attached the boundary conditions that we received in June 2014, prior detailed design of Arcadia Stage 2 project. In addition, please find attached Overall Arcadia Demand Table and H2OMAP Schematic from the Conceptual Servicing Study for complete details that we sent as part of the boundary condition request for the aforementioned project.

Should you have any questions or concerns please do not hesitate to contact me.

Ivan Dzeparoski

Ivan Dzeparoski
Water Resources Intern

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



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Boundary Conditions for Acadia Stage 3 and 4

Information Provided:

Date provided: February 2017

Scenario	Interim Condition		Ultimate Condition	
	Demand		Demand	
	L/min	L/s	L/min	L/s
Average Daily Demand	540	9	810	13.5
Maximum Daily Demand	1098	18.3	1644	27.4
Peak Hour	2262	37.7	3384	56.4
Fire Flow Demand	12000	200	12000	200

Location:



- Future internal 203 mm watermain (shown conceptually in orange in the figure above) was added to the City's model.

Results:

Connection 1 - Paine Avenue

Demand Scenario	Interim Conditions		Ultimate Conditions	
	Head (m)	Pressure ¹ (psi)	Head (m)	Pressure ¹ (psi)
Maximum HGL	161.6	93.7	161.4	93.4
Peak Hour	154.4	83.5	154.4	83.5
Max Day plus Fire (12,000l/min)	135.8	57.0	134.0	54.5

¹ Ground Elevation = 95.7m

Connection 2 - Calvington Avenue

Demand Scenario	Interim Conditions		Ultimate Conditions	
	Head (m)	Pressure ¹ (psi)	Head (m)	Pressure ¹ (psi)
Maximum HGL	161.6	92.6	161.4	92.3
Peak Hour	154.5	82.5	154.5	82.6
Max Day plus Fire (12,000l/min)	143.8	67.2	142.4	65.3

¹ Ground Elevation = 96.5m

Connection 3 - Campeau Drive

Demand Scenario	Interim Conditions		Ultimate Conditions	
	Head (m)	Pressure ¹ (psi)	Head (m)	Pressure ¹ (psi)
Maximum HGL	161.6	96.5	161.4	96.3
Peak Hour	154.6	86.5	154.6	86.5
Max Day plus Fire (12,000l/min)	153.3	84.8	153.0	84.3

¹ Ground Elevation = 93.76m

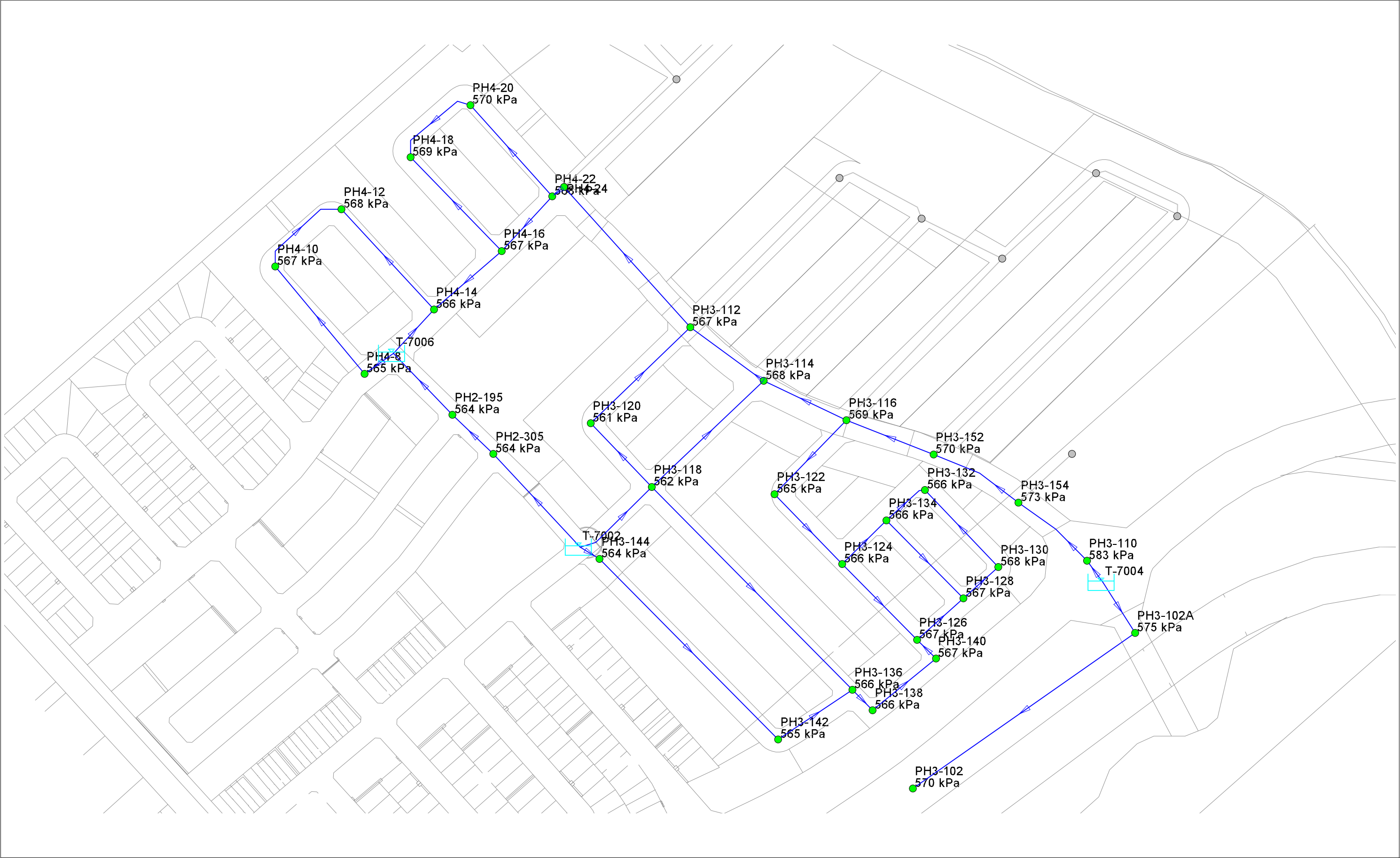
Notes:

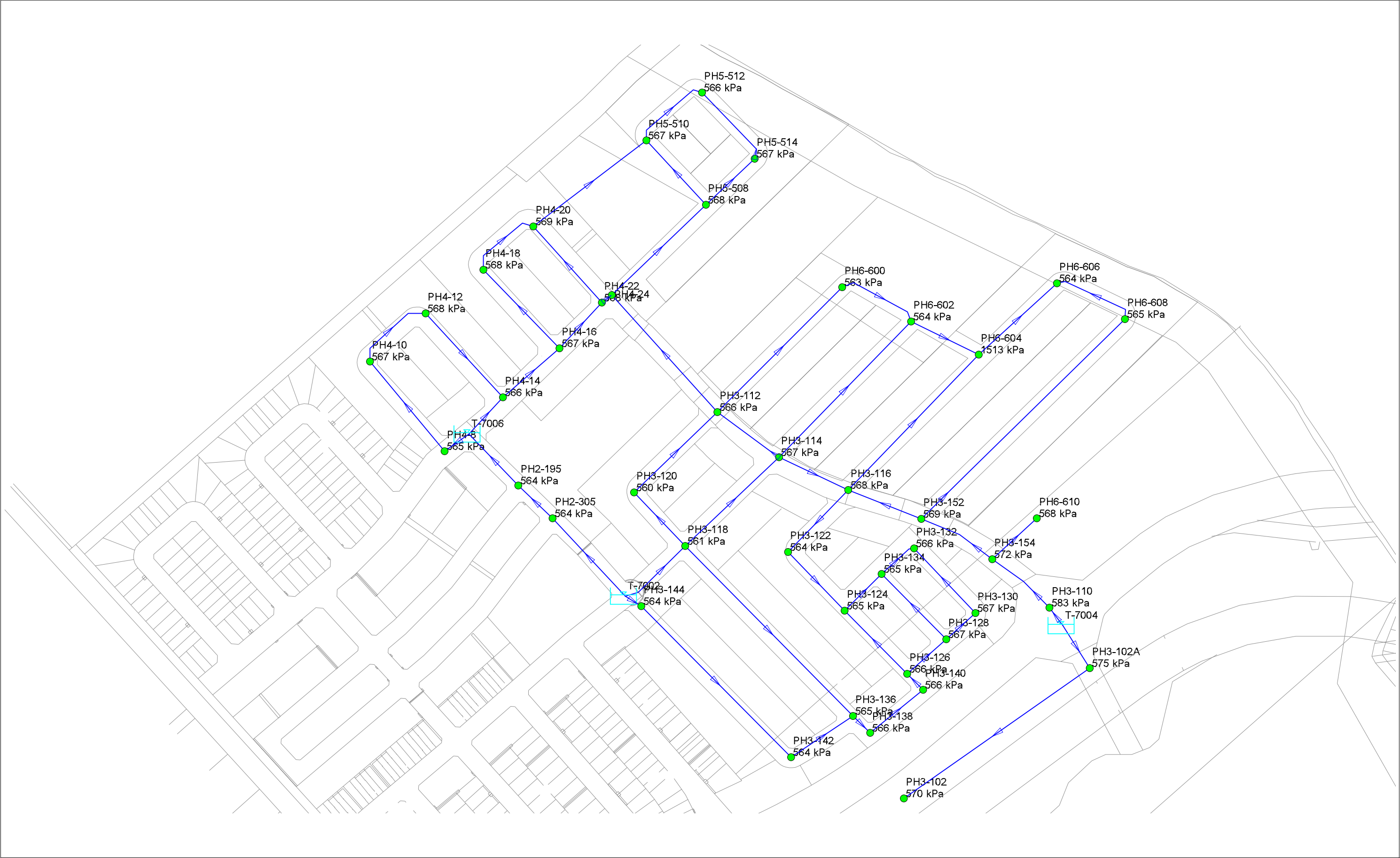
- 1) In the future, please provide:
 - FUS calculation for your “design” fire structure.
 - Demands for residential and ICI land-uses. The City’s water model applies demand patterns based on land-use type.
- 2) As per the Ontario Building Code in areas that may be occupied, the static pressure at any 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.

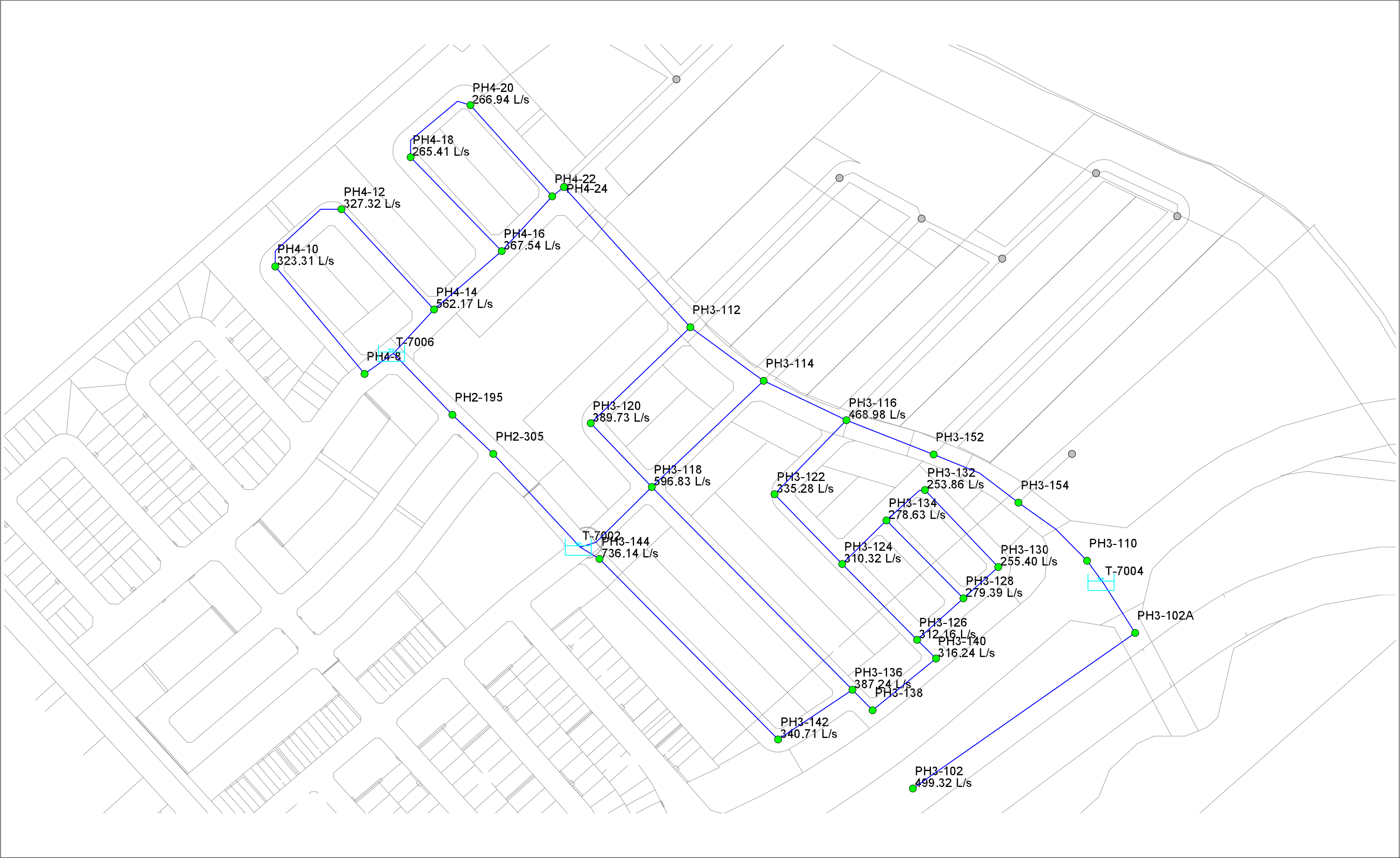
- 3) One set of boundary conditions was provided on Paine Avenue and Calvington Avenue. The HGL is the same at the requested locations for Paine and Calvington.
- 4) One set of boundary conditions was provided on Campeau Drive. The City avoids placing demands, especially large fire flows, on dead-end watermain stubs. The consultant is responsible for modelling the hydraulic losses along the 200 mm and 300 mm watermains, respectively.

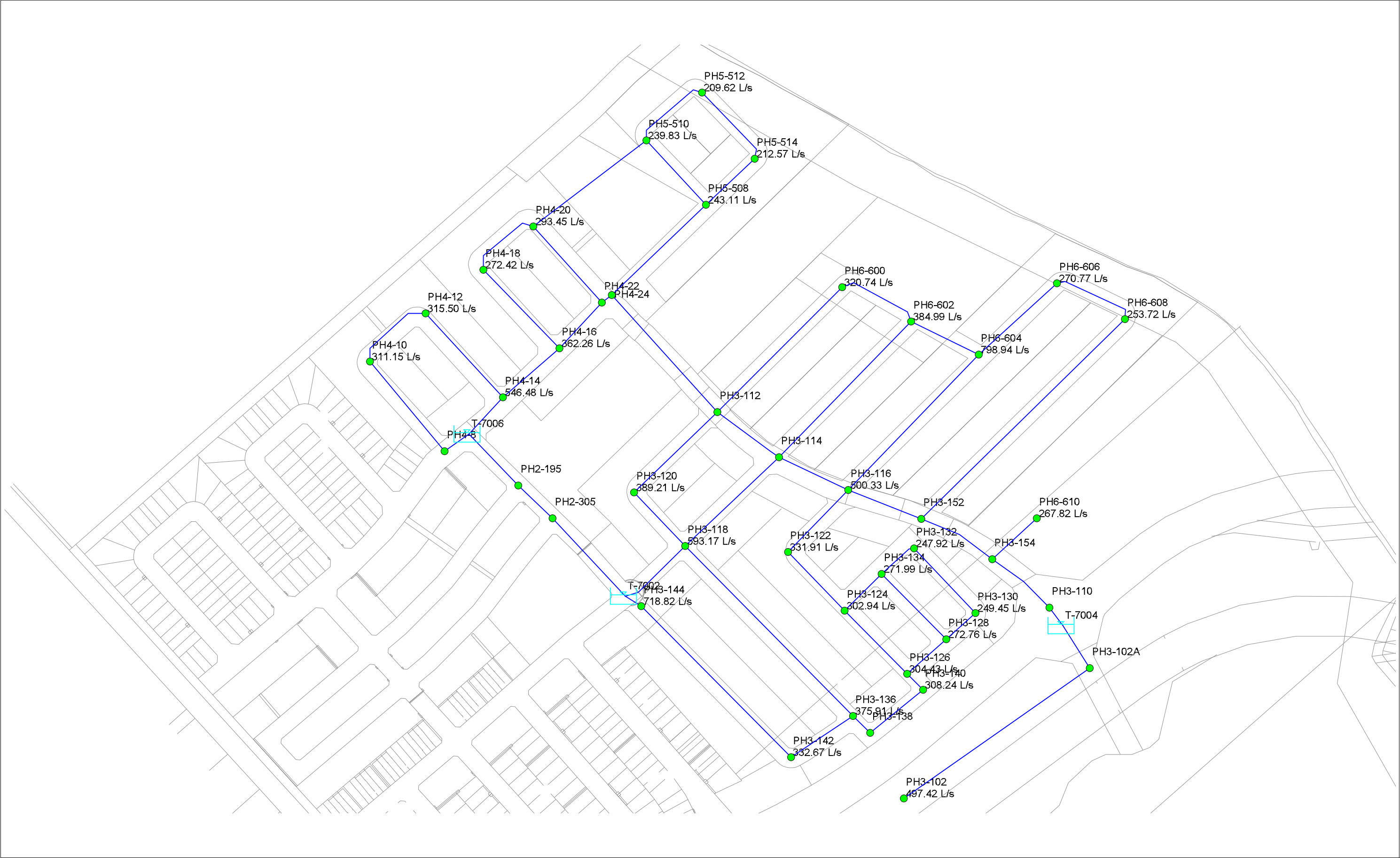
Disclaimer

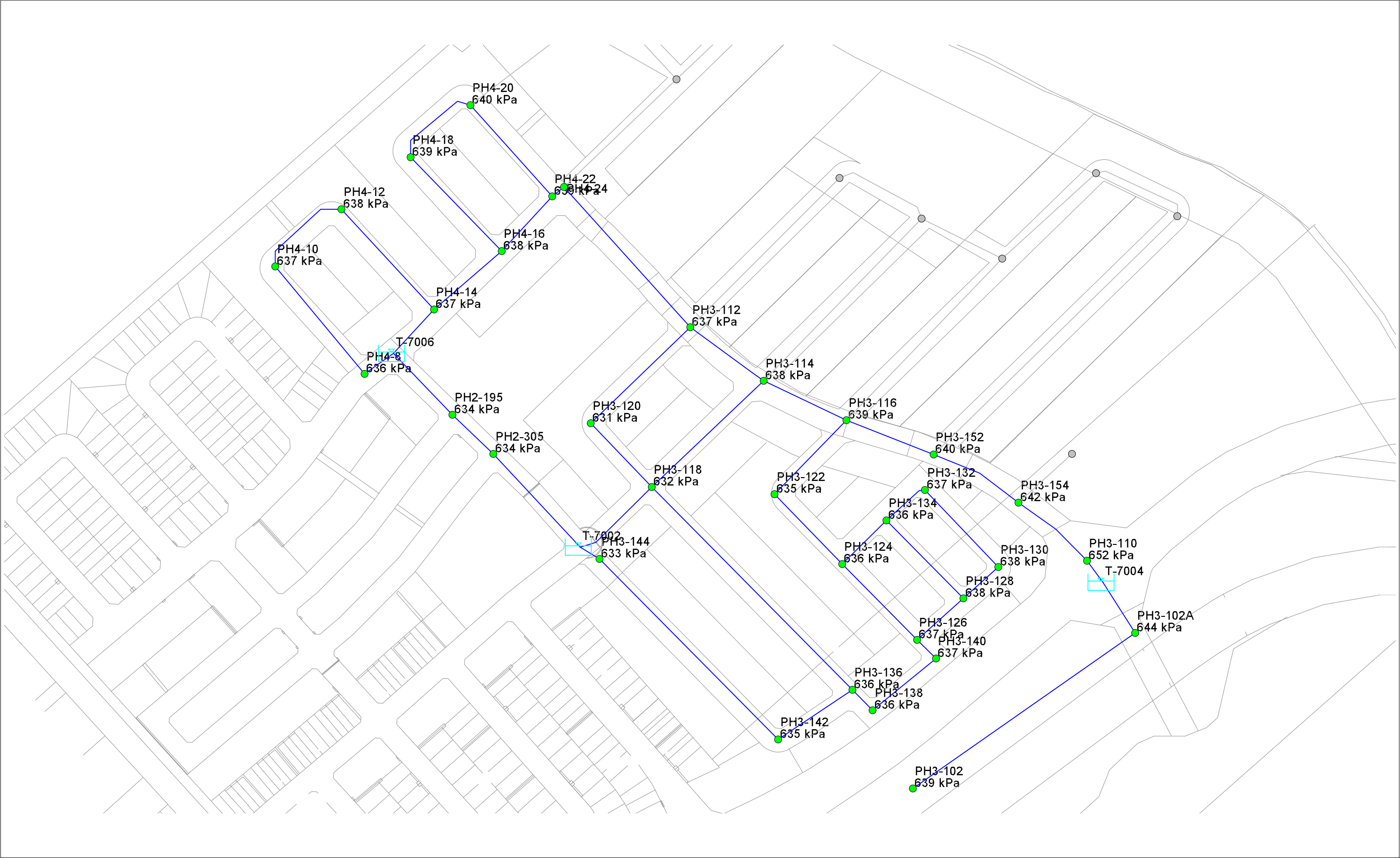
The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary 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.

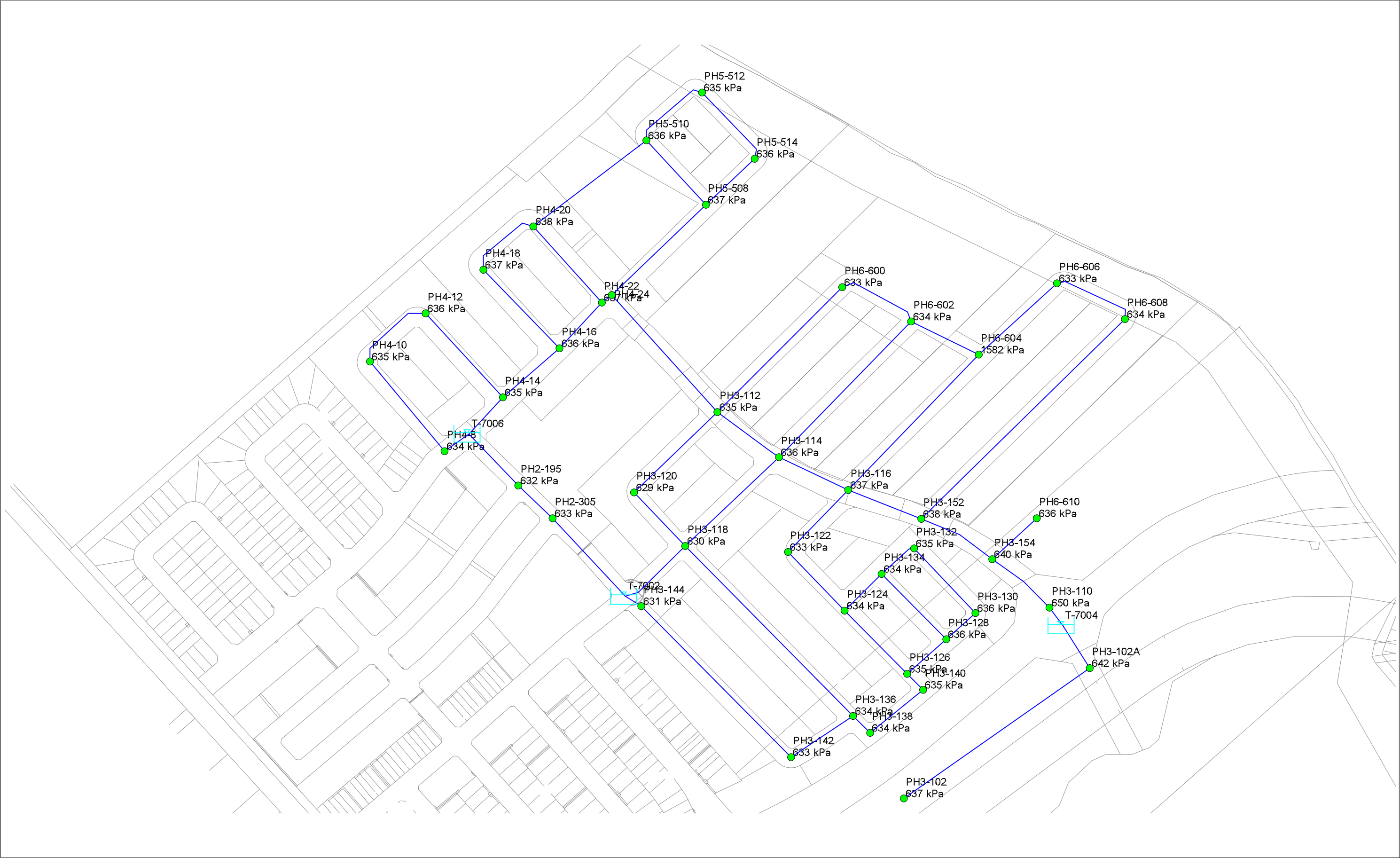












A P P E N D I X 'C'

BACKGROUND WASTEWATER SERVICING DOCUMENTS















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1770 HOOVER RD. CHICAGO, IL 60643

Legend

- | | |
|---|---|
|  | ULTIMATE MAJOR DRAINAGE LIMIT |
|  | SUBCATCHMENT AREAS |
|  | PROPOSED TRUNK SEWER |
|  | PROPOSED FORCEMAIN |
|  | TEMPORARY FORCEMAIN |
|  | PROPOSED STITTSVILLE PUMPING STATION AND FORCEMAIN |
|  | EXISTING TRUNK SEWER |
|  | MAJOR DRAINAGE SPLIT |
|  | NODES |
|  | EXISTING PUMPING STATION AND FORCEMAIN (TO BE DECOMMISSIONED) |
|  | INPUT POINT AND AREA IN HECTARES |
|  | EXISTING PUMPING STATION GRAVITY OUTLET |

File Name:	_____	_____	_____	_____
	Dwn	Chkd	Rean	Date

Seale

Client/Project

Kanata West Concept Plan
Master Servicing Study

Ottawa, Ontario

Preferred Waste-Water Option

Project No. 60400406

Scale 0 75 225 375
1:7500

Drawing No.	Sheet	Revision
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S-I 7 of 7 5

z:\01-604\active\160400406\design\drawing\West Kanata Dwg S-1-Dec_05.dwg
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 Last Saved By: nlonita Feb 20, 2007 - 10:02am

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72.5

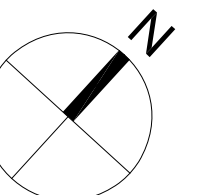
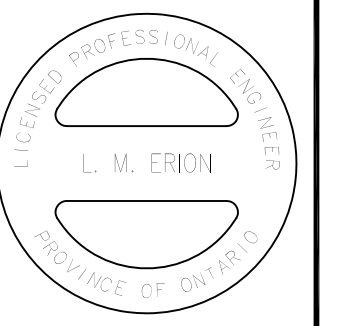
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4	REVISED PER CITY COMMENTS		12:06:27
3	REVISED PER LEGAL & CITY COMMENTS	LME	12:05:15
2	REVISED PER NEW LEGAL	LME	12:02:17
1	ISSUED FOR SUBMISSION	LME	10:11:26
No.	REVISIONS	By	Date



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

Project Title

ARCADIA
KANATA WEST
PHASE I



Drawing Title

EXTERNAL SANITARY DRAINAGE AREA PLAN

Scale 1:2000

Design L.M.E.	Date MARCH '09
Drawn M.M.	Checked R.W.W.
Project No. 3775	Drawing No. 501A



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

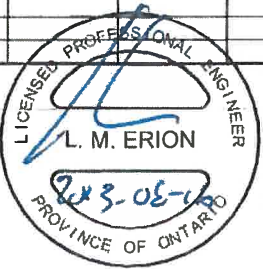
SANITARY SEWER DESIGN SHEET

PROJECT: ARCADIA PHASE 1
DEVELOPER: MINTO

JOB #: 3775-5.7
DATE PRINTED: 16-Aug-13
DESIGN: LE

LOCATION			INDIVIDUAL					CUM. RES. FLOW			INSTIT., INDUST., & COMM. FLOW						INFILTRATION			TOTAL	PROPOSED SEWER						
STREET	FROM MH	TO MH	RESID. UNITS			RES. AREA (Ha)	POP.	POP.	PEAK FACT.	PEAK FLOW (l/s)	Indust. AREA (Ha)	Comm. AREA (Ha)	Average FLOW (l/s)	CUM. Ave. Flow (l/s)	PEAK FACT.	PEAK FLOW (l/s)	INCR. AREA (Ha)	CUM. AREA (Ha)	FLOW (l/s)	DESIGN FLOW (l/s)	CAP. l/s	PIPE (mm)	LGTH. (m)	SLOPE %	VEL. (full) m/s	AVAIL. CAP. (l/s)	AVAIL. CAP. (%)
Phase 2	Stub	104 A	122	116		11.05	728.0	728	3.88	11.59							11.05	11.05	3.09	14.69	166.68	375	12.0	0.83	1.46	151.99	91%
Paine Avenue	104 C	104 A	19			0.71	64.6	65	4.00	1.06							0.71	0.71	0.20	1.26	135.67	375	25.7	0.55	1.19	134.41	99%
Clonrush Walk	104 A	200 A		7		0.27	18.9	812	3.86	12.83							0.27	12.03	3.37	16.20	77.64	375	76.8	0.18	0.68	61.44	79%
Calvington Avenue	Stub	200 A		5		0.19	13.5	14	4.00	0.22							0.19	0.19	0.05	0.27	26.72	200	16.5	0.61	0.82	26.45	99%
Calvington Avenue	200 A	201 A		7		0.29	18.9	844	3.85	13.31							0.29	12.51	3.50	16.81	85.85	375	75.7	0.22	0.75	69.04	80%
Mission Trail Crescent	208 A	207 A	8			0.41	27.2	27	4.00	0.45							0.41	0.41	0.11	0.56	28.02	200	79.7	0.67	0.86	27.46	98%
Mission Trail Crescent	207 A	206 A	5			0.26	17.0	44	4.00	0.72							0.26	0.67	0.19	0.91	27.37	200	79.6	0.64	0.84	26.46	97%
Mission Trail Crescent	206 A	205 A		2		0.08	5.4	50	4.00	0.81							0.08	0.75	0.21	1.02	28.83	200	11.3	0.71	0.89	27.81	96%
Calvington Avenue	205 A	204 A		15		0.43	40.5	90	4.00	1.48							0.43	1.18	0.33	1.81	52.24	200	65.7	2.33	1.61	50.44	97%
Mission Trail Crescent	209 A	210 A	14			0.76	47.6	48	4.00	0.78							0.76	0.76	0.21	0.99	27.37	200	90.3	0.64	0.84	26.38	96%
Mission Trail Crescent	210 A	204 A	6	1		0.42	23.1	71	4.00	1.16							0.42	1.18	0.33	1.49	22.44	200	84.0	0.43	0.69	20.95	93%
Calvington Avenue	204 A	203 A		15		0.46	40.5	201	4.00	3.30							0.46	2.82	0.79	4.09	24.19	200	69.4	0.50	0.75	20.10	83%
Brettonwood Crescent	212 A	211 A	15			0.75	51.0	51	4.00	0.84							0.75	0.75	0.21	1.05	28.21	200	90.3	0.68	0.87	27.17	96%
Brettonwood Crescent	211 A	203 A	7			0.37	23.8	75	4.00	1.23							0.37	1.12	0.31	1.54	29.45	200	83.3	0.74	0.91	27.91	95%
Calvington Avenue	203 A	202 A		15		0.47	40.5	317	4.00	5.19							0.47	4.41	1.23	6.43	24.19	200	75.8	0.50	0.75	17.77	73%
Brettonwood Crescent	213 A	214 A	1			0.11	3.4	3	4.00	0.06							0.11	0.11	0.03	0.09	32.82	200	12.0	0.92	1.01	32.73	100%
Brettonwood Crescent	214 A	215 A	13			0.67	44.2	48	4.00	0.78							0.67	0.78	0.22	1.00	28.21	200	87.2	0.68	0.87	27.21	96%
Brettonwood Crescent	215 A	202 A	8	1		0.46	29.9	78	4.00	1.27							0.48	1.26	0.35	1.62	26.07	200	87.7	0.58	0.80	24.45	94%
Calvington Avenue	202 A	201 A		8		0.31	21.6	416	4.00	6.82							0.31	5.98	1.67	8.49	21.92	200	72.8	0.41	0.68	13.43	61%
Country Glen Way	201 A	216 A	5	4		0.43	27.8	1287	3.73	19.67							0.43	18.92	5.30	24.97	83.80	375	96.1	0.21	0.74	58.83	70%
Country Glen Way	216 A	217 A	13	10		0.92	71.2	1359	3.71	20.67							0.92	19.84	5.56	26.22	77.64	375	119.5	0.18	0.68	51.42	66%
Country Glen Way	217 A	303 A				0.33	19.8	1378	3.71	20.94							0.33	20.17	5.65	26.59	114.24	375	46.0	0.39	1.00	87.65	77%
Campeau Drive	300 A	301 A		15		0.65	40.5	41	4.00	0.66	19.10	65.40	45.60	45.60	1.50	68.40	85.15	85.15	23.84	92.91	124.04	375	105.0	0.46	1.09	31.13	25%
Commercial Site	Stub	301 A					0.0	0	4.00	0.00		0.85	0.49	0.49	1.50	0.74	0.85	0.85	0.24	0.98	24.19	200	24.0	0.50	0.75	23.22	96%
Campeau Drive	301 A	302 A		14		0.51	37.8	78	4.00	1.28				46.09	1.50	69.14	0.51	86.51	24.22	94.65	131.91	375	76.9	0.52	1.16	37.26	28%
Campeau Drive	302 A	303 A		5		0.51	13.5	92	4.00	1.51				46.09	1.50	69.14	0.51	87.02	24.37	95.01	118.57	375	104.7	0.42	1.04	23.56	20%
Future Street	Stub	303 A				3.82	229.2	229	4.00	3.78	3.82	1.36	2.33	2.33	1.50	3.49	8.99	8.99	2.52	9.77	58.81	300	20.6	0.34	0.81	49.04	83%
Campeau Drive	303 A	304 A		20		0.59	46.0	1745	3.63	25.98				48.42	1.50	72.63	0.59	116.77	32.70	131.31	210.50	525	85.0	0.22	0.94	79.18	38%
Campeau Drive	304 A	305 A		24		0.57	55.2	1801	3.62	26.73				48.42	1.50	72.63	0.57	117.34	32.86	132.22	179.44	525	79.8	0.16	0.80	47.22	26%
Campeau Drive	305 A	306 A		42		0.85	96.6	1897	3.60	28.03				48.42	1.50	72.63	0.85	118.19	33.09	133.76	215.19	525	117.0	0.23	0.96	81.43	38%
Campeau Drive	306 A	307 A		38		0.82	87.4	1985	3.59	29.20				48.42	1.50	72.63	0.82	119.01	33.32	135.16	219.88	525	117.0	0.24	0.98	84.73	39%
Future north	Stub	307 A	Stage 3 units fronting Campeau:				19.72	1084.0	1084								1.41	1.41	0.40	15.02							
			160	200		5.50	330.0	1414	3.70	21.44	5.50	1.95	3.36	3.36	1.50	5.03	32.67	32.67	9.15	35.62	180.92	450	13.5	0.37	1.10	145.30	80%
Future south	Stub	307 A				3.98	238.8	239	4.00	3.87	3.98	1.41	2.43	2.43	1.50	3.64	9.37	9.37	2.62	10.13							
							0.0	239	4.00	3.92		22.13	12.81	15.24	1.50	22.86	31.50	31.50	8.82	35.60	89.61	375	25.5	0.24	0.79	54.01	60%
Campeau Drive	307 A	308 A				0.43	0.0	3637	3.37	50.26				67.02	1.50	100.53	0.43	183.61	51.41	202.20	447.33	675	115.0	0.26	1.21	245.13	55%
Campeau Drive	308 A	309 A				0.31	0.0	3637	3.37	50.26				67.02	1.50	100.53	0.31	183.92	51.50	202.29	328.02	675	66.0	0.14	0.89	125.73	38%
Campeau Drive	309 A	310 A					0.0	3637	3.37	50.26				67.02	1.50	100.53	0.00	183.92	51.50	202.29	382.32	675	97.0	0.19	1.04	180.03	47%
Campeau Drive	310 A	311 A					0.0	3637	3.37	50.26				67.02	1.50	100.53	0.00	183.92	51.50	202.29	438.47	675	117.0	0.25	1.19	236.18	54%
Campeau Drive	311 A	312 A					0.0	3637	3.37	50.26				67.02	1.50	100.53	0.00	183.92	51.50	202.29	401.90	675	67.0	0.21	1.09	199.61	50%
Campeau Drive	312 A	SAN 8					0.0	3637	3.37	50.26				67.02	1.50	100.53	0.00	183.92	51.50	202.29	438.47	675	34.0	0.25	1.19	236.18	54%

Where Q = average daily per capita flow (350 l/cap d) or (0.0041 l/sec /cap)
I = Unit of peak extraneous flow (0.28 l/sec/ha)
M = Residential Peaking factor = Harmon Peaking Factor, $M = 1 + (14 / (4 + P^{0.5}))$, where P = population in thousands
Q(p) = Peak population flow (l/s)
Q(i) = peak extraneous flow (l/s)
Population Density = 3.4 per single family, 2.7 per semi-detached and row townhouse units and 2.3 per stacked townhouse unit
Commercial, Employment Area - Average flow 50,000 l/day/ha (0.579 l/s/ha) with Peaking Factor = 1.5
Light Industrial, Business Park - Average flow 35,000 l/day/ha (0.405 l/s/ha) with Peaking Factor = 1.5
Gross Residential Lands = 60 persons/gross hectare



Total allocated for Arcadia Development
North of Campeau = 35.62 l/s + 5.02 l/s = 40.64 l/s
Total allocated for Arcadia development
South of Campeau = 10.13 + 3.91 = 14.04 l/s

As Built Pipe Lengths and Slopes
includes 37 townhouse units for Stage 1A



ARCADIA STAGE 2
370, 404, 410, 450 Huntmar Drive
CITY OF OTTAWA
MINTO COMMUNITIES INC.

SANITARY SEWER DESIGN SHEET

Designed by: H.M.
Checked by: K.F.

Date : September 2014

Single Family	3.4	pers/unit	q =	350	L/cap/day
Semi-Detached/Townhouse (row)	2.7	pers/unit	l =	0.280	L/s/ha
Manning's Coeff. N =	0.013		Inst. =	50000	L/ha/day

Denotes Existing Sewers	
-------------------------	--

STREET	M.H. #		RESIDENTIAL							PEAK EXTR. FLOW l/s	PEAK DES. FLOW l/s	Actual DIA. mm	SEWER DATA					RESIDUAL CAP. l/s	UPSTREAM					DOWNSTREAM				
			NUMBER OF UNITS			CUMULATIVE		PEAKING FACTOR	POPUL. FLOW l/s				DIA. mm	SLOPE %	CAPAC. l/s	VEL. m/s	LENGTH m		Center Line	Obvert Drop	Obvert	Invert	Cover	Center Line	Obvert Drop	Obvert	Invert	Cover
	SING.	MULT.	AREA ha	POPUL. peop.	AREA ha																							
Paine Avenue	1	2	2	5	0.25	20	0.25	4.00	0.33	0.07	0.40	203	200	1.50	41.9	1.29	38.21	41.51	100.25		96.45	96.243	3.80	99.20	0.018	95.87	95.670	3.33
Westover Crescent	13	14	11		0.47	37	0.47	4.00	0.61	0.13	0.74	203	200	0.40	21.7	0.67	63.12	20.93	99.03		96.46	96.256	2.57	99.15	0.005	96.21	96.003	2.94
Westover Crescent	14	2	9		0.37	68	0.84	4.00	1.10	0.24	1.34	203	200	0.40	21.6	0.67	71.66	20.28	99.15		96.20	95.998	2.95	99.20	0.06	95.92	95.712	3.28
Paine Avenue	2	3	3	10	0.46	126	1.55	4.00	2.03	0.43	2.47	203	200	1.00	34.2	1.06	74.06	31.77	99.20		95.8553	95.652	3.34	98.35	0.013	95.11	94.911	3.24
Westover Crescent	13	15	2		0.17	7	0.17	4.00	0.11	0.05	0.16	203	200	0.68	28.2	0.87	11.55	28.06	99.03		96.44	96.238	2.59	98.95	0.03	96.36	96.159	2.59
Westover Crescent	15	16	5		0.29	24	0.46	4.00	0.39	0.13	0.51	203	200	0.68	28.2	0.87	57.76	27.70	98.95		96.33	96.129	2.62	98.55	0.03	95.94	95.737	2.61
Westover Crescent	16	17	3		0.20	34	0.66	4.00	0.55	0.18	0.74	203	200	0.68	28.3	0.87	11.33	27.52	98.55		95.91	95.707	2.64	99.48	0.03	95.83	95.629	3.65
Westover Crescent	17	18	13		0.53	78	1.19	4.00	1.27	0.33	1.60	203	200	0.40	21.6	0.67	67.40	20.04	99.48		95.80	95.599	3.68	98.58	0.005	95.53	95.330	3.05
Westover Crescent	18	3	8		0.33	105	1.52	4.00	1.71	0.43	2.13	203	200	0.40	21.6	0.67	69.02	19.51	98.58		95.53	95.325	3.05	98.35	0.15	95.25	95.049	3.10
Paine Avenue	3	4	3		0.25	241	3.32	4.00	3.91	0.93	4.84	203	200	0.56	25.6	0.79	74.06	20.75	98.35		95.101	94.898	3.25	97.30	0.008	94.69	94.484	2.61
Saddleback Crescent	19	20	12		0.48	41	0.48	4.00	0.66	0.13	0.80	203	200	0.35	20.2	0.62	63.46	19.45	97.12		95.23	95.023	1.89	97.58	0.004	95.00	94.801	2.58
Saddleback Crescent	20	4	9		0.37	71	0.85	4.00	1.16	0.24	1.39	203	200	0.35	20.2	0.62	74.53	18.85	97.58		95.00	94.797	2.58	97.30	0.06	94.74	94.536	2.56
Paine Avenue	4	5	1	5	0.21	329	4.38	4.00	5.34	1.23	6.56	203	200	0.35	20.2	0.62	36.58	13.68	97.30		94.68	94.476	2.62	96.75	0.03	94.55	94.348	2.20
Paine Avenue	5	6	2	5	0.27	350	4.65	4.00	5.67	1.30	6.97	203	200	0.35	20.2	0.62	37.99	13.27	96.75		94.52	94.318	2.23	96.85	0.002	94.39	94.185	2.46
Saddleback Crescent	19	21	2		0.16	7	0.16	4.00	0.11	0.04	0.15	203	200	0.35	20.2	0.62	11.62	20.09	97.12		95.25	95.049	1.87	97.19	0.004	95.21	95.009	1.98
Saddleback Crescent	21	22	5		0.28	24	0.44	4.00	0.39	0.12	0.51	203	200	0.35	20.2	0.62	57.78	19.73	97.19		95.21	95.004	1.98	97.10	0.03	95.01	94.802	2.09
Saddleback Crescent	22	23	3		0.21	34	0.65	4.00	0.55	0.18	0.73	203	200	0.35	20.2	0.62	11.34	19.51	97.10		94.98	94.772	2.12	97.02	0.03	94.94	94.732	2.08
Saddleback Crescent	23	24	13		0.53	78	1.18	4.00	1.27	0.33	1.60	203	200	0.35	20.2	0.62	70.68	18.65	97.02		94.91	94.702	2.11	97.00	0.004	94.66	94.455	2.34
Saddleback Crescent	24	6	6		0.28	99	1.46	4.00	1.60	0.41	2.01	203	200	0.35	20.2	0.62	59.45	18.24	97.00		94.65	94.451	2.35	96.85	0.06	94.45	94.243	2.40
Paine Avenue	6	7	4	8	0.44	484	6.55	3.98	7.80	1.83	9.63	254	250	0.26	31.6	0.62	65.18	22.00	96.85		94.39	94.132	2.46	96.57	0.03	94.22	93.963	2.35
Paine Avenue	7	8			0.00	484	6.55	3.98	7.80	1.83	9.63	254	250	0.26	31.6	0.62	9.86	22.00	96.57		94.19	93.933	2.38	96.63	0.003	94.16	93.907	2.47
Paine Avenue	8	9	2		0.16	490	6.71	3.98	7.90	1.88	9.78	254	250	0.26	31.6	0.62	27.94	21.85	96.63		94.16	93.904	2.47	96.75	0.06	94.09	93.831	2.66
Clonrush Way	9	41	5	7	0.46	526	7.17	3.96	8.45	2.01	10.45	254	250	0.26	31.6	0.62	74.61	21.18	96.75		94.03	93.771	2.72	96.90	0.003	93.83	93.577	3.07
Fallengale Crescent	33	34		2	0.09	5	0.09	4.00	0.09	0.03	0.11	203	200	2.62	55.4	1.71	11.75	55.27	99.72		96.87	96.668	2.85	99.46	0.60	96.56	96.360	2.90
Fallengale Crescent	34	35		19	0.41	57	0.50	4.00	0.92	0.14	1.06	203	200	0.65	27.6	0.85	66.25	26.53	99.46		95.96	95.760	3.50	98.30	0.008	95.53	95.329	2.77
Fallengale Crescent	35	36		11	0.26	86	0.76	4.00	1.40	0.21	1.61	203	200	0.40	21.6	0.67	65.38	20.03	98.30		95.52	95.322	2.78	98.10	0.005	95.26	95.060	2.84
Brettonwood Ridge	37	36		16	0.48	43	0.48	4.00	0.70	0.13	0.83	203	200	0.35	20.2	0.62	69.05	19.41	97.82		95.56	95.362	2.26	98.10	0.06	95.32	95.120	2.78
Sweetwater Lane	36	38		9	0.21	154	1.45	4.00	2.49	0.41	2.90	203	200	0.35	20.2	0.62	56.14	17.34	98.10		95.26	95.060	2.84	97.53	0.03	95.07	94.864	2.46
Sweetwater Lane	38	39		14	0.30	192	1.75	4.00	3.11	0.49	3.60	203	200	0.35	20.2	0.62	49.06	16.65	97.53		95.04	94.834	2.49	97.00	0.03	94.87	94.662	2.13
Sweetwater Lane	39	40		16	0.44	235	2.19	4.00	3.81	0.61	4.42	203	200	0.35	20.2	0.62	68.09	15.82	97.00		94.84	94.632	2.16	96.90	0.004	94.60	94.393	2.30
Sweetwater Lane	40	41		6	0.16	251	2.35	4.00	4.07	0.66	4.73	203	200	0.35	20.2	0.62	46.99	15.52	96.90		94.59	94.389	2.31	96.90	0.60	94.43	94.225	2.47
Clonrush Way	41	32	5		0.23	794	9.75	3.86	12.43	2.73	15.16	254	250	0.26	31.6	0.62	46.03	16.48	96.90		93.83	93.574	3.07	96.95	1.32	93.71	93.454	3.24
Fallengale Crescent	25	26		2	0.12	5	0.12	4.00	0.09	0.03	0.12	203	200	2.57	54.9	1.69	11.21	54.73	99.20		96.16	95.961	3.04	98.95	0.03	95.88	95.673	3.07
Fallengale Crescent	26	27		19	0.42	57	0.54	4.00	0.92	0.15	1.07	203	200	0.50	24.2	0.75	66.60	23.12	98.95		95.85	95.642	3.10	98.22	0.006	95.51	95.309	2.71
Fallengale Crescent	27	28		15	0.45	97	0.99	4.00	1.58	0.28	1.85	203	200	0.35	20.2	0.62	65.71	18.39	98.22		95.51	95.303	2.71	97.25	0.004	95.28	95.073	1.97
Halyard Way	28	29		6	0.26	113	1.25	4.00	1.84	0.35	2.19	203	200	0.35	20.2	0.62	33.30	18.06	97.25		95.27	95.069	1.98	96.97	0.004	95.16	94.952	1.81
Halyard Way	29	30		16	0.36	157	1.61	4.00	2.54																			



ARCADIA STAGE 2
370, 404, 410, 450 Huntmar Drive
CITY OF OTTAWA
MINTO COMMUNITIES INC.

SANITARY SEWER DESIGN SHEET

Designed by: H.M.
Checked by: K.F.

Date : September 2014

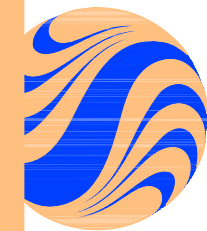
Single Family	3.4	pers/unit	q =	350	L/cap/day
Semi-Detached/Townhouse (row)	2.7	pers/unit	l =	0.280	L/s/ha
Manning's Coeff. N =	0.013		Inst. =	50000	L/ha/day

Denotes Existing Sewers	
-------------------------	--

			RESIDENTIAL																										
STREET	M.H. #		NUMBER OF UNITS			CUMULATIVE		PEAKING FACTOR	POPUL. FLOW l/s	PEAK EXTR. FLOW l/s	PEAK DES. FLOW l/s	Actual DIA. mm	SEWER DATA					RESIDUAL CAP. l/s	UPSTREAM					DOWNSTREAM					
			SING.	MULT.	AREA ha	POPUL. peop.	AREA ha						DIA. mm	SLOPE %	CAPAC. l/s	VEL. m/s	LENGTH m		Center Line	Obvert Drop	Obvert	Invert	Cover	Center Line	Obvert Drop	Obvert	Invert	Cover	
	FROM	TO																											
Calvington Avenue	EX. Stub	EX 200A		5	0.19	14	0.19	4.00	0.22	0.05	0.27	203	200	0.61	26.7	0.82	16.50	26.43	97.06		93.81	93.610	3.25	96.97		93.71	93.510	3.26	
Calvington Avenue	EX 200A	EX 201A		7	0.29	1056	13.55	3.78	16.19	3.79	19.98	381	375	0.22	86.6	0.76	75.74	66.59	96.97	0.05	92.23	91.850	4.74	97.24		92.06	91.680	5.18	
Calvington Avenue	EX 202A	EX 201A		11	0.38	424	6.05	4.00	6.87	1.69	8.56	203	200	0.41	22.0	0.68	72.79	13.40	97.18		93.21	93.010	3.97	97.24		92.91	92.710	4.33	
Country Glen Way	EX 201A	EX 216A	9	2	0.49	1516	20.09	3.68	22.57	5.63	28.19	381	375	0.21	83.4	0.73	96.10	55.23	97.24	0.09	91.97	91.590	5.27	97.30		91.77	91.390	5.53	
Country Glen Way	EX 216A	EX 217A	15	8	0.91	1588	21.00	3.66	23.56	5.88	29.44	381	375	0.18	76.6	0.67	119.53	47.19	97.30		91.77	91.390	5.53	97.48		91.56	91.180	5.92	

A P P E N D I X 'D'

BACKGROUND STORM SERVICING AND STORMWATER MANAGEMENT DOCUMENTS



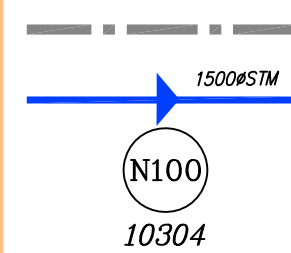
Stantec Consulting Ltd.
1505 Laperriere Avenue
Ottawa ON Canada
K1Z 7T1
Tel. 613.722.4420
Fax. 613.722.2799
www.stantec.com

Stantec

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Legend



KANATA-WEST CONCEPT
PLAN BOUNDARY
PROPOSED STORM SEWER & SIZE
STORM NODE
STORM SEWER IDENTIFICATION



2	REVISED FOR DEC.21/05 SUBMISSION	GBU	SJP	DEC.21/05
1	REVISED AS PER CITY COMMENTS (Sept.16/05)	GBU	MAF	OCT.28/05
Revision		By	Appd.	Date
File Name:	160400406	LM	MAF	MAF
		Dwn.	Chkd.	Dsgn.

Seals

Client/Project

Kanata West Concept Plan
Master Servicing Study

Ottawa, Ontario

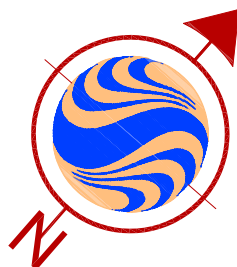
Title

MODEL SCHEMATIC
STORM SEWER MINOR SYSTEM

Project No.	Scale	0 75 225 375m
60400406	1:7500	
Drawing No.	Sheet	Revision

ST-MN 6 of 7 2

N:\01-404\Vector\160400406\Design\Drawings\160400406_06-Phase_2_Rev_11.dwg
2010-07-15 12:24PM By: mmlh



--- KANATA-WEST CONCEPT PLAN BOUNDARY
--- POND DRAINAGE BOUNDARY
--- STORM SEWER DRAINAGE LIMIT

A-1

A= 72.31 ha.
C= 0.60
I= 246 L/s
MNR= N4A01
MJR= 4A01
INF= 73 mm/yr

DRAINAGE AREA IDENTIFICATION
AREA IN HECTARES
RUNOFF COEFFICIENT
100yr. INLET CAPACITY (L/s)
MINOR SYSTEM NODE NUMBER
MAJOR SYSTEM SEGMENT NUMBER
INFILTRATION

Notes

* REFER TO FIGURE 3.2 IN KANATA WEST MASTER SERVING STUDY FOR FURTHER INFILTRATION DETAILS

1. THOSE AREAS WHICH ARE COMPLETELY SURROUNDED BY ARTERIAL ROADWAYS (SPECIFICALLY AREAS A-8, C-4, C-12, C-15, C-17, C-18) MUST PROVIDE SURFACE STORAGE IN THE AMOUNT OF 360mm/ha, OR IN SUFFICIENT QUANTITY TO DEMONSTRATE COMPLETE CONTAINMENT OF THE 100yr EVENT. (i.e. NO MAJOR SYSTEM FLOW IN THE 1:100yr EVENT)



Revision	Description	By	Date
2	REVISED FOR DEC 21/05 SUBMISSION	GBU	DEC 21/05
1	REVISED AS PER CITY COMMENTS (Sept 16/05)	GBU	OCT 26/05

Client/Project

Kanata West Concept Plan
Master Servicing Study

Ottawa, Ontario

Title

STORM DRAINAGE AREA PLAN
NORTH PONDS

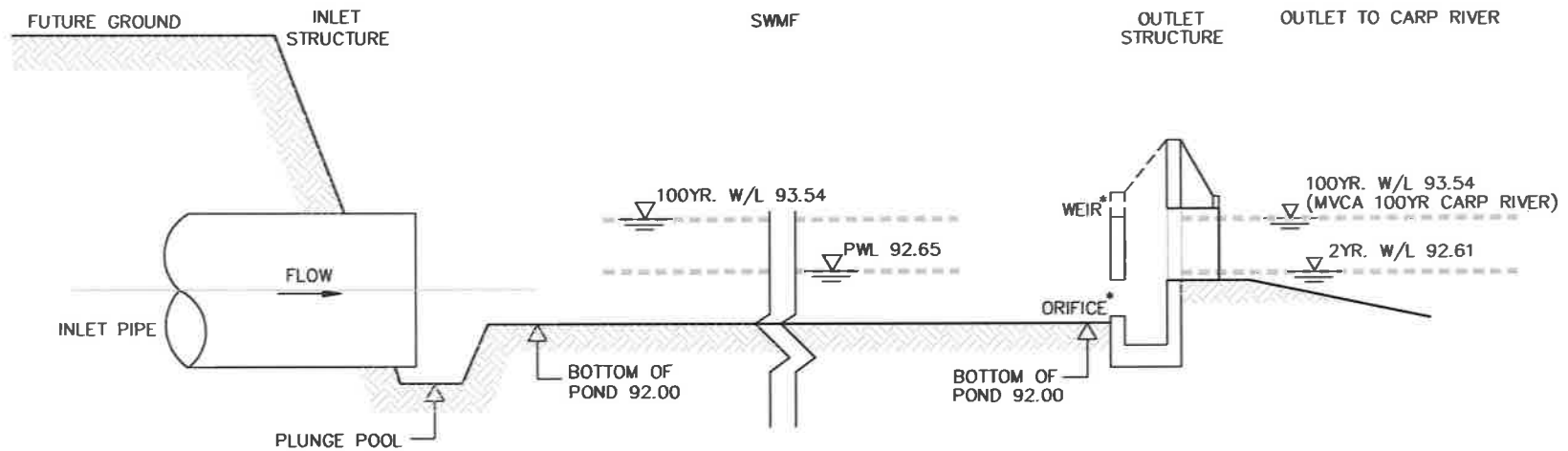
Project No.	Scale	Sheet	Revision
60400406	1:3000		

Drawing No.

ST-PN

4 of 7

2



NOTE:

* WEIR ELEVATION AND ORIFICE SIZE TO BE ADJUSTED TO PROVIDE EXTENDED DETENTION RELEASE FOR QUALITY TREATMENT.

Plot Style: AIA STANDARD COLOR-HALF.CTB Plot Scale: 1:1 Plotted At: Oct. 1, 13 12:27 PM Printed By: PETER DEIR Last Saved By: PDEIR Last Saved At: Sep. 20, 13

Sheet No.

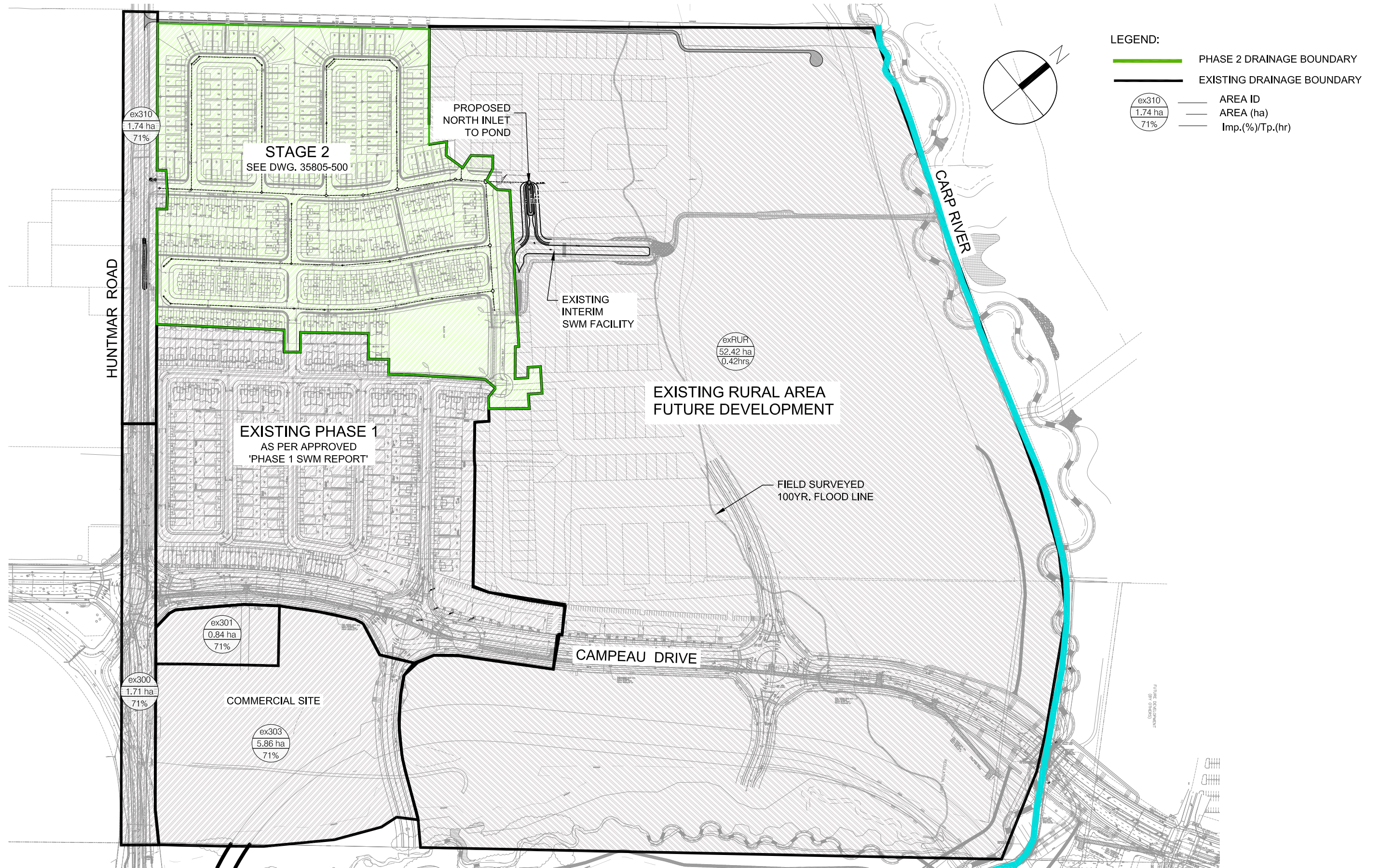


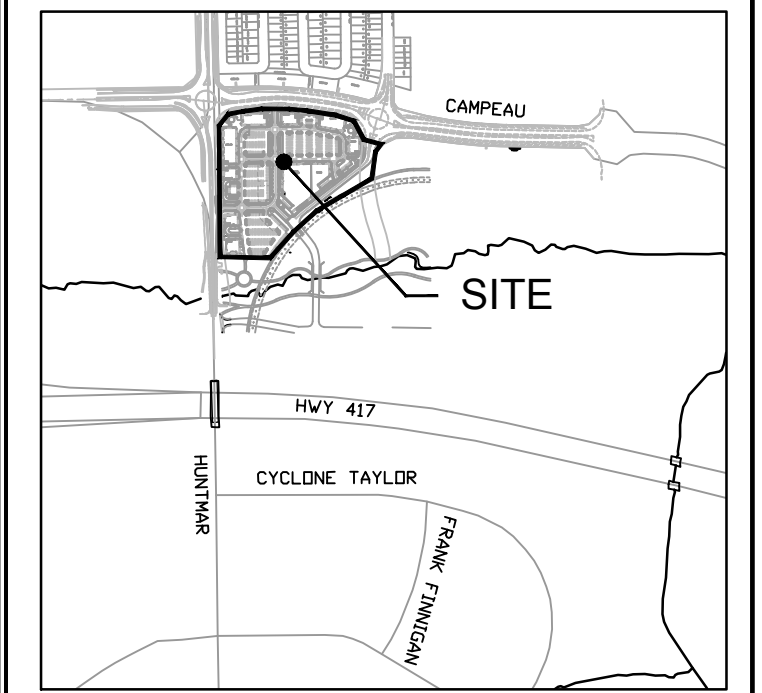
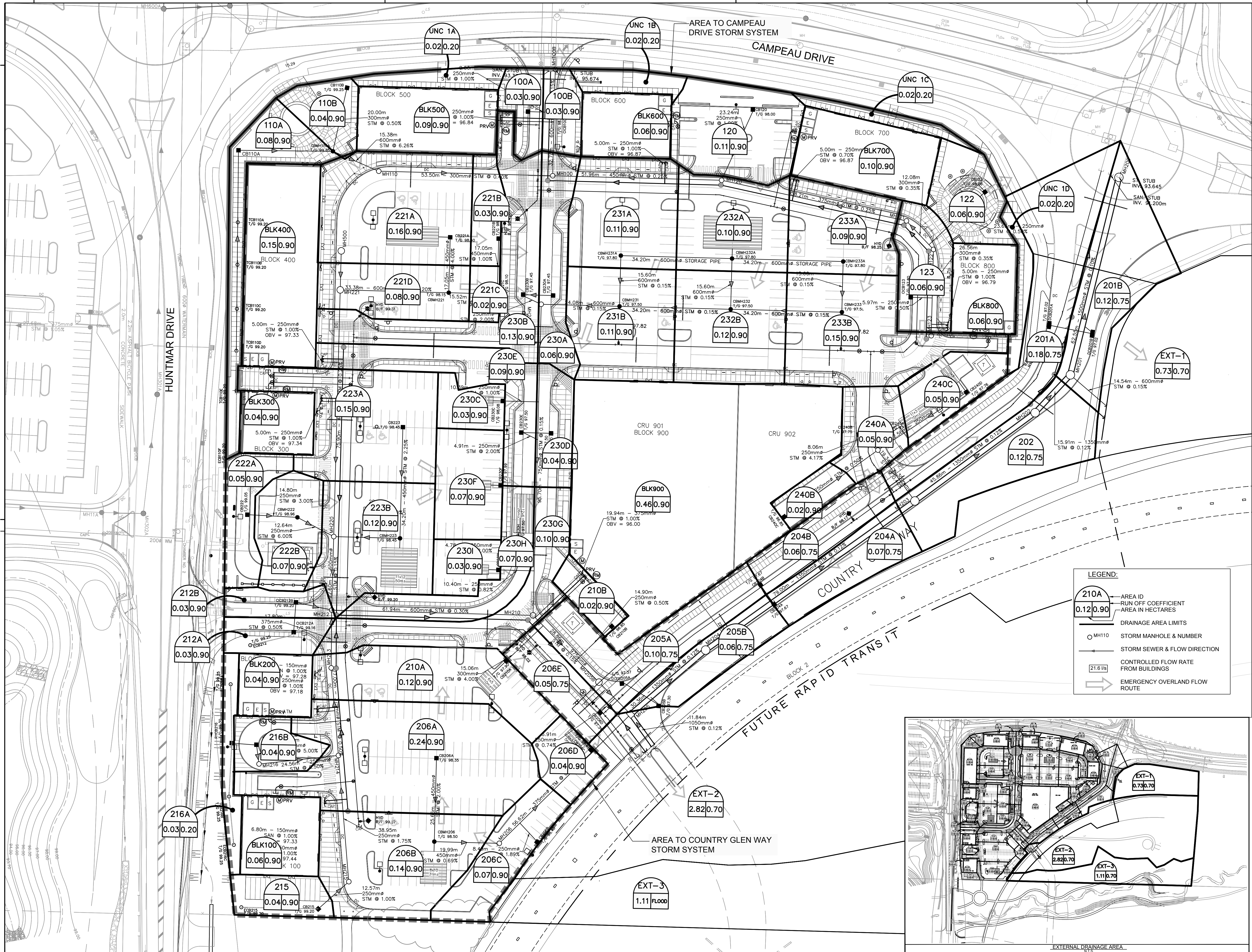
ULTIMATE POND CONCEPTUAL SECTION

FIGURE 6

PROJECT No. 3775
DATE: 18-09-2013
SCALE: N.T.S.

J:\35805-ArcadiaSWM\5.9 Drawings\59sww\current\35805_ Model Drainage area.dwg Layout Name: 2ur Plot Style: ----- Plot Scale: 1:2,5849 Plotted At: 9/23/2014 12:50 PM Last Saved By: SVukic Last Saved At: Sep. 23, 14





APPROVED ☐ REFUSED ☐

DATE _____

Felice Petti, P. Eng., Manager, Development Review
Suburban Services
City of Ottawa

4	Revised as per City Comments	14:10:02	DGY
3	Revised as per City Comments	14:08:22	DGY
2	Issued for SPA Resubmission	14:06:27	DGY
1	Issued for SPA	13.11.18	DGY
No.	Description	Date	Checked

Issued for _____

All measurements and conditions must be checked on the work by the contractor. This drawing not to be used for construction until signed.

Date _____

plotted 1:35355-ArcadiaComm\5.9 Drawings\9901\9901\VC-500.dwg
Layout Name: Storm Drainage Plot Style: AIA STANDARD-FULL.CTB
Plot Scale: 1:1 Plotted At: 10/6/2014 3:42 PM Last Saved By: dglm
Last Saved At: Oct. 3, 14

drawn by	DPS	scale	1:500
checked by	DGY	date	NOV. 2013
printed		file	35355

Arcadia Retail Development
Kanata, Ontario

Minto Properties
200 Kent Street • Suite 180 • Ottawa, Ontario • K1P 0B6
Telephone: (613)782-3137 Fax: (613)782-5777

drawing title:
**STORM DRAINAGE AREA PLAN
370 HUNTMAR DRIVE
OTTAWA, ON.**

drawing no.
C-500

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

A P P E N D I X 'E'

**JLR SWM TECHNICAL MEMORANDUM &
CITY CORRESPONDENCE DATED AUGUST 24, 2016**

Hilary MacKay

From: Wise, David <David.Wise@ottawa.ca>
Sent: August 24, 2016 12:18 PM
To: Hilary MacKay; Marcel Denomme; Lucie Dalrymple
Cc: Newton, Tim; Fraser, Mark; Moodie, Derrick
Subject: RE: Minto Arcadia Lands - Proposed Alternate Storm Servicing and SWM Strategy

Follow Up Flag: Follow up
Flag Status: Completed

Marcel, Hilary and Lucie,

We have met with our internal colleagues from Environmental Services, Infrastructure Policy and Transportation, and all are supportive and agree in principle with a two-pond scenario including location of a pond on the south side of Campeau. We do have strong reservations concerning converting the existing interim facility into the ultimate as the City notes significant performance issues, and we are unconvinced that an northern ultimate pond in the location as outlined in the MSS is not achievable. However, it is also our opinion that a 2-pond scenario as proposed can be considered a minor revision to the Kanata West MSS and can be executed through a *Planning Act* process associated with future phases of the Arcadia subdivision.

To move forward, we suggest the following:

- JLR provide a clear memorandum focusing on the north interim pond (Paine) and indicate why a pond in the location as proposed by the MSS is not achievable and how an ultimate pond would provide overall system benefit;
- City to arrange a technical meeting between ESD, IPU and JLR to review the above memo and focus in on technical requirements associated with approvals of both ponds, including modelling associated with the Carp River and proposed designs – taking into account City and MOE requirements and maintenance needs;
- City and Minto to engage in a pre-consultation on Arcadia Phase 3 to determine submission requirements, timing etc.

Please don't hesitate to give me a call to discuss. In the interim, Mark Fraser will be the primary point of contact for the City.

Thanks, David

David Wise, MUP, MCIP, RPP

Program Manager, Suburban West
(613) 580-2424 ext. 13877
david.wise@ottawa.ca

From: Hilary MacKay [<mailto:hmackay@jlrichards.ca>]
Sent: Tuesday, August 02, 2016 8:39 AM
To: Wise, David
Cc: Marcel Denomme; Lucie Dalrymple
Subject: Minto Arcadia Lands - Proposed Alternate Storm Servicing and SWM Strategy

David,

Please find attached a PDF copy of our memo which outlines a proposed deviation from the stormwater servicing and SWM strategy outlined in the 2006 Kanata West Master Servicing Study for Minto's Arcadia Lands, a portion of the Campeau Drive ROW and transitway corridor for your review.

Let me know whether you would like hard copies and if so, how many.

Please do not hesitate to call should you have any questions or require clarification.

Regards,

Hilary MacKay, P.Eng.
Civil Engineer

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



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MEMORANDUM

PAGE 1 OF 7

TO: David Wise
City of Ottawa
Planning and Infrastructure Portfolio
Planning & Growth Management Branch
110 Laurier Avenue West, 4th floor
Ottawa, ON K1P 1J1

DATE: August 2, 2016

JOB NO.: 26299-01

FROM: Hilary MacKay, P.Eng.
RE: Minto Communities – Arcadia Lands
Conceptual Alternate Stormwater Servicing
& Stormwater Management Strategy

CC: Marcel Denomme
Minto Communities (Minto)
Lucie Dalrymple, P.Eng.
J.L. Richards & Associates Limited

1.0 PURPOSE

This Memorandum was prepared in support of a proposed variation to the stormwater servicing and stormwater management (SWM) strategies recommended as part of the 2006 Kanata West Master Servicing Study (KWMSS) for Minto's Arcadia lands (located east of Huntmar Drive at Campeau Drive), as well as a portion of the Campeau Drive right-of-way (ROW) and a portion of the future transitway corridor located south of Campeau Drive. This Memorandum presents the advantages of a new servicing strategy that consists of two (2) wet ponds and privately owned water quality unit(s) outletting to the Carp River over the single pond strategy recommended for the area in the 2006 KWMSS.

2.0 BACKGROUND

In 2006, the KWMSS was prepared on behalf of the Kanata West Owners Group (KWOG) to investigate servicing requirements for a large mixed-use community referred to as Kanata West, which at build-out would include a population of approximately 17,000 persons in 6,300 households, 24,000 jobs in approximately 1 million square metres of commercial space. In terms of stormwater servicing and SWM, the KWMSS recommended that the ± 725 ha area be serviced by seven (7) water quality/quantity facilities spread over the entire Kanata West Study Area. The largest facility in Kanata West, Pond 1, was identified to serve as the dedicated stormwater outlet for approximately 77 ha, which included all of the lands owned by Minto (Minto Communities and Minto Properties), the Campeau Drive ROW (from Huntmar Drive to the Carp River), as well as the Transitway ROW (ROW north of Feedmill Creek). Refer to the 2006 KWMSS Storm Sewer Minor System Drawing ST-MN and Storm Drainage Area Plan North – Pond 1 Drawing ST-PN provided in Attachment 1 for details.

Approximately 22 ha of Minto's Arcadia Lands known as Arcadia Stages 1 and 2 have been developed (refer to Figure 1). Another ± 4 ha commercial development plus ± 4 ha external area located south of Campeau Drive, tributary to the Stage 1 stormwater servicing, is awaiting approval for construction. The Stage 1 and 2 lands currently outlet to a temporary wet pond facility located east of the developments via two inlets and forebays. It was intended that this temporary pond would ultimately be decommissioned once the Carp River restoration works were completed and the permanent Pond 1 was constructed.

3.0 KWMSS SINGLE POND STRATEGY

3.1 PRELIMINARY DESIGN SUMMARY

The ultimate Pond 1 was conceptually sized within a 1.50 ha block as part of the 2006 KWMSS based on design standards that were applicable at that time. Since then, the Ottawa Sewer Design Guidelines were updated and re-issued in October 2012. The 2012 Design Guidelines provide more details in terms of modelling technique for infiltration (Horton Method), calculation of Runoff Coefficients (C-Factors) based on maximum permissible zoning, calculation of time of concentration, and assessing the performance of the infrastructure under a specific climate change event. Furthermore, the City has also developed a PCSWMM model of the Carp River and has generated hydrographs at key locations that are to be matched under post-development conditions. Due to the changes to the Design Guidelines as well as the completion of the Carp River PCSWMM model, the SWM strategy outlined in the 2006 KWMSS needed to be re-evaluated.

More recently, preliminary sizing of the ultimate Pond 1 was carried out by IBI as part of the Report entitled “Conceptual Site Servicing Study – Arcadia Stages 1, 2, 5 & 8”, dated September 2013. The simulation results for this undertaking showed that the Pond 1 block needed to be increased in size from 1.50 ha to 2.45 ha in order to fulfill the requirements of the 2012 Design Guidelines. The Conceptual Site Servicing Study provided the following configuration details for Pond 1 (refer to Figure 6 Ultimate Pond Conceptual Section in Attachment 2):

- Bottom of facility: 92.00 m
- Permanent pool elevation: 92.65 m
- 1:100 year water surface elevation: 93.54 m
- Revised SWM Block Area: 2.45 ha

It should be noted that the 2.45 ha SWM Block was sized prior to the development of the “calibrated” PCSWMM model. Hence, the block size will need to be verified with PCSWMM to ensure that the target hydrograph outflows are met.

3.2 PRELIMINARY DESIGN OF TRUNK STORM SEWERS

Assuming that the single pond SWM strategy is pursued, Pond 1 would be located west of the Carp River corridor within the reclaimed floodplain area and \pm 550 m north of Campeau Drive as shown on Figure 1. This pond would serve as the dedicated stormwater outlet for the area highlighted in yellow on Drawing ST-PN Attachment 1. A conceptual stormwater sewer system outletting to Pond 1 was developed for the future Arcadia lands as well as existing Stages 1 and 2 in accordance with the 2012 Design Guidelines. The existing interim pond servicing Stages 1 and 2 would be decommissioned and the existing Stages would have their stormwater conveyed to Pond 1 via an extension of the trunk storm sewer on Paine Avenue. Key conceptual design components have been summarized below for the single pond servicing strategy and are also indicated on Figure 1:

- Pond inlet sewer size (per JLR conceptual sewer design): 3000 mm dia. sewer
- Inlet obvert/invert elevation at Pond 1 (per JLR conceptual sewer design): 93.53 OBV / 90.48 INV
- Normal Water Elevation (per IBI 2013 concept design): 92.65
- Depth of submergence at Pond 1: 2.17 m
- Total length of submergence in storm sewers: \pm 1040 m (on Paine Ave, Clonrush Way, Riverchase Road)
- Length of cost shared sewer along Riverchase Road: 670 m (from Transitway to Pond 1)



LEGEND

- STANDING WATER IN STORM SEWER
- STORM SEWER TO BE COST SHARED BETWEEN CITY & MINTO
- STANDING WATER IN STORM SEWER AND TO BE COST SHARED BETWEEN CITY & MINTO
- CONCEPTUAL STORM SEWER & MANHOLE
- CONCEPTUAL SANITARY SEWER & MANHOLE
- CONCEPTUAL WATERMAIN

1	ISSUED FOR SWM MEMORANDUM	28/07/16
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CONSULTANT:

PROFESSIONAL STAMP

PROJECT NORTH

PROJECT:

MINTO COMMUNITIES INC.
ARCADIA LANDS

DRAWING:

CONCEPTUAL
KWMSS SINGLE POND
SERVICING STRATEGY

DESIGN: HM

DRAWN: TB

CHECKED: HM/LD

JLR #: 26299-01

DRAWING #:

FIGURE 1

The elevation of the inlet pipe to the pond is governed by the invert elevation of the existing trunk storm sewer on Paine Avenue at MH 510 which was constructed as part of Stage 2. It is noted that this invert elevation is slightly higher (± 0.25 m) than the conceptual invert elevation previously identified by JLR as part of the Stage 2 detailed design. Refer to Attachment 2 for a copy of the conceptual Paine Avenue Extension Plan & Profile provided to the City in July 2014.

The elevation of the Riverchase Road storm sewer is limited by the location of the existing watermain on Campeau Drive as well as cover requirements at Campeau Drive. As per Dwg. 110 prepared by IBI (refer to the copy provided in Attachment 2), the storm sewer which crosses Campeau Drive to service lands to the south (including the future transitway corridor) is to have a minimum invert elevation of 92.00 to be able to cross over the existing Campeau Drive watermain. The proposed storm sewer at Campeau Drive is however proposed to be set at a maximum invert elevation of 92.30 to minimize submergence in the pipe while still meeting the 2 m cover requirement per City Design Guidelines. It is also noted that the Riverchase Road trunk storm sewer was sized to convey runoff generated from the 1:5 year storm event from 3.78 ha of lands to the south of Campeau Drive as well as the 1:10 year storm event for 4.55 ha of the Campeau Drive ROW and the transitway corridor as per the Design Guidelines.

3.3 CONSTRAINTS

In developing a conceptual storm sewer design to convey stormwater to the ultimate Pond 1, the following constraints were identified:

- The extensions of Paine Avenue and Calvington Avenue will require low centreline of road elevations to allow for upstream major system overland flows to be conveyed easterly to the future permanent SWM facility. Therefore, the further east that the pond is located, the lower the road elevations and consequently the lower the cover depth over sewer obverts and the hydraulic grade line (HGL).
- Due to the large trunk storm sewers, the sanitary sewers along the extension of Paine Avenue and Riverchase Road are anticipated to be located along the north and west side of the road, respectively, to minimize crossing conflicts with the trunk storm sewers. Therefore, the watermains along these streets would have to be located north and west of the centreline of the road (i.e., within a non-conventional alignment).
- Due to existing ground conditions, pre-loading of Stage 3, Stage 4, and Riverchase Road was required. Although the pre-loading program was initiated in 2009, some of these areas, including Riverchase Road, are not “cured”, and are therefore not yet ready for servicing.
- The pond is to be located within the reclaimed Carp River floodplain lands and therefore cannot proceed until the Carp River restoration works are completed.
- The construction of Campeau Drive and the Campeau Drive Bridge cannot proceed until the pre-loading program and the Carp River restoration works are completed and an outlet is available thereby impacting accessibility and marketability of the area.
- A high HGL (and therefore minimal freeboard to future underside of footings) is anticipated at the upstream ends of the storm sewer system.

4.0 PROPOSED DOUBLE WET POND AND WATER QUALITY UNIT(S) STRATEGY

4.1 PRELIMINARY DESIGN SUMMARY

Considering the current City Design Guidelines, the design constraints identified above for the single pond SWM strategy, and the greater level of detailed information available at this time, a more efficient storm servicing and SWM strategy was developed. This proposed servicing strategy consists of the following components:

1. The existing 'temporary' wet detention pond would be made a permanent facility that would service; i) the existing Arcadia Stages 1 and 2; ii) future Arcadia Stage 4; iii) Stage 5; iv) the western portion of Arcadia Stage 8 (the commercial lands); v) the western portion of the Campeau Drive right-of way; and vi) the western portion of the future transitway corridor – refer to Figure 2 for conceptual drainage area limits. The latter four areas were allocated to the existing Stage 1 sewers as part of the Stage 1 detailed design and would therefore maintain their outlet to this pond, herein referred to as the Paine Avenue Pond, via existing Stage 1 storm sewers and the southern forebay. Whereas the future Arcadia Stage 4 would outlet to the Paine Avenue Pond via the existing northern forebay (at existing MH 510) that was constructed as part of the Stage 2 servicing works.
2. One new wet detention pond would be added south of Campeau Drive west of the Carp River Corridor within the Stage 8 lands. The pond would discharge to the Carp River upstream of the Campeau Drive bridge crossing. This new pond, herein referred to as the Campeau Drive Pond would service; i) future Arcadia Stage 3; iii) the eastern portion of Arcadia Stage 8 (the commercial lands), iv) the eastern portion of the Campeau Drive ROW, and v) the eastern portion of the future transitway corridor - refer to Figure 2 for conceptual drainage area limits. To minimize sewer size and submergence, this pond would have two inlet pipes: one for lands north of Campeau Drive (Stage 3) and one for the combined Campeau Drive ROW and lands to the south of the ROW.
3. A privately owned water quality unit outletting directly to the Carp River to service Arcadia and Stage 7 (commercial).
4. Arcadia Stage 6 (residential) to be serviced by either a private water quality unit outletting directly to the Carp River or by the Paine Avenue Pond (to be confirmed at detailed design).

Water Quality

The SWM systems identified above would provide water quality control to achieve an MOECC Normal Level of Protection (i.e., 70% total suspended solids removal) before outletting to the Carp River in accordance with the Carp River Watershed Study and the 2006 KWMSS. Although the existing interim SWMF has approximately 1,808 m³ residual water quality volume (as per IBI Report and Design Brief Arcadia Stage 2 SWM Report and Stage 2 Inlet Design Brief dated September 2014) to service the additional proposed drainage areas, it is anticipated that the existing permanent pool would require some dredging to achieve a water quality volume that satisfies MOECC guidelines. Alternatively, the footprint area of the pond could also be increased.

Major System

It is noted that major system flows generated in Stage 3 are not permitted to cross Campeau Drive overland to outlet to the Campeau Drive Pond in accordance with City Design Guidelines, (i.e., major system flows shall not cross arterial roadways). For this reason, a spillover area northwest of the Campeau Drive/Riverchase Road intersection is proposed. Should the roadway sags of Stage 3 not offer sufficient major system storage, this spillover area would capture cascading major system flows and gradually release them to the minor



LEGEND

- STORM DRAINAGE BOUNDARY
- STANDING WATER IN STORM SEWER
- STORM SEWER TO BE COST SHARED BETWEEN CITY & MINTO
- CONCEPTUAL STORM SEWER & MANHOLE
- CONCEPTUAL SANITARY SEWER & MANHOLE
- CONCEPTUAL WATERMAIN

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PROFESSIONAL STAMP

PROJECT NORTH

PROJECT:

MINTO COMMUNITIES INC.
ARCADIA LANDS

DRAWING:

PROPOSED
DOUBLE WET POND &
WATER QUALITY UNITS
SWM STRATEGY

DESIGN: HM

DRAWN: TB

CHECKED: HM/LD

JLR #: 26299-01

DRAWING #:

FIGURE2

system. Alternatively, major system flows could be conveyed underground, across Campeau Drive via a culvert. As a third alternative, major system flows above the 1:10 year storm event could be conveyed easterly across Riverchase Road directly to the Carp River (via ditch) in accordance with the 2006 KWMSS, which states that the ponds are to contain at least the 1:10 year storm event.

Major system flows in Stage 4 would be conveyed overland to the Paine Avenue Pond. Stage 6 and 7 would provide their respective storage on-site.

4.2 PRELIMINARY DESIGN OF TRUNK STORM SEWERS

A conceptual stormwater sewer system was developed for the proposed double pond SWM strategy. The following key conceptual design components have been summarized below for the proposed Paine Avenue and Campeau Drive Pond minor systems:

Paine Avenue Pond

- Existing Pond Normal Water Level (NWL): 93.00
- Existing Pond HGL: 94.21

Northern Inlet

- Inlet Structure (Paine Avenue): Existing MH 510 Wall Opening 2400x1800 mm
- Inlet Structure Invert Elevation: 91.39
- Depth of Submergence at inlet structure: 1.61 m
- Length of submergence in existing Stage 2 sewers: 224 m (to existing MH 4 at Saddleback Crescent)
- Length of submergence in future Stage 4 sewers: 50 m (based on Invert @ Ex MH 510 of 92.85)
- Maximum proposed pipe size (Stage 4) = 1050 mm dia.

Southern Inlet

- Inlet Structure: Existing MH 104B Wall Opening 2400 x 2264 mm
- Inlet Structure Invert Elevation: 92.30
- Depth of Submergence at inlet structure: 0.70 m
- Length of submergence in existing Stage 1 sewers: 105 m

Campeau Drive Pond

- Assumed Pond Normal Water Level: 92.83
- Assumed Pond HGL: 94.10
- Stage 3 Inlet sewer size and elevation at Pond: 1200 mm dia., INV 92.83
- Depth of submergence in Stage 3 inlet: 0 m
- Campeau Drive ROW + Commercial + Transitway Inlet sewer size and elevation at Pond: 1200 mm dia., 92.83 INV
- Depth of submergence in Campeau Drive ROW + Commercial + Transitway Inlet = 0 m
- Length of cost shared sewer: 60 m

4.3 SIMULATION OF DOUBLE POND STRATEGY

JLR carried out preliminary stormwater modelling to assess the feasibility of using the two-pond strategy. The following modelling approach and assumptions were used:

- The City of Ottawa PCSWMM model of the Carp River and surrounding catchments provided in April 2016 was used. The model consisted of three scenarios: 1:100 year existing, 1:100 year Interim and 1:100 year Future Ultimate.
- The two proposed ponds were added to the 1:100 year Future Ultimate scenario of the Carp River PCSWMM model, as well as the two individual outlets (post to pre-condition) for the Stage 6 and 7 developments.
- The existing Paine Avenue Pond was modelled as its current designed condition.
- The new Campeau Drive Pond was modelled with 1.25 metres deep active storage (excluding permanent pool), and a surface area of 5,400 m² for a total volume of 5,600 m³ and an outflow via two orifice structures.

Simulation results are as follows:

- The calculated 1:100 year peak outflow from the new Campeau Drive Pond was found to be 1.2 m³/s, which occurs approximately 6.3 hours into the simulation.
- At the Campeau Drive Bridge, the 1:100 year peak flow in the Carp River remains unchanged at 44.4 m³/s, which was found to occur approximately 10.6 hours into the simulation.
- No impact was found from the addition of the Campeau Drive Pond under the Future Ultimate scenario. This is due to the low release rate from the Campeau Drive Pond and its timing, which occurs several hours prior to the peak flow in the Carp River.
- The calculated 1:100 year peak outflow from the Paine Avenue Pond was found to be 8 m³/s, which occurs approximately 6.1 hours into the simulation.
- The calculated 1:100 year peak flow in the Carp River at the Paine Avenue Pond discharge location was found to be 43.0 m³/s, which was found to occur approximately 12 hours into the simulation.
- No impact of the Paine Avenue Pond was found under the Future Ultimate scenario. This is due to the low release rate from the Paine Avenue Pond and its timing, which occurs several hours prior to the peak flow in the Carp River.

5.0 BENEFITS AND RECOMMENDATION

Based on the information presented in Sections 3.0 and 4.0, the two (2) pond and water quality unit(s) strategy is proposed. This option can be developed to meet regulatory requirements, and will manage stormwater more efficiently compared to the KWMSS single pond option. Although the proposed strategy would deviate from the 2006 KWMSS, we understand that this type of deviation in SWM strategy was recently approved by the City for the lands owned by West Ottawa Land Holdings, West Ottawa Land Holdings 2 and RioCan. Key advantages that support the implementation of the two pond strategy over the single pond KWMSS strategy are as follows:

- Reduced lengths of submergence (standing water) in storm sewers resulting in reduced maintenance costs (from approximately 1040 m to 380 m, cumulative).

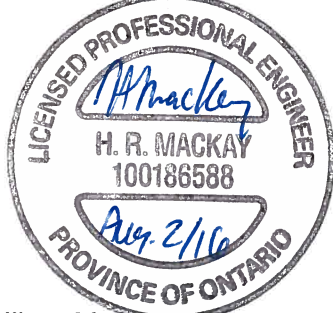
- Reduced cost shared sewer lengths to service the eastern ROW portions of both Campeau Drive and the Transitway as well as the eastern portion of Minto's commercial lands located south of Campeau Drive (from approximately 670 m to 60 m).
- Reduced trunk sewer sizes (from maximum 3000 mm dia. to 1200 mm dia.) and depths which would result in reduced proportional costs for both the City (Campeau Drive and Transitway) and Minto.
- Reduced City operation and maintenance costs as well as replacement costs associated with smaller and shallower trunk storm sewers.
- More flexibility in terms of servicing and grading for the Campeau Drive ROW and lands to the south of Campeau Drive due to their close proximity to the proposed outlet (Campeau Drive Pond).
- Both the City and Minto could move forward the development of Campeau Drive, Stage 3, and Stage 8 since the Campeau Drive Pond is currently outside the floodplain limit (whereas the KWMSS ultimate Pond 1 is not) and could therefore proceed to construction sooner. The Campeau Drive Pond is also not impacted by the pre-loading program currently ongoing in the Arcadia lands whereas the KWMSS single pond would require the completion of the pre-loading program to install the trunk infrastructure along Riverchase Road that is required to service Campeau Drive and the lands to the south.
- The Campeau Pond makes use of essentially undevelopable land resulting from the limitations imposed by the parcel's narrow width and limited accessibility (i.e., site entrance).

For the above reasons, we recommend that the proposed deviation to the 2006 KWMSS SWM strategy which would utilize two (2) wet ponds and water quality unit(s) to service the Arcadia lands, the Campeau Drive ROW and the future transitway corridor be implemented.

Prepared by:

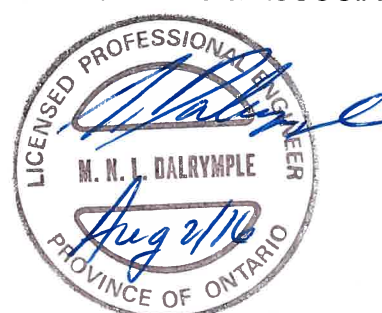
Reviewed by:

J.L. RICHARDS & ASSOCIATES LIMITED



Hilary Mackay, P.Eng.

J.L. RICHARDS & ASSOCIATES LIMITED



Lucie Dalrymple, P.Eng.

Attach.

ATTACHMENT 1
2006 KWMSS Drawings



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1500MSTM

N100

10304

KANATA-WEST CONCEPT
PLAN BOUNDARY

PROPOSED STORM SEWER & SIZE

STORM NODE

STORM SEWER IDENTIFICATION

Seals

Sheet	Revision
-------	----------

2



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1505 Lepeigne Avenue
Ottawa, ON Canada
K1Z 7T1
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--- KANATA-WEST CONCEPT
PLAN BOUNDARY
--- POND DRAINAGE BOUNDARY
--- STORM SEWER
DRAINAGE LIMIT

A-1
AREA IN HECTARES
AREA IN HECTARES
RUNOFF COEFFICIENT
100yr. INLET CAPACITY (L/s)
MINOR SYSTEM NODE NUMBER
MAJOR SYSTEM SEGMENT NUMBER
INFILTRATION

1/25

* REFER TO FIGURE 3.2 IN KANATA WEST MASTER
SERVICING STUDY FOR FURTHER INFILTRATION DETAILS

1. THOSE AREAS WHICH ARE COMPLETELY SURROUNDED BY
ARTERIAL ROADWAYS (SPECIFICALLY AREAS A-6, C-6, C-11,
C-15, C-17, C-18) MUST PROVIDE SURFACE STORAGE IN
THE AMOUNT OF 30mm/hr, OR IN SUFFICIENT QUANTITY TO
DEMONSTRATE COMPLETE CONTAINMENT OF THE 100yr EVENT.
(i.e. NO MAJOR SYSTEM FLOW IN THE 1:100yr EVENT)

CCL/IBI

2. REVISION FOR DEC. 21/15 SUBMISSION
1. REVISION AS PER CITY COMMENTS (June 15/15)
Revision: By: Date:

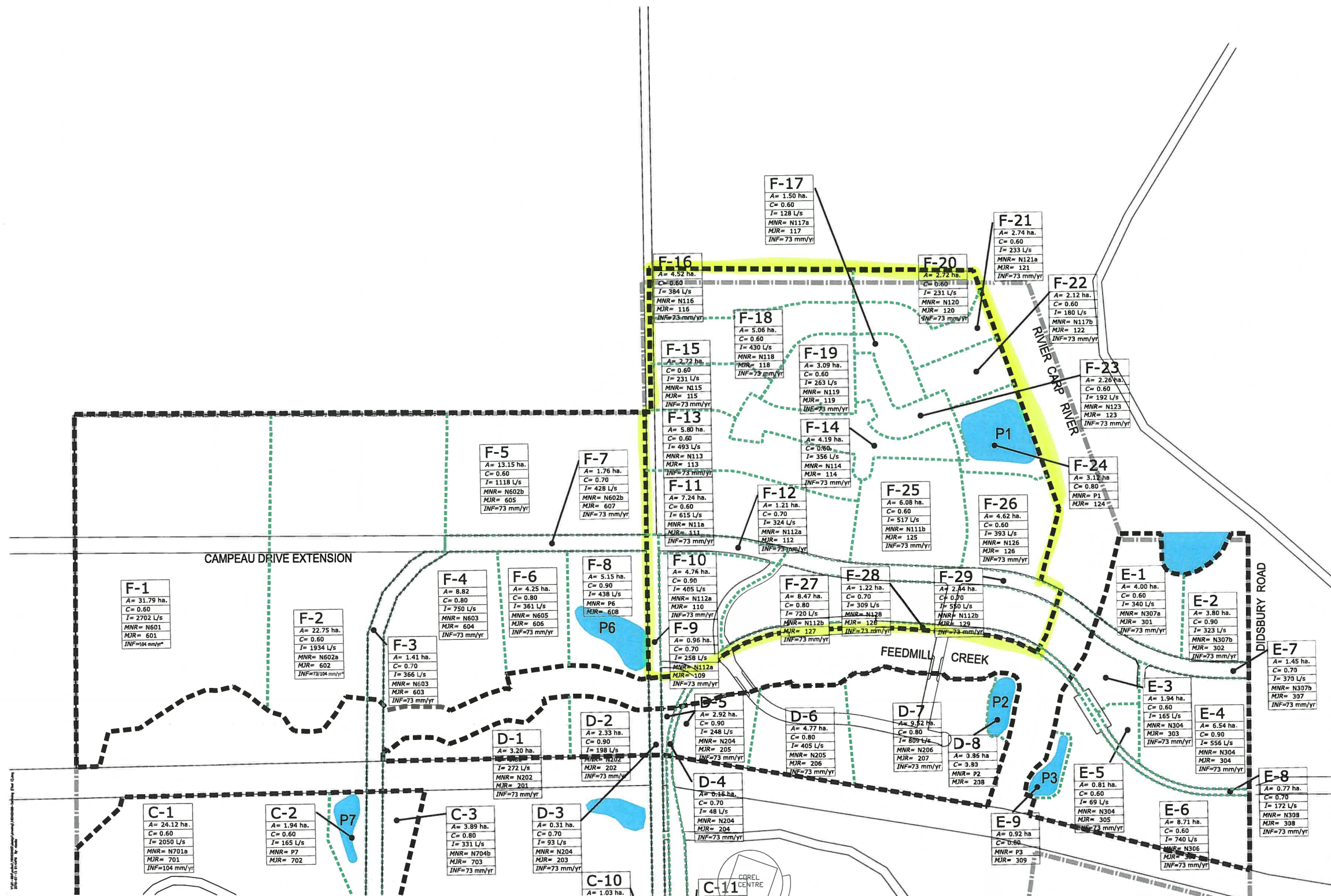
Client/Project:

Kanata West Concept Plan
Master Servicing Study

Ottawa, Ontario

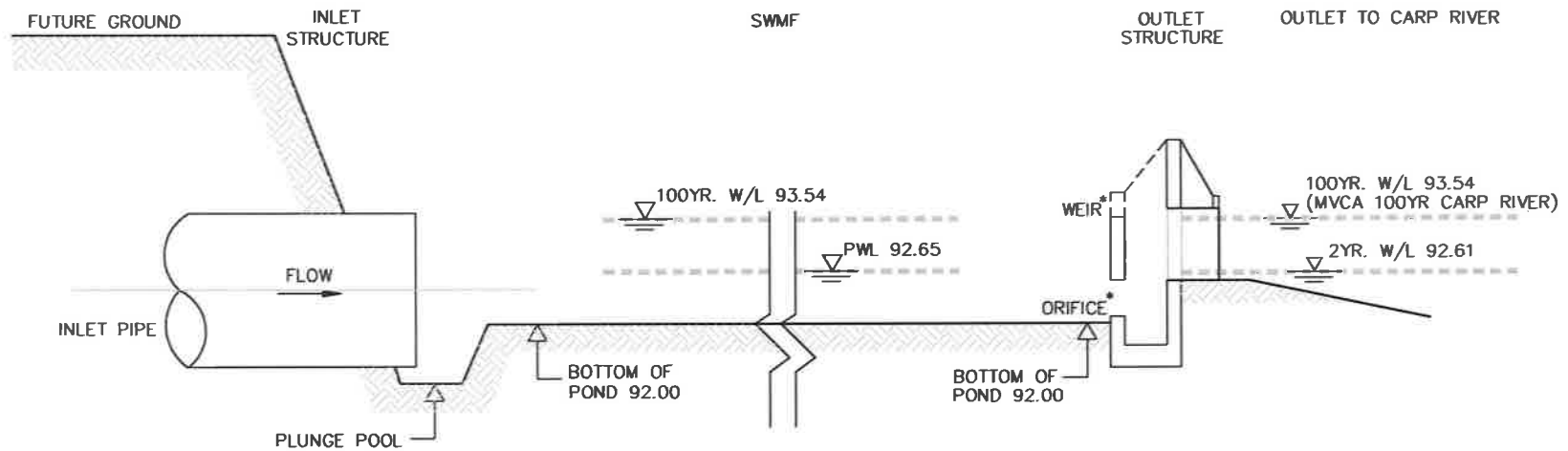
**STORM DRAINAGE AREA PLAN
NORTH PONDS**

Project No: 60400406
Drawing No: ST-PN
Scale: 1:2000
Sheet: 4 of 7
Revision: 2



ATTACHMENT 2

Single Pond Strategy Background Documents



NOTE:

* WEIR ELEVATION AND ORIFICE SIZE TO BE ADJUSTED TO PROVIDE EXTENDED DETENTION RELEASE FOR QUALITY TREATMENT.

Plot Style: AIA STANDARD COLOR-HALF.CTB Plot Scale: 1:1 Plotted At: Oct. 1, 13 12:27 PM Printed By: PETER DEIR Last Saved By: PDEIR Last Saved At: Sep. 20, 13

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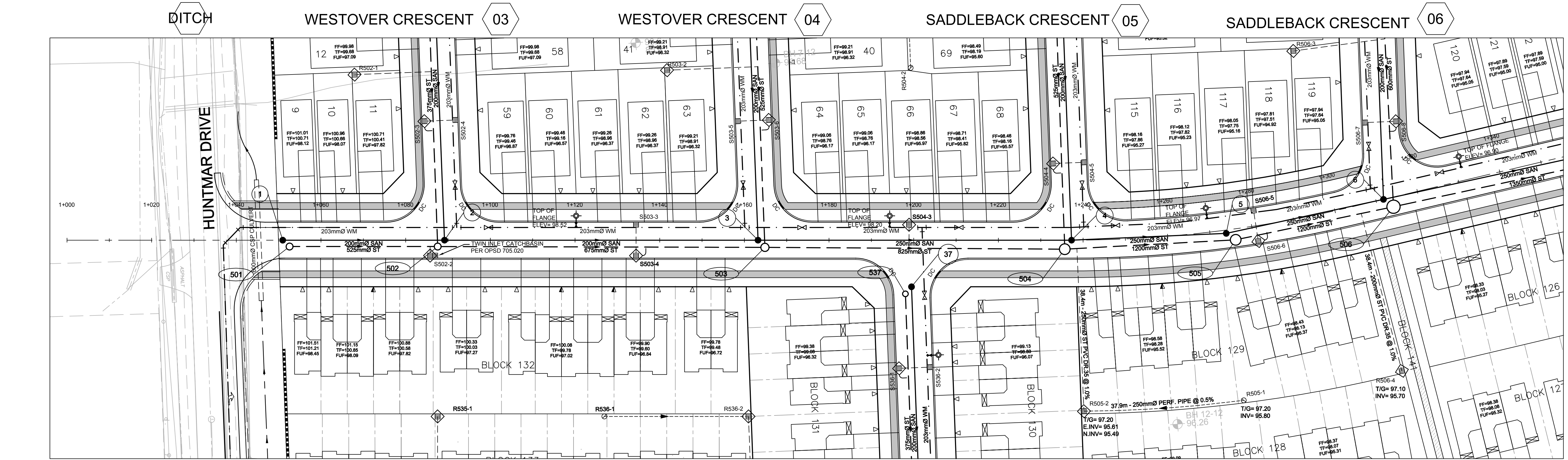


ULTIMATE POND CONCEPTUAL SECTION

FIGURE 6

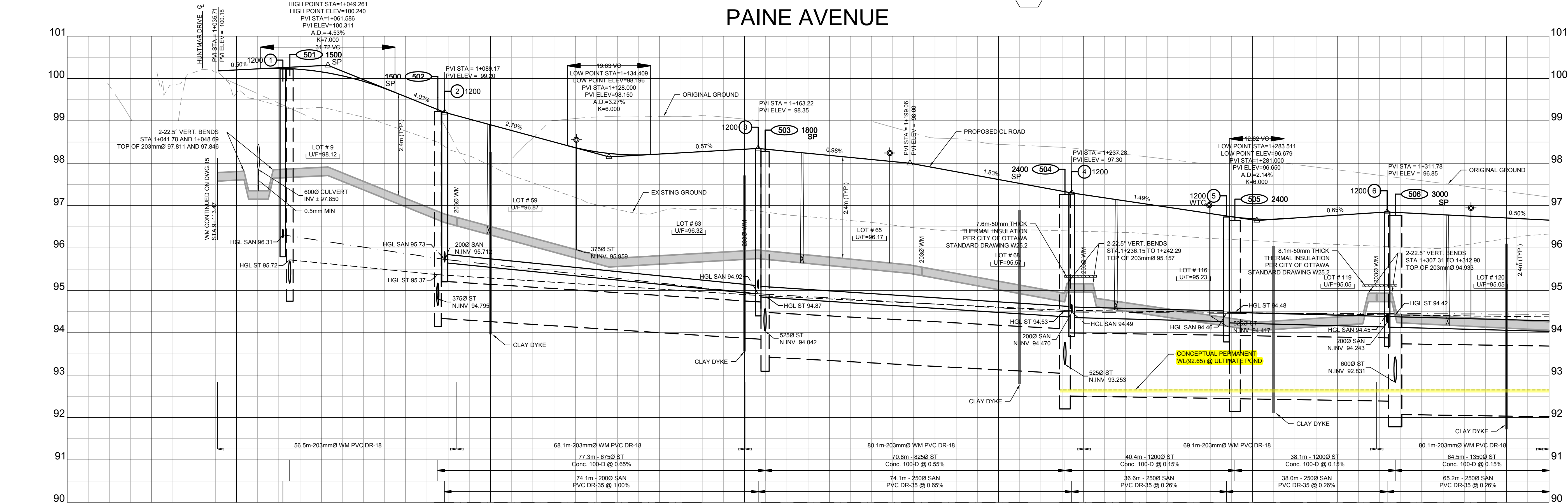
PROJECT No. 3775
DATE: 18-09-2013
SCALE: N.T.S.

File Location: P:\26000\26299 - Arcadia Stage 2\JLR DWG\Civil\26299 C 01-02 (Paine Avenue) dwg



KEYPLAN

- NOTE:
- BUILDERS TO INSTALL PRVs ON ALL WATER SERVICES.
 - ALL SANITARY AND STORM HGL INFORMATION PROVIDED BY IBI GROUP IN ACCORDANCE WITH ARCADIA - STAGE 2 SWM REPORT AND STAGE 2 INLET DESIGN BRIEF DATED JULY 2014.
 - HUNTMAR ROAD INTERSECTION MODIFICATION DETAILS TO BE PROVIDED UNDER SEPARATE RMA COVER, INCLUDING ROAD MODIFICATION, DITCH REALIGNMENT, CULVERT DESIGN AND REGRADING OF HUNTMAR BOULEVARD.



DESIGN PROFILE ELEVATIONS	W.M. TOP ELEVATIONS	STORM SEWER INV. ELEVATION	SANITARY SEWER INV. ELEVATION	C.L. ROADWAY STATION
1+000.00	97.76	97.76	97.76	1+000.00
1+020.00	97.76	97.76	97.76	1+020.00
1+040.00	97.76	97.76	97.76	1+040.00
1+060.00	97.76	97.76	97.76	1+060.00
1+080.00	97.76	97.76	97.76	1+080.00
1+100.00	97.76	97.76	97.76	1+100.00
1+120.00	97.76	97.76	97.76	1+120.00
1+140.00	97.76	97.76	97.76	1+140.00
1+160.00	97.76	97.76	97.76	1+160.00
1+180.00	97.76	97.76	97.76	1+180.00
1+200.00	97.76	97.76	97.76	1+200.00
1+220.00	97.76	97.76	97.76	1+220.00
1+240.00	97.76	97.76	97.76	1+240.00
1+260.00	97.76	97.76	97.76	1+260.00
1+280.00	97.76	97.76	97.76	1+280.00
1+300.00	97.76	97.76	97.76	1+300.00
1+320.00	97.76	97.76	97.76	1+320.00
1+340.00	97.76	97.76	97.76	1+340.00
1+360.00	97.76	97.76	97.76	1+360.00

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200-180 KENT STREET
OTTAWA, ON
K1P 0B6

CONSULTANT:
J.L. Richards
ENGINEERS - ARCHITECTS - PLANNERS
www.jlrichards.ca

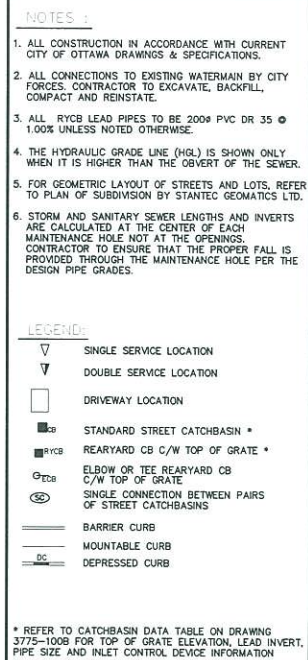
PROFESSIONAL STAMP
PROJECT NORTH

PROJECT:
MINTO COMMUNITIES INC.
ARCADIA STAGE 2
370, 404, 410, 450 HUNTMAR DRIVE

DRAWING:
PAINE AVENUE
STA. 1+000-1+350

DESIGN: H.M.
DRAWN: S.K.
CHECKED: K.F.
JLR #: 26299
DRAWING #: 01

PLOT DATE: July 15, 2014 4:52:01 PM



14			
13			
12	AS-BUILT	LME	14:02:13
11	REVISE WATERMAIN PIPE CLASS TO 18	LME	13:01:31
10	WATER CHAMBER REVISIONS	LME	12:12:19
9	GENERAL REVISIONS	LME	12:11:28
8	GENERAL WATERMAIN REVISIONS	LME	12:11:14
7	ADDED ACCESS ROAD	LME	12:10:30
6	ISSUED FOR TENDER	LME	12:08:21
5	REVISED PER CITY COMMENTS	LME	12:06:27
4	REVISED PER CITY COMMENTS	LME	12:06:08
3	REVISED PER LEGAL & CITY COMMENTS	LME	12:05:16
2	REVISED PER NEW LEGAL	LME	12:02:17
1	ISSUED FOR SUBMISSION	LME	11:01:26
No.	REVISIONS	By	Date



IBI
GROUP

Project Title

ARCADIA
KANATA WEST
PHASE I



Drawing Title

CAMPEAU DRIVE

STA. 1+600 TO STA. 1+910

Scale	
HORIZ. SCALE	1:500
VERT. SCALE	1:50

Design L.M.E.	Date MARCH
Drawn M.M.	Checked R.W.V.

Project No.	Drawing No.
3775	110

File Location: R:\26000\26299-01 Arcadia Preliminary Stages 3-4\LI R DWG\Civil\26299-01 C Stages3-4 CS1.dwg



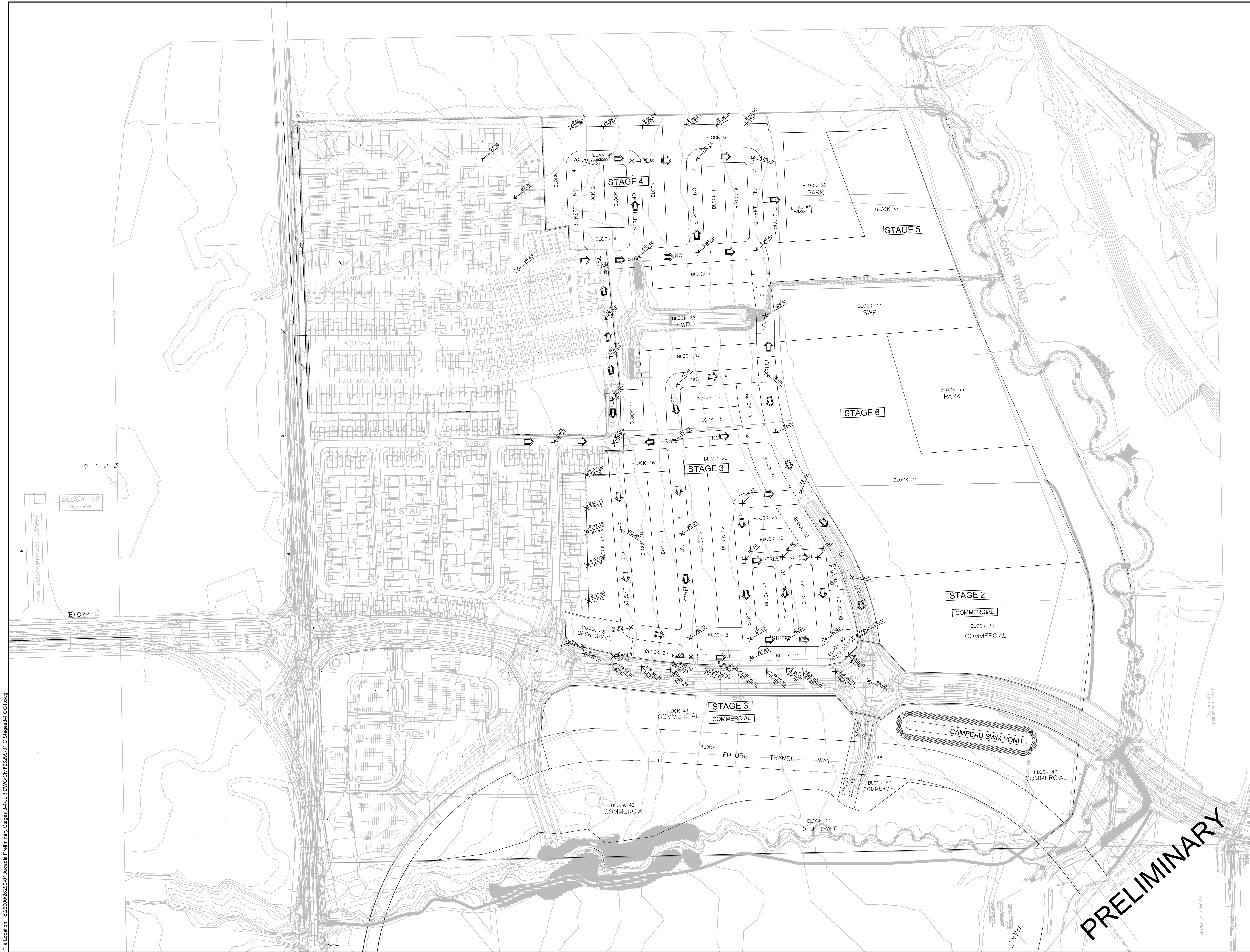
LEGEND

- PROPOSED STORM SEWER & MANHOLE
- PROPOSED SANITARY SEWER & MANHOLE
- PROPOSED WATERMAIN
- EXISTING STORM SEWER & MANHOLE
- EXISTING SANITARY SEWER & MANHOLE
- EXISTING WATERMAIN
- LIMIT OF CUT AND FILL (FROM PATERNON)
- IPGR
- HGL(u)
- HGL(l)
- PERMISSIBLE GRADE RAISE
- HGL UNDER ULTIMATE CONDITIONS
- HGL UNDER INTERM CONDITIONS (PART OF STAGE 3)





1	ISSUED WITH SERVICING BRIEF	21/12/16
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CONSULTANT:		
PROFESSIONAL STAMP	PROJECT NORTH 	
PROJECT: MINTO COMMUNITIES INC. ARCADIA STAGES 3 & 4		
DRAWING: CONCEPTUAL SITE SERVICING PLAN		
DESIGN: HM	DRAWING #:	
DRAWN: TB	CS1	
CHECKED: LD		
JLR #:	26299-01	

PLOT DATE: December 21, 2016 3:07:15 PM

File Location: R:\260000\26299-01 Arcadia Preliminary Stages 3-4\JLR DWG\Civil\26299-01 2 Stages 3-4 CG1.dwg



PRELIMINARY

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		PROJECT NORTH	
			
PROJECT:			
MINTO COMMUNITIES INC. ARCADIA STAGES 3 & 4			
DRAWING:			
CONCEPTUAL GRADING PLAN			
DESIGN: KF/LD		DRAWING #: CG1	
DRAWN: TB			
CHECKED: LD			
JLR #: 26299-01			

PLOT DATE: December 21, 2016 9:33:26 AM