MINTO / CANDEREL

CONCEPTUAL SITE SERVICING STUDY
STORMWATER SITE MANAGEMENT PLAN
EROSION AND SEDIMENTATION CONTROL PLAN
485 RICHMOND ROAD, OTTAWA

Project: 32385-5.2.2

JULY 2012
NOVEMBER 2012
JULY 2013

IBI GROUP

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1. INTRODUCTION

1.1 Development Servicing Study Checklist

The servicing Study Guideline Checklist is included in **Appendix A** for reference. The list identifies where elements in this report can be found. Some elements are not applicable and are identified accordingly. Otherwise, the checklist items are address in this report.

1.2 Purpose

The purpose of this report is to outline the required municipal services, including water supply, stormwater management and wastewater disposal, needed to support the redevelopment of the subject property. The total property is approximately 0.33 hectares in area and is located at 485 Richmond Road. See **Figure 1** for the site Location Plan.

As requested by the City of Ottawa, this Conceptual Site Servicing Study, which also includes the Stormwater Site Management Plan, Watermain Analysis and Erosion and Sedimentation Control Plans, is being completed as a requirement of the Site Plan Application. The Conceptual Site Servicing Study is one of the documents required to support a site plan application and this document will fulfil that requirement.

1.3 Subject Site

Minto Communities Inc., in conjunction with Canderel, propose to develop the remaining parcel of a mixed use development located at 485-495 Richmond Road as a high-rise apartment building. The mixed use development includes the Amica at Westboro Park senior's residence at 491 Richmond Road, and the Denis Coolican office building located at 495 Richmond Road. The address of the remaining parcel to be developed is 485 Richmond Road, and **Figure 2**, which is the site plan is included in **Appendix B**.

In the City of Ottawa Official Plan, the entire property is designated General Urban Area. The entire property is also located on a portion of Richmond Road that is designated Traditional Mainstreet in the Official Plan. The entire property is regulated by the City of Ottawa Zoning By-Law 2008-250, and is currently zoned TM [157] F(2.3) S149 – Traditional Mainstreet, Exception 157, Floor Space index 2.3, Schedule 149. The parcel to be developed comprises Area D on Schedule 149, with a maximum height limit of 77 meters.

The parcel to be developed is currently used as overflow parking for the neighbouring office building located at 495 Richmond Road. The proposed development comprises a 24-storey tower that includes 194 residential units, associated amenity space, three levels of above-grade podium parking, and one level of underground parking. Parking for 150 vehicles would be provided. Access to the parcel from Richmond Road would be from the existing driveways on the east and west sides of the Amica Building.

1.4 Pre-Consultation

In July 2012, The City of Ottawa was advised that IBI Group was retained to provide civil engineering services for the proposed development. **Appendix C** includes response e-mails providing some design criteria for sewer outlets and water supply analysis.

J:\32385-485Richmond\5.9 Drawings\59civil\current\32385-485Richmond Rd-2012-05-15.dwg Layout Name: Figure 1

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485 RICHMOND ROAD

LOCATION PLAN

FIGURE 1

1.5 Geotechnical Investigation

A geotechnical investigative report entitled 'Geotechnical Investigation Proposed Residential Building, 485 Richmond Road, Ottawa, Ontario' by Houle Chevrier Engineering Ltd., dated July 2012, was prepared for the subject site.

The objectives of the investigation report include:

- Determination of the subsoil and groundwater conditions;
- Provision of geotechnical recommendations pertaining to the design and development of the subject site including construction considerations.

Among other items, the reports will comment on the following:

- Site grading;
- Foundation design;
- Pavement Structure;
- Infrastructure construction
- Groundwater control;
- Contamination/corrosive environment.

The report noted that the concentration of sulphate in the overburden can be classified as low and moderate in the bedrock. Accordingly, any concrete that will be in contact with the native soil, bedrock or groundwater should be batched with moderate sulphate-resistant hydraulic cement (MS).

2. WATER SUPPLY

2.1 Existing Conditions

A 305 mm diameter watermain runs along the south side of Richmond road across the frontage of the subject site. Previously, a 203 mm diameter watermain was extended north from Richmond Road to service the existing 7-storey Denis Coolican office building at 495 Richmond Road located west of the subject site. Subsequently, the Amica Seniors Residence was constructed immediately south of the subject site at 491 Richmond Road. During its construction, the existing 203 mm diameter water service to the office building was relocated slightly to the west as part of the site works. Additionally, a dedicated 152 mm diameter water service for the senior's residence was also extended from the 305 mm diameter main on Richmond Road.

The preferred location for connection to the existing municipal water supply is via the existing 203 mm diameter main that currently serves the adjacent office building. This eliminates the requirement to disturb Richmond Road with excavation and connection to an existing main on the opposite side of the roadway.

2.2 Design Criteria

In an e-mail provided by City of Ottawa staff, and included in **Appendix C,** a boundary condition for the existing 305 mm diameter main on Richmond Road has been provided. The exact location of the boundary condition is also included in an attached sketch, also in **Appendix C**. The following is a summary of the boundary conditions:

- Minimum HGl = 106.7 m
- Maximum HGL = 114.1 m
- Max Day Fire Flow HGL = 106.2 m

The above noted fire flow boundary condition is based on an available fire flow demand of 170 l/s, which is appropriate for the proposed type of high-density residential development, as discussed in the Fire Underwriters Survey (F.U.S.) 1999, and discussed in detail in Section 2.2.1.

In accordance with both MOE and City of Ottawa requirements, the watermain system for the subject site has been designed with following objectives in mind:

(i) Minimum pressure of 276 kPa under maximum hourly demand conditions.
(ii) Minimum pressure of 140 kPa during periods of maximum day and fire flow demands.
(iii) Maximum pressure of 552 kPa at all points within the system.

The predicted water demands for the subject site are determined using the following City of Ottawa criteria:

(iv)	Average Day	350 L/c/d
(v)	Maximum Day Demand	875 L/c/d
(vi)	Peak Hour Demand	1,925 L/c/d

Based on a population of 334 (191 units x 1.8 p/p/u) within the proposed residential development, the following demands are expected:

(vii)	Average Day Demand	1.39 L/s
(viii)	Maximum day Demand	3.48 L/s
(ix)	Peak Hour Demand	7.66 L/s

If any existing water services are encountered during construction, the City will be notified and a decision regarding decommissioning of any existing laterals can be discussed.

2.2.1 FIRE FLOW CALCULATION

The necessary fire flow, as determined by the F.U.S 1999, for the proposed 24 storey residential building can be determined as follows:

- $F = 220C\sqrt{A}$
  Where,
  F = Fire flow rate in L/min
  C = coefficient related to type of construction (C = 0.8 for non-combustible construction)
  A = Floor area of largest unit in the building

  Therefore, for the proposed building, the required fire flow becomes:
  $F = 220\ (0.8)\ (2015)^{0.5}$ = 7,900 L/min, assume 8,000 L/min

- Apply a reduction of 25% for a low hazard occupancy type;
  Therefore, -8,000 x 0.25 = -2,000 L/min

- Apply a reduction of 30% for the building being sprinklered
  Therefore, -8,000 x 0.30 = -2,400 L/min

- Apply a 20% increase due to the west face of the building being exposed to adjacent structure within 3.1 m to 10 m;
  Therefore, +8,000 x 0.20 = - +1,600 L/min

  Apply a 10% increase due to the south face of the building being exposed to adjacent structures within 20.1 m to 30 m;
  Therefore, +8,000 x 0.10 = - +800 L/min

  Apply a 20% increase due to the east face of the building being exposed to adjacent structures within 3.1 m to 10 m;
  Therefore, +8,000 x 0.20 = +1,600 L/min

  Thus, the total increase for exposure to adjacent structures is 1,600 L/min + 800 L/min + 1600 L/min = 4,000 L/min

- The fire flow requirement can then be calculated as:
  8,000 L/min – 2,000 L/min – 2,400 L/min + 4,000 L/min = 7,600 L/min (127 L/s)

2.3 Hydraulic Analysis

The water distribution system for the proposed development was modeled us H_20 MAP software and existing boundary conditions. Repeated iterations were run in order to determine adequacy of the proposed system based on the pressure criteria noted in Section 2.2.

The following results were obtained;

- Minimum pressure during max hour conditions = 427.42 kPa
- Maximum pressure during average day conditions = 499.98 Kpa
- Fire flow of 204.93 L/s during max day and fire flow conditions (minimum pressure of 140 kPa maintained)

A complete list of the results from the model during different demand conditions is included in **Appendix D**. The results indicate that the proposed 203 mm diameter extension from the existing infrastructure will provide the new building with a reliable water supply.

Because of the height of the proposed building, an internal booster pump will be required to maintain pressure at higher levels of the 24-storey building.

2.4 Proposed Water Plan

In order to supply the proposed development with a reliable water supply, it is recommended that the existing 203 mm diameter watermain be extended eastward from the adjacent office building property at 495 Richmond Road. A hydrant is proposed just south of the building and will provide adequate flow for fire protection. The 203 mm diameter pipe will also be extended to service the proposed building.

Details of the proposed water plan are shown on drawing 32385-C-100, a copy of which is included in **Appendix F.**

3. WASTEWATER DISPOSAL

3.1 Existing Conditions

The site is currently improved with an asphalt parking lot and related access road. The parking lot will be removed to accommodate the new building. There is an abandoned 150 mm diameter sanitary sewer located along the west side of the site. The sewer was originally designed for a building which was removed in 2006 as part of the redevelopment of the adjacent site including the Amica building. The Amica building is now serviced from a sanitary sewer located to the west of that building. The abandoned sanitary sewer connected to an existing 150 mm diameter sanitary sewer immediately north of the Denis Coolican building which in turn connects to the 1500 mm diameter West Nepean Collector sewer. The existing 150 mm diameter sanitary sewer, which was constructed at a slope of 3.5%, has a capacity of 28.8 l/s.

There is only one other building, which is located immediately east of the subject property, using the existing sanitary sewer. The Rogers Communication building is a single storey commercial building covering 1.29 ha. Peak wastewater flows from that site are expected to be in the 1.5 l/s range.

3.2 Sewer Capacity Analysis

The City of Ottawa's Servicing Study Guideline Checklist recommends that the proponent confirm that there is available capacity in receiving sewers. IBI has determined there is a total full flow capacity of 28.8 l/s in the existing 150 mm diameter sanitary sewer located immediately north of the site. As noted above in Section 3.1, only one other building, Rogers Communications, is using the existing sanitary sewer. It has an estimated peak flow of 1.5 l/s so there is about 27 l/s available residual capacity for other developments including the subject site.

The current proposal is to replace the existing parking lot with a 24 storey residential high rise with both above ground and underground parking. IBI estimates that the peaked wastewater flow from the proposed development will be 5.7 l/s. This is based on the following criteria:

Total # of units	191
Population density	1.8 ppu
Average Residential Flow	350 l/p/d
Peaking Factor	Harmon Formula [max = 4.0, min. = 2.0]
Infiltration Allowance	0.28 l/s/ha
Site Area	0.34 ha

The detailed sewer calculations, together with **Figure 3,** the Sanitary Drainage Area Plan, are included in **Appendix E.**

3.3 Proposed Wastewater Plan

A new 150 mm diameter service connection is proposed to be connected to the existing 150 mm diameter sanitary. The connection is proposed to the existing manhole where the abandoned 150 mm site sewer is presently connected. At this location, the abandoned site sewer is proposed to be replaced. The service is proposed to enter the building near the northwest corner. The Site Servicing Plan as well as the Site Grading and Drainage Plan are included in **Appendix F**.

4. STORMWATER MANAGEMENT

4.1 Existing Conditions

As stated in Section 3.1, the 0.33 ha subject site is presently improved with an asphalt parking lot and some landscaped areas. The entire existing site surface will be replaced. Runoff from the existing site presently outlets in three directions. A small area of 0.022 ha adjacent to Richmond Road drains southward towards an existing 675 mm storm sewer in that street. Another small area of 0.055 ha, east and south of the Amica building, drains to an existing 900 mm storm sewer and the balance of the site of about 0.275 ha drains to the north where it is captured in a catchbasin and outlets to an existing 250 mm storm sewer.

The existing outlet storm sewer is constructed at a slope of 0.80% and has a full flow capacity of 53.75 l/s. A detailed calculation of the existing condition tributary to the existing 250 mm diameter storm sewer is included in **Appendix E**. The existing 250 mm diameter storm sewer collects runoff from only portions of the subject site. The Rogers Communications property located to the east of the site is served with its own storm sewer.

4.2 Proposed Stormwater Plan

For further stormwater information pertaining to the site refer to the report titled 'Stormwater Management Servicing Report, 485 Richmond Road, Ottawa' completed by IBI Group and dated July 2013. That report identified a total outlet storm sewer capacity of 48.38 l/s was available for the new site. That allowance is based on 90% of the full flow capacity of the outlet sewer.

The proposed stormwater plan for the development will include a site catchbasin which will collect uncontrolled runoff from that portion of the site not covered by the building that will be tributary to the proposed catchbasin. The catchbasin will outlet to a proposed MH1 before connecting to the existing 250 mmØ storm sewer.

Runoff from the building will be collected in an internal cistern and controlled released via a proposed 200 mmØ storm service pipe which will also outlet to the proposed MH1. The 200 mmØ storm service pipe is proposed to be located about 14 m from the northwest building corner. A 250 mmØ sewer is proposed to outlet from MH1 and connect to the existing MH.

The details of the proposed sewer are indicated on drawing C-100 Site Servicing Plan. **Figure 4**, Storm Drainage Area Plan and a related storm sewer spread sheet are also included in **Appendix E** for further reference.

The balance of the site is proposed to sheet drain either to the west or south mirroring existing conditions.

5. STORMWATER SITE MANAGEMENT

During construction, existing 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:

- In trench groundwater will be pumped into a filter mechanism prior to release to the environment. Pumping in excess of 50,000 l/day will require a Permit To Take Water from the provincial Ministry of Environment. The geotechnical report will review this issue.

- Filter cloths will be placed on open structures such as catchbasins and manhole covers, and will remain in place until the project is completed. Regular monitoring will be required to ensure proper function of the cloth including replacement as required.

- Existing catchbasins on the streets adjacent to the streets are to be monitored to ensure that their sumps remain clean (cleaned as required).

- Silt fence on the perimeter of the site as per OPSD Standard 219.110 will be erected.

- Another method the contractor should try to utilize on the site during construction is to maintain the ground sloping to an artificial low spot which would include a settling bay to collect silt material. This could reduce the amount of silt material being pumped to the filter mechanism.

6. APPROVALS AND PERMIT REQUIREMENTS

6.1 City of Ottawa

The City of Ottawa reviews all development documents including this report. Upon completion, the City will approve the service connections and eventually issue a Commence Work Notification.

6.2 Province of Ontario

There may be no need to obtain an MOE Environmental Compliance Approval since proposed sewer discharge from the site will be directed to separate sewers. Those sewers do not appear to contribute to a downstream combined sewer but rather have separate outlets.

6.3 Conservation Authority

There are no approvals required from any Conservation Authority for this project.

6.4 Federal Government

There will be a requirement to obtain a Federal Land Use Permit from the National Capital Commission which owns the property immediately north of the subject site. The existing storm sewer, to which it is proposed to connect the building service pipe, is located on NCC property.

7. CONCLUSIONS AND RECOMMENDATIONS

7.1 Conclusions

The existing municipal services, including the 200 mm diameter watermain, 150 mmø diameter sanitary sewer and 250 mm diameter storm sewer provide the site with the necessary capacity to support the proposed development. Some on site stormwater attenuation is also required. Appropriate connections to the existing infrastructure are needed to properly service the subject development.

7.2 Recommendations

Based on the findings and conclusions of our investigation, IBI recommends that the proposed high rise development at 485 Richmond Road be serviced with a water supply, wastewater and stormwater outlet to existing infrastructure adjacent to the site.

APPENDIX A
Servicing Study Guideline Checklist

General Content

	ITEM DESCRIPTION	LOCATION
	Executive Summary (for larger reports only)	N/A
√	Date and revision number of the report	Front Cover
√	Location Map and plan showing municipal address, boundary, and layout of proposed development.	Figure 1 and 2
√	Plan showing the site and location of all existing services.	Drawing C-01
√	Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.	Section 1.3, 2.2, 3.2
√	Summary of Pre-consultation Meeting with City and other approval agencies.	Appendix B
	Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.	N/A
	Statement of objectives and servicing criteria	N/A
√	Identification of existing and proposed infrastructure available in the immediate area.	Section 2.1, 3.1, 4.1
	Identification of Environmentally Significant Areas, Watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).	N/A
	Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.	N/A
	Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.	N/A
	Proposed phasing of the development, if applicable.	N/A
√	Reference to geotechnical studies and recommendations concerning servicing.	Section 1.5
√	All preliminary and formal site plan submissions should have the following information: • Metric scale • North arrow (including construction North) • Key plan • Name and contact information of applicant and property owner • Property limits including bearings and dimensions • Existing and proposed structures and parking areas • Easements, road widening and rights-of-way • Adjacent street names	Report Drawings

Development Servicing Report: Water

	ITEM DESCRIPTION	LOCATION
	Confirm consistency with Master Servicing Study, if available	N/A
√	Availability of public infrastructure to service proposed development	Section 2.4.
	Identification of system constraints – external water needed	N/A
√	Identify boundary conditions	Section 2.2
√	Confirmation of adequate domestic supply and pressure	Section 2.4
√	Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.	Section 2.2
√	Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.	Section 2.3
	Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defining phases of the project including the ultimate design.	N/A
	Address reliability requirements such as appropriate location of shut-off valves.	N/A
	Check on the necessity of a pressure zone boundary modification.	N/A
√	Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range.	Section 2.3
	Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.	N/A
	Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities and timing of implementation.	N/A
√	Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.	Section 2.2
	Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.	N/A

Development Servicing Report: Wastewater

	ITEM DESCRIPTION	LOCATION
√	Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).	Section 3.2 and Appendix C
	Confirm consistency with Master Servicing Study and/or justifications for deviations.	N/A
	Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age condition of sewers.	N/A
√	Description of existing sanitary sewer available for discharge of wastewater from proposed development.	Section 3.1
√	Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)	Section 3.2
√	Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix "C") format.	Appendix C
√	Description of proposed sewer network including sewers, pumping stations and forcemains.	Section 3.3
	Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).	N/A
	Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.	N/A
	Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.	N/A
	Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.	N/A
√	Special considerations such as contamination, corrosive environment, check soils, etc.	Section 1.5

Development Servicing Report: Stormwater Checklist

	ITEM DESCRIPTION	LOCATION
√	Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)	N/A
√	Analysis of available capacity in existing public infrastructure.	Section 2.2, 3.2, 4.2
	A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.	N/A
	Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.	N/A
	Water quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	N/A
	Description of the stormwater management concept with facility locations and descriptions with references and supporting information.	N/A
	Set-back from private sewage disposal systems.	N/A
	Watercourse and hazard lands setbacks.	N/A
	Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	N/A
	Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.	N/A
√	Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).	Section 4.2, SWM Report, Drawing C-01
	Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.	N/A
√	Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.	Section 4.2 SWM Report, Drawing C-01
	Any proposed diversion of drainage catchment areas from one outlet to another.	N/A
	Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.	N/A
	If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100-year return period storm event.	N/A
	Identification of potential impacts to receiving watercourses	N/A
	Identification of municipal drains and related approval requirements.	N/A

√	Descriptions of how the conveyance and storage capacity will be achieved for the development.	Section 4.2 SWM Report
	100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	Drawing 27399-200
	Inclusion of hydraulic analysis including hydraulic grade line elevations.	N/A
√	Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	Section 5
	Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.	N/A
	Identification of fill constraints related to floodplain and geotechnical investigation.	N/A

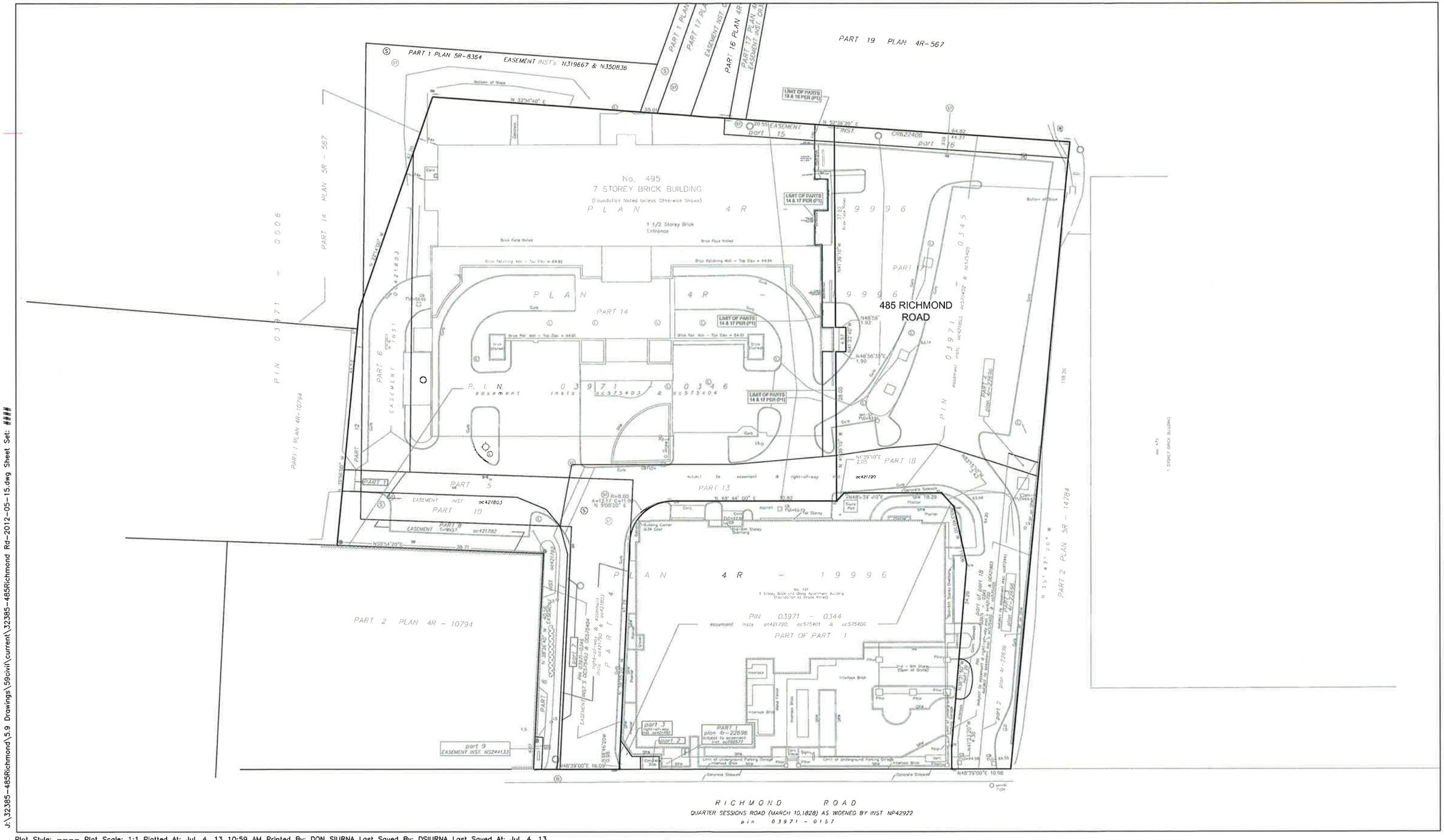
Approval and Permit Requirements: Checklist

	ITEM DESCRIPTION	LOCATION
	Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement Act. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act.	N/A
√	Application for Certification of Approval (CofA) under the Ontario Water resources Act.	Section 6.2
	Changes to Municipal Drains	N/A
	Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)	Section 6.4

Conclusion Checklist

	ITEM DESCRIPTION	LOCATION
√	Clearly stated conclusions and recommendations	Section 7
	Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.	N/A
√	All draft and final reports shall be signed and stamped by professional Engineer registered in Ontario.	Done

APPENDIX B
Site Plan



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Scale

N.T.S.

Project Title

minto CANDEREL

485 RICHMOND ROAD

Drawing Title

SITE PLAN

Sheet No.

FIGURE 2

APPENDIX C
Pre-Consultation Records

From: Wu, John [mailto:John.Wu@ottawa.ca]
Sent: July 13, 2012 10:02
To: Ryan Kennedy
Subject: RE: 485 Richmond Road - Watermain Boundary Condition

The result with 170L/s fire flow demand:

Max Day + FF = 98.9 m assuming a fire flow of 320 L/s

Max Day + FF = 106.2 m assuming a fire flow of 170 L/s

Minimum HGL = 106.7 m

Maximum HGL = 114.1 m

From: Ryan Kennedy [mailto:rkennedy@IBIGroup.com]
Sent: July 13, 2012 9:40 AM
To: Wu, John
Subject: RE: 485 Richmond Road - Watermain Boundary Condition

Thanks John,

Can you also request a boundary condition for a 170 L/s fireflow, as we discussed?

Ryan Kennedy P.Eng.

IBI Group
400-333 Preston Street
Ottawa ON K1S 5N4 Canada

tel 613 225 1311 **ext** 526
fax 613 225 9868
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email rkennedy@ibigroup.com
web www.ibigroup.com

From: Wu, John [mailto:John.Wu@ottawa.ca]
Sent: July 13, 2012 9:36
To: Ryan Kennedy
Subject: RE: 485 Richmond Road - Watermain Boundary Condition

The result:

******The following information may be passed on to the consultant, but do NOT forward this e-mail directly.******

The following are boundary conditions, HGL, for hydraulic analysis at 485 Richmond Road assumed to be connected to the 305mm on Richmond Road (see attached PDF for location).

Max Day + FF = 98.9 m assuming a fire flow of 320 L/s

Minimum HGL = 106.7 m

Maximum HGL = 114.1 m

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

John

From: Wu, John [mailto:John.Wu@ottawa.ca]
Sent: July 10, 2012 15:32
To: Ryan Kennedy
Subject: RE: 485 Richmond Road - Watermain Boundary Condition

Thanks, I will forward that to IMD too, this is a reasonable fire demand.

John

From: Ryan Kennedy [mailto:rkennedy@IBIGroup.com]
Sent: July 10, 2012 3:31 PM
To: Wu, John
Subject: RE: 485 Richmond Road - Watermain Boundary Condition

John, if we are to follow the Building Code method with a 2-hour fire separation we can reduce the needed fire flow to 170 L/s (10,200 L/min) based on the largest unit.

Thanks,

Ryan Kennedy P.Eng.

IBI Group
400-333 Preston Street
Ottawa ON K1S 5N4 Canada

tel 613 225 1311 **ext** 526
fax 613 225 9868
cell 613 255 3850
email rkennedy@ibigroup.com
web www.ibigroup.com

From: Wu, John [mailto:John.Wu@ottawa.ca]
Sent: July 10, 2012 14:16
To: Ryan Kennedy
Subject: RE: 485 Richmond Road - Watermain Boundary Condition

Hi, Ryan:

I don't think City's can provide the fire flow like that big, I do not know what happens last time , DME has some mistake when it use the modelling, I am familiar with that model, the assumption is totally wrong. I am not the project manager at that time. The fire flow should use the largest unit in the building with fire separation of 2 hours to determine the fire flow, not the total area of the building(that is for small buildings with no fire separation more than 2 hours).
If you wish to continue using fire flow of 320 L/s as request. Just let you know the answer maybe no.

Thanks.

John

From: Ryan Kennedy [mailto:rkennedy@IBIGroup.com]
Sent: July 10, 2012 2:00 PM
To: Wu, John
Cc: Jim Moffatt
Subject: RE: 485 Richmond Road - Watermain Boundary Condition

John,

Here is a summary of the revised demands for the proposed 24-storey residential building:

1. Fire Flow = 320 L/s (19,200 L/min) based on a total floor area of 22,356 sq.m.
2. Daily demand = 1.39 L/s
3. Max day demand = 3.48 L/s
4. Peak hour demand = 7.66 L/s

Please have your IMD group provide a boundary condition based on these numbers.

Thanks,

Ryan Kennedy P.Eng.

IBI Group
400-333 Preston Street
Ottawa ON K1S 5N4 Canada

tel 613 225 1311 **ext** 526
fax 613 225 9868
cell 613 255 3850
email rkennedy@ibigroup.com
web www.ibigroup.com

From: Wu, John [mailto:John.Wu@ottawa.ca]
Sent: July 10, 2012 11:42
To: Ryan Kennedy
Subject: RE: 485 Richmond Road - Watermain Boundary Condition

Hi, Ryan:
I need the updated fire flow request and daily water (including peak) demand, I can forward to our IMD group, please note the original fire flow maybe not right by DME. It is too high(the calculation is wrong).

Thanks.

John

From: Ryan Kennedy [mailto:rkennedy@IBIGroup.com]
Sent: July 10, 2012 11:36 AM
To: Wu, John
Cc: Jim Moffatt
Subject: 485 Richmond Road - Watermain Boundary Condition

Hi John,

As you know, we are working on a project at 485 Richmond Road. Part of the requirement involves updating a watermain hydraulic analysis previously prepared by DME in July 2006.

Can you please provide us with a current boundary condition at that location so that we can ensure we are using the latest data.

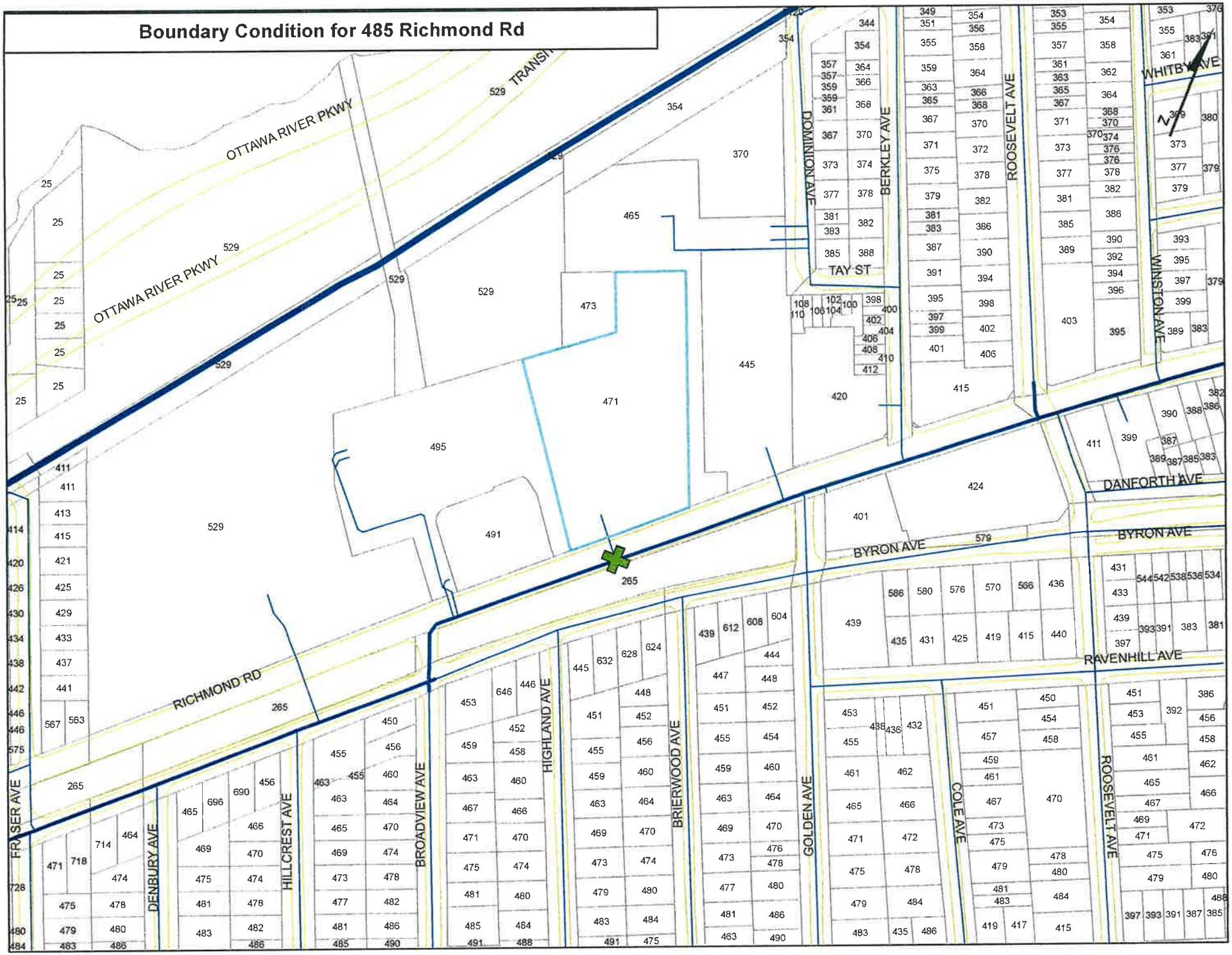
I have attached the previous report with boundary conditions for reference.

Ryan Kennedy P.Eng.

IBI Group
400-333 Preston Street
Ottawa ON K1S 5N4 Canada

tel 613 225 1311 **ext** 526
fax 613 225 9868
cell 613 255 3850
email rkennedy@ibigroup.com
web www.ibigroup.com

Boundary Condition for 485 Richmond Rd



APPENDIX D
Watermain Analysis Outputs

IBI GROUP
333 PRESTON STREET
OTTAWA, ON
K1S 5N4

WATERMAIN DEMAND CALCULATION SHEET

PROJECT : 485 RICHMOND ROAD
LOCATION : CITY OF OTTAWA
DEVELOPER : MINTO COMMUNITIES INC.

FILE: 32385.5.7
DATE: 2012-07-25
DESIGN: RK
PAGE : 1 OF 1

NODE	RESIDENTIAL UNITS SF	SD	TH	APT	GROSS RES. (Ha)	POP'N	NON-RESIDENTIAL COM (Ha)	IND (Ha)	INS (Ha)	AVERAGE DAILY DEMAND (l/s) Res.	Non-res.	Total	MAXIMUM DAILY DEMAND (l/s) Res.	Non-res.	Total	MAXIMUM HOURLY DEMAND (l/s) Res.	Non-res.	Total	FIRE DEMAND (l/s)
30							0.15			0.00	0.05	0.05	0.00	0.07	0.07	0.00	0.13	0.13	250
60				191		344				1.39	0.00	1.39	3.48	0.00	3.48	7.66	0.00	7.66	170

ASSUMPTIONS

RESIDENTIAL DENSITIES

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

AVERAGE DAILY DEMAND

- Residential	350 l/cap/day
- Commercial	28,000 l/ha/day
- Industrial	35,000 l/ha/day
- Institutional	15,000 l/ha/day

MAXIMUM DAILY DEMAND

- Residential	875 l/cap/day
- Commercial	42,000 l/ha/day
- Industrial	52,500 l/ha/day
- Institutional	22,500 l/ha/day

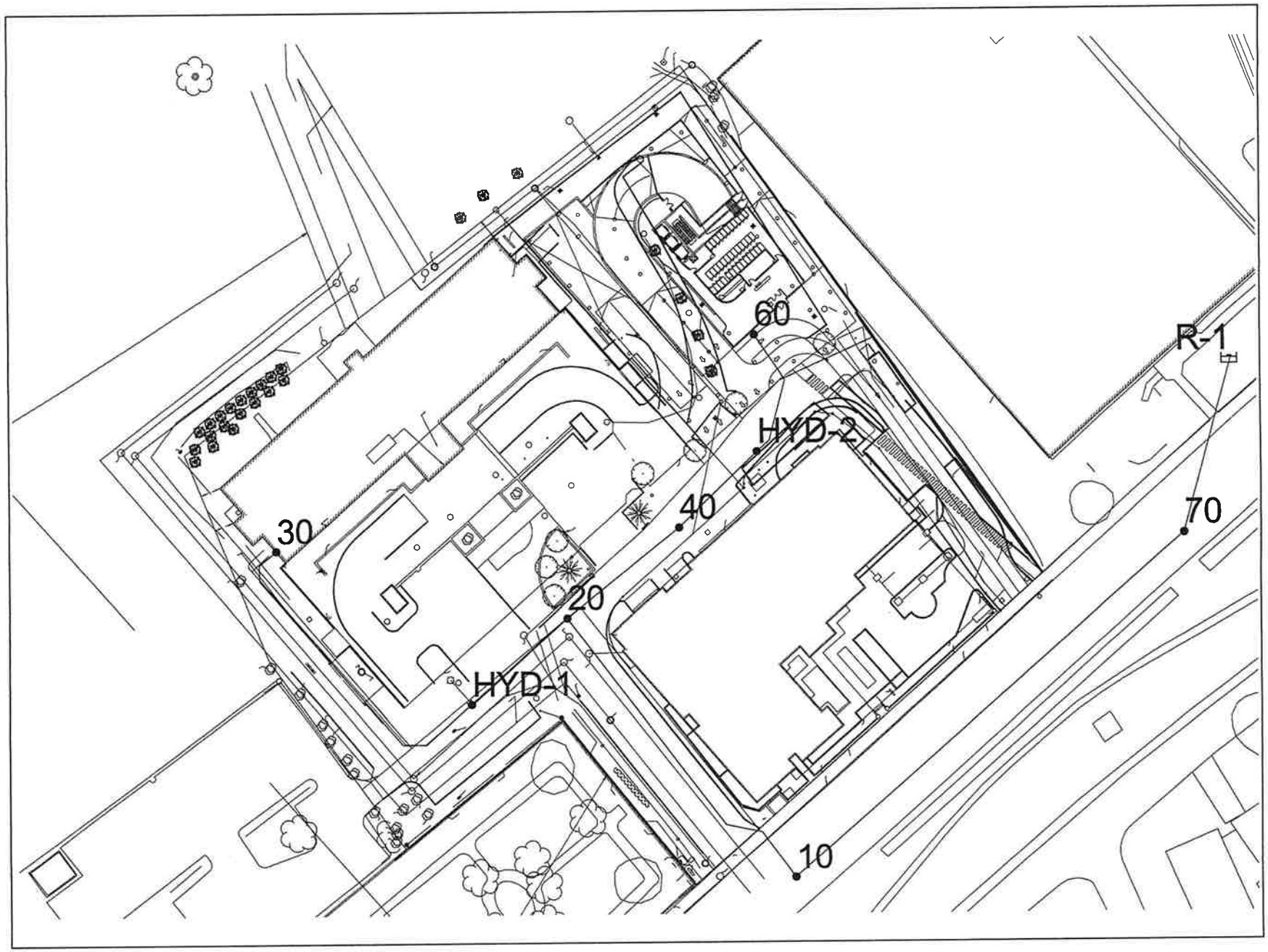
MAXIMUM HOURLY DEMAND

- Residential	1,925 l/cap/day
- Commercial	75,600 l/ha/day
- Industrial	94,500 l/ha/day
- Institutional	40,500 l/ha/day

FIRE DEMANDS

- SF	100 l/s
- SD	125 l/s
- TH	125 l/s
- APT	170 l/s
- ICI	250 l/s

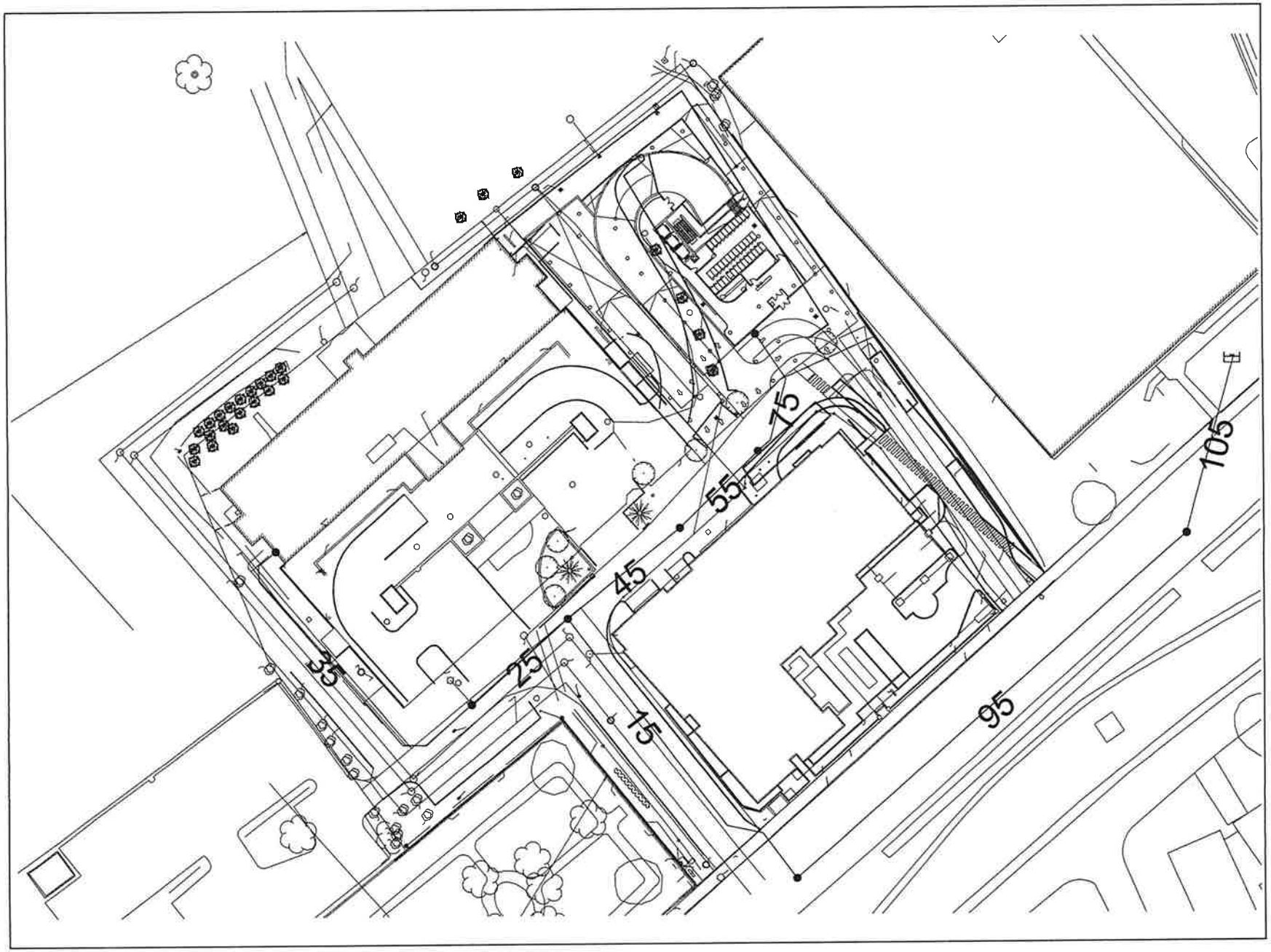
485 RICHMOND ROAD - NODE ID's



Prepared By: IBI Group

Date: Tuesday, July 24, 2012

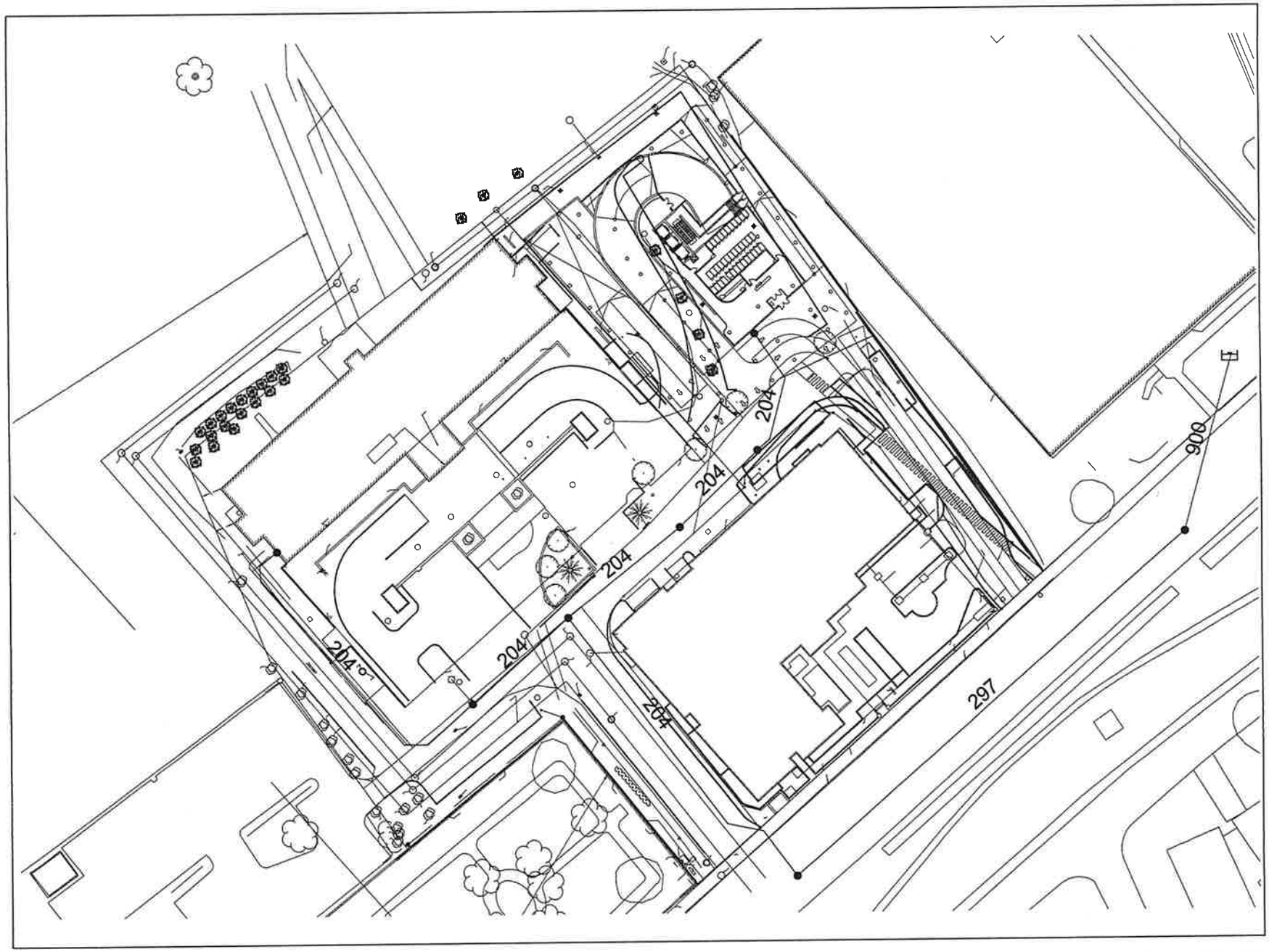
485 RICHMOND ROAD - PIPE ID's



Prepared By: IBI Group

Date: Tuesday, July 24, 2012

485 RICHMOND ROAD - PIPE SIZES



Prepared By: IBI Group

Date: Tuesday, July 24, 2012

Average Day - Junction Report (HGL = 106.7m)

		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
1		10	0.00	64.15	106.69	416.89
2		20	0.00	62.40	106.66	433.70
3		30	0.13	61.30	106.66	444.48
4		40	0.00	62.90	106.65	428.67
5		60	7.66	63.00	106.62	427.47
6		70	0.00	64.30	106.70	415.49
7		HYD-1	0.00	62.30	106.66	434.68
8		HYD-2	0.00	63.10	106.64	426.61

Average Day - Junction Report - High Pressure Check (HGL = 114.1m)

		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
1		10	0.00	64.15	114.09	489.40
2		20	0.00	62.40	114.06	506.22
3		30	0.13	61.30	114.06	517.00
4		40	0.00	62.90	114.05	501.18
5		60	7.66	63.00	114.02	499.98
6		70	0.00	64.30	114.10	488.00
7		HYD-1	0.00	62.30	114.06	507.20
8		HYD-2	0.00	63.10	114.04	499.13

Average Day - Pipe Report (HGL = 106.7m)

		ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness	Flow (L/s)	Velocity (m/s)	Headloss (m)
1		105	R-1	70	0.10	900.00	130.00	7.79	0.01	0.00
2		15	10	20	67.52	204.00	110.00	7.79	0.24	0.03
3		25	20	HYD-1	24.95	204.00	110.00	0.13	0.00	0.00000
4		35	HYD-1	30	64.79	204.00	110.00	0.13	0.00	0.0000
5		45	20	40	27.32	204.00	110.00	7.66	0.23	0.01
6		55	40	HYD-2	20.62	204.00	110.00	7.66	0.23	0.01
7		75	HYD-2	60	25.31	204.00	110.00	7.66	0.23	0.01
8		95	10	70	99.30	297.00	120.00	-7.79	0.11	0.01

Average Day - Pipe Report (HGL = 106.7m)

		ID	HL/1000 (m/km)
1		105	0.00
2		15	0.51
3		25	0.000
4		35	0.000
5		45	0.49
6		55	0.49
7		75	0.49
8		95	0.07

Max Day + Fireflow Report (HGL = 106.2m)

		ID	Total Demand (L/s)	Critical Node 1 ID	Critical Node 1 Pressure (kPa)	Critical Node 1 Head (m)	Adjusted Fire-Flow (L/s)
1		HYD-1	250.00	HYD-1	98.65	72.37	232.47
2		HYD-2	170.00	HYD-2	221.29	85.68	204.93

Max Day + Fireflow Report (HGL = 106.2m)

		ID	Available Flow @Hydrant (L/s)	Critical Node 2 ID	Critical Node 2 Pressure (kPa)	Critcal Node 2 Head (m)	Adjusted Available Flow (L/s)
1		HYD-1	232.47	HYD-1	139.96	76.58	232.47
2		HYD-2	204.93	HYD-2	139.96	77.38	204.93

Max Day + Fireflow Report (HGL = 106.2m)

		ID	Design Flow (L/s)
1		HYD-1	232.47
2		HYD-2	204.93

Max Hour - Junction Report - (HGL = 106.7m)

		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
1		10	0.00	64.15	106.69	416.88
2		20	0.00	62.40	106.65	433.65
3		30	0.66	61.30	106.65	444.42
4		40	0.00	62.90	106.64	428.62
5		60	7.66	63.00	106.62	427.42
6		70	0.00	64.30	106.70	415.49
7		HYD-1	0.00	62.30	106.65	434.63
8		HYD-2	0.00	63.10	106.63	426.56

APPENDIX E

Sewer Calculation Sheet
Sanitary Drainage Area Plan (Figure 3)
Storm Drainage Area Plan (Figure 4)

SEWER CALCULATION SHEET

Pre and post development sewer flow reviews

485 Richmond Road

Revision 1 4-Jul-13

LOCATION			STORM WATER FLOW								RESIDENTIAL FLOW							COMM/INST. FLOW			Foundation Drainage (L/s)	Infiltration Flow (L/s)	Total Flow (L/s)	SEWER DATA								
Street			Area (ha)	Cum. Area (ha)	Imp. factor C	Indiv. 2.78AC	Sum 2.78AC	Time of conc.	rainfall intensity	5-year peak flow (L/s)	Area (ha)	Units	Pop.	Cumulative Area (ha)	Cumulative Pop.	Peak factor	Peak flow (L/s)	Area (ha)	Cum area (ha)	Peak flow (L/s)				Actual dia. (mm)	Nominal dia. (mm)	Type	Slope (%)	Length (m)	Capacity (L/s)	Velocity (m/s)	Time of flow (min)	Ratio Q/Q_{full}
Sanitary (Existing Conditions)																															
Rogers Communications																		1.29	1.29	1.12	0.00	0.36	**1.48**								
485 Richmond Road											0.00	0		0	0.00	0	0.00	0.00	0.00	0.00		0.00	**0.00**								
Total																						0.00	**1.48**	*152.4*	*150*		*3.50*		*28.79*	*1.63*	*0.00*	*0.05*
Sanitary (Proposed Conditions)																															
Rogers Communications																		1.29	1.29	1.12	0.00	0.36	**1.48**								
485 Richmond Road											0.34	191	343.8	0.34	343.8	4.0	5.57					0.10	**5.67**								
Total																							**7.15**	*152.4*	*150*		*3.50*		*28.79*	*1.63*	*0.00*	***0.25***
Storm (Proposed Conditions)	CB1	MH1																													
	Area B		0.07	0.07	0.76	0.15	0.15	20.00	119.95	17.44																					
	Area D		0.05	0.05	0.77	0.11	0.11	20.00	119.95	13.69																					
	Total									31.12													**31.12**	254.0	250		0.50		42.49	0.87	0.00	0.73
	Building	MH1																													
	Area C		Controller Release Rate							17.25													**17.25**	203.2	200		1.00		33.14	1.06	0.00	0.52
	MH1	*Ex MH*								48.37													**48.37**	254.0	250		1.00		60.09	1.22	0.00	0.80
Existing Sewer										*48.37*													*48.37*	*254.0*	*250*		*0.80*		*53.75*	*1.09*	*0.00*	*0.90*

Residential Population Avg Apt =	1.8	persons/unit	Foundation Drainage	5.0 L/s/ha.
Average Daily Flow =	350	L/cap./day	Extraneous Flow =	0.28 L/s/ha.
Max. Residential Peak Factor =	4.0		Minimum Velocity =	0.76 m/s
Commercial Flow =	50000	L/ha/day	Manning's n =	0.013
Commercial Peak Factor =	1.5			

Designed: Jim Moffatt, P.Eng.,

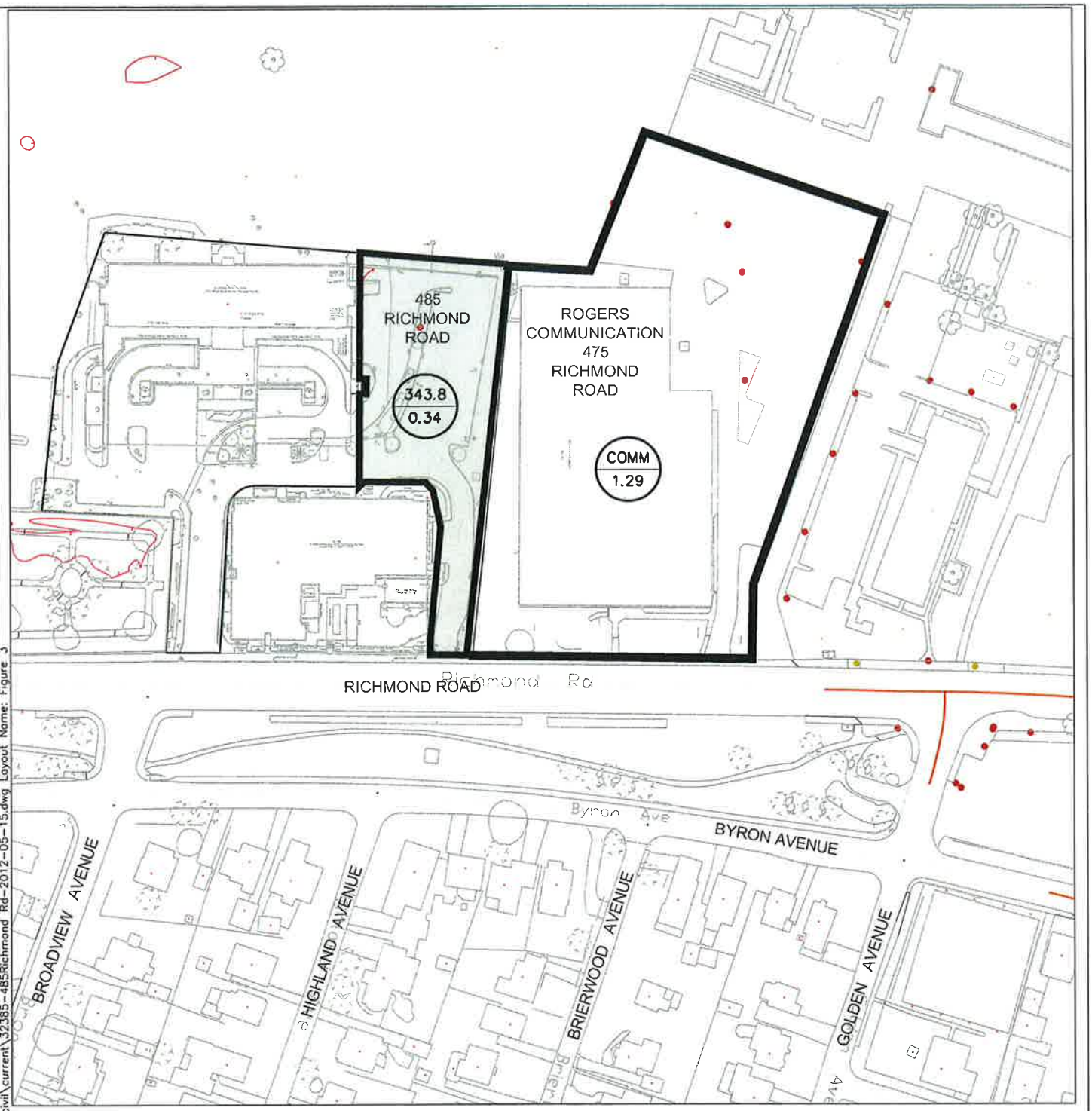
Checked: Jim Moffatt, P.Eng.,

27-Jul-12

PROJECT: 485 Richmond Road

LOCATION: City of Ottawa

File Ref.: 32385-5.7



J:\32385-485Richmond\5.9 Drawings\59civil\current\32385-485Richmond Rd-2012-05-15.dwg Layout Name: Figure 3

Plot Style: AIA STANDARD COLOR-HALF.CTB Plot Scale: 1:1 Plotted At: Jul. 4, 13 10:41 AM Printed By: DON SIURNA Last Saved By: DSIURNA Last Saved At: Jul. 4, 13

IBI GROUP

minto CANDEREL

485 RICHMOND ROAD

SANITARY DRAINAGE AREA PLAN

FIGURE 3

APPENDIX F

Site Servicing Plan – Drawing C-100

Site Grading and Drainage Plan – Drawing C-200

NOTES:

1. ALL WORKS TO BE COMPLETED AS PER CITY OF OTTAWA STANDARDS AND ONTARIO PROVINCIAL STANDARDS AND SPECIFICATIONS.

2. SEWER LATERALS TO BE PVC DR 35.

3. WATER SERVICES TO BE PVC. DR 18 CL150. MINIMUM COVER OF 2.4m FOR WATER SERVICE AS REQUIRED, USE THERMAL INSULATION AS PER CITY STANDARDS WHEN COVER IS LESS THAN 2.4m.

4. ALL SERVICE LATERAL AND SURFACE RESTORATION WORK IN ACCORDANCE WITH CURRENT CITY OF OTTAWA STANDARDS AND SPECIFICATIONS.

5. FULL PORT BACKWATER VALVE IS REQUIRED ON THE SANITARY SERVICE AND A CHECK VALVE IS REQUIRED ON THE STORM SERVICE.

6. WATER SERVICE CHLORINATION AND TESTING TO BE COMPLETED BY CITY FORCES.

7. PROPOSED BUILDING INFORMATION TAKEN FROM WALLMAN ARCHITECTS DRAWINGS.

8. AN EROSION AND SEDIMENTATION CONTROL PLAN WILL BE IMPLEMENTED ON THIS SITE. AS A MINIMUM THAT PLAN WILL INCLUDE A LIGHT DUTY SILT FENCE BARRIER TO OPSD STANDARD 219.110 SURROUNDING THE SITE WHERE PRACTICAL AND FILTER CLOTHS FITTED UNDER EXISTING STREET CATCH BASINS.

9. ALL SHOWN UTILITIES ARE APPROXIMATE AND ARE TO BE FIELD VERIFIED BY CONTRACTOR, ANY DISCREPANCIES ARE TO BE REPORTED TO IBI GROUP PRIOR TO CONTRACTOR MOBILIZING TO SITE.

10. CONTRACTOR RESPONSIBLE TO SUPPORT EXISTING UTILITIES THAT MAY BE AFFECTED DURING CONSTRUCTION

11. MOST EXISTING CURBS ARE TO BE REPLACED, ALL NEW CURBS TO BE AS PER CITY STANDARD SC1.1 TIEING INTO TOP/BOTTOM OF CURB ELEVATIONS.

12. CONCRETE SIDEWALK TO BE IN ACCORDANCE WITH CITY STD. DRAWING SC4 AND SC5.

13. SURFACE RESTORATION OVER NEW WATERMAIN TO BE IN ACCORDANCE WITH CITY STD. DRAWING R-10.

14. THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES, TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE RECEIVING WATER COURSE, DURING CONSTRUCTION ACTIVITIES. THIS INCLUDES LIMITING THE AMOUNT OF EXPOSED SOIL, USING FILTER CLOTH UNDER THE GRATES OF CATCHBASINS AND MANHOLES AND INSTALLING SILT FENCES AND OTHER EFFECTIVE SEDIMENT TRAPS. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT APPROPRIATE EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY APPLICABLE REGULATORY AGENCIES.

15. BOUNDARY INFORMATION COMPILED FROM PLAN 4R-19996. ELEVATIONS HEREON ARE REFERRED TO GEODETIC DATUM. IT IS THE RESPONSIBILITY OF THE USER OF THIS INFORMATION TO VERIFY THAT THE JOB BENCHMARK HAS NOT BEEN ALTERED OR DISTURBED AND THAT IT'S RELATIVE ELEVATION AND DESCRIPTION AGREES WITH THE INFORMATION ON THIS DRAWING.

16. FOR GEOTECHNICAL INFORMATION SEE "GEOTECHNICAL INVESTIGATION PROPOSED RESIDENTIAL BUILDING 485 RICHMOND ROAD OTTAWA ONTARIO BY HOULE CHEVRIER ENGINEER DATED JULY 2012

17. FOR STORMWATER MANAGEMENT INFORMATION SEE STORMWATER MANAGEMENT REPORT BY IBI GROUP TITLED STORMWATER MANAGEMENT ......

16. CLAY SEAL TO BE INSTALLED IN SERVICE TRENCHES BETWEEN CONNECTION POINT AND CAP.

17. CONTRACTOR TO REFER TO LANDSCAPE PLANS AND SPECIFICATIONS FOR SOME FINISHES, TEXTURES, COLORS AND REMAINING LANDSCAPE FEATURES.

18. NEW PAVEMENT/CONCRETE STRUCTURES ARE INCLUDED ON THIS DRAWING. THE HEAVY DUTY PAVEMENT/CONCRETE AREA IS SHADED. ALL OTHER AREAS TO BE PAVED/CONCRETE WITH LIGHT DUTY.

19. 1200mmø MANHOLES TO BE AS PER OPSD-701.010 WITH COVER AND FRAME AS PER CITY STANDARD S24 AND S25.

20. THE PROPOSED 150ø SANITARY SEWER SERVICE AND 200ø STORM SERVICE PIPES TO BE INSULATED AS PER CITY OF OTTAWA STANDARD DETAIL W22.

SEWER SCHEDULE

LOCATION	INVERT ELEVATIONS (m)					OPSD	FRAME COVER *
	NORTH	SOUTH	EAST	WEST	TOP COVER		
CB-1				59.96	60.70	705.010	S19
MH1	59.81	59.85	59.87		60.95	701.012	S24.1/S25
EX STM MH		59.75			61.29	–	–
EX SAN MH		59.18	*59.13EX*	*59.12EX*	61.02	–	–

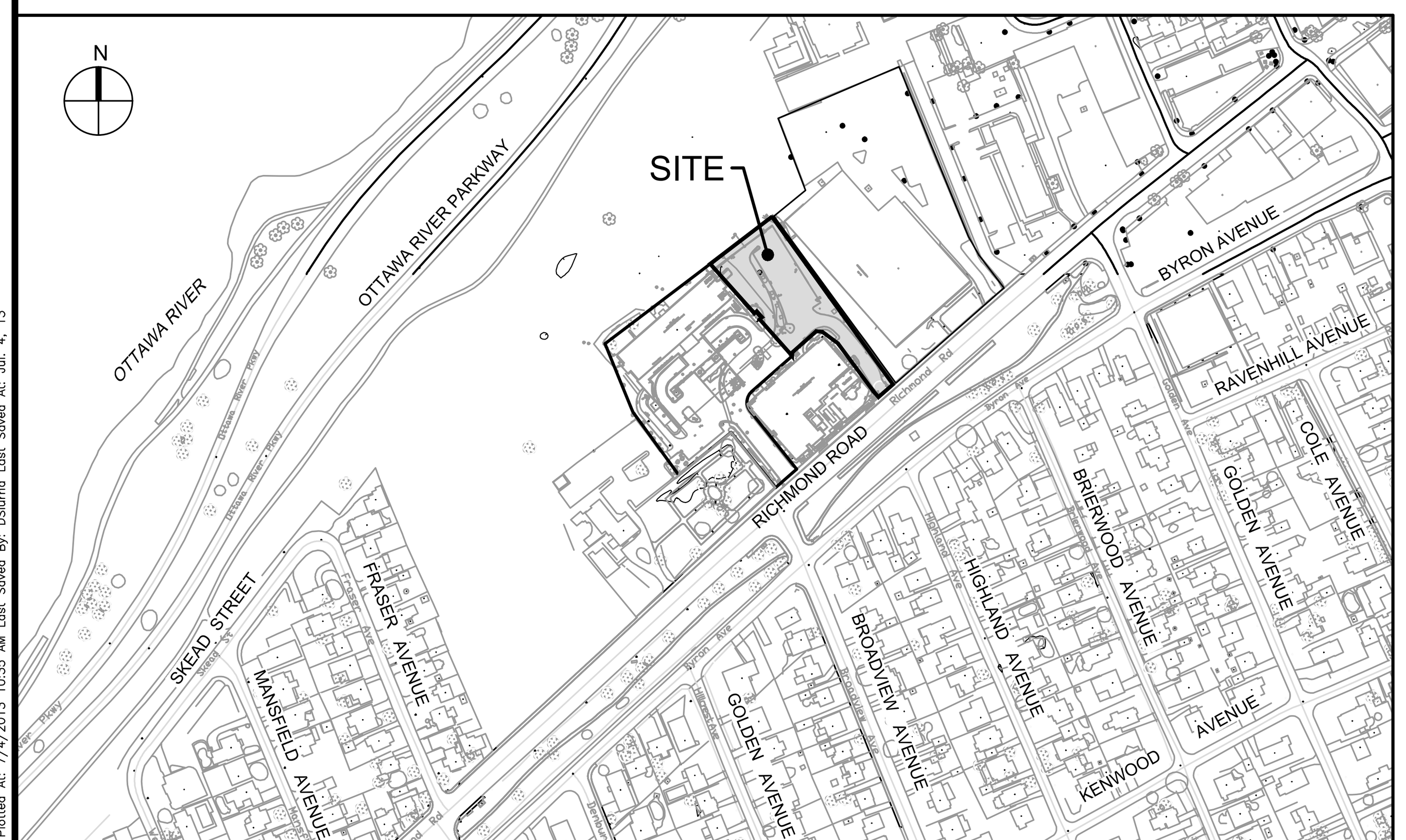
* CITY STANDARD DRAWING NUMBER

WATERMAIN SCHEDULE-BOTH PIPES

LOCATION	DESCRIPTION	FINISHED GRADE(m)	TOP OF WATERMAIN(m)	
			PROPOSED	AS-BUILT
(A) 0+000	200x200TEE	±62.45	60.05	
0+003	45° BEND	±62.50	60.10	
0+015	–	±62.70	60.30	
0+030	–	±62.91	60.51	
0+045	VALVE & BOX	63.35	60.95	
0+061	45° BEND	64.20	61.80	
0+063	45° BEND	64.26	61.86	
0+064	200x150TEE	64.36	61.96	
(C) 0+075.5	CAP	64.60	62.20	
(B) 0+000	200x150TEE	64.36	61.96	
0+013.6	22° BEND	64.70	62.30	
(D) 0+016.1	HYDRANT	64.91	62.41	

PIPE CROSSING CONFLICT TABLE

1	PROPOSED 200ø STORM SEWER 0.42m CLEARANCE OVER PROPOSED 150ø SAN SEWER
2	PROPOSED 200ø STORM SEWER 0.38m CLEARANCE OVER EX. 150ø SAN SEWER



KEY PLAN
N.T.S.

ROAD STRUCTURES ASPHALT:

LIGHT DUTY PAVEMENT

50mm SUPER PAVE 12.5mm
150mm GRANULAR 'A'
300mm GRANULAR 'B'

HEAVY DUTY PAVEMENT

40mm SUPER PAVE 12.5mm
40mm SUPER PAVE 19mm
150mm GRANULAR 'A'
450mm GRANULAR 'B' TYPE II
SEE NOTE 18.

ROAD STRUCTURES CONCRETE:

LIGHT DUTY CONCRETE

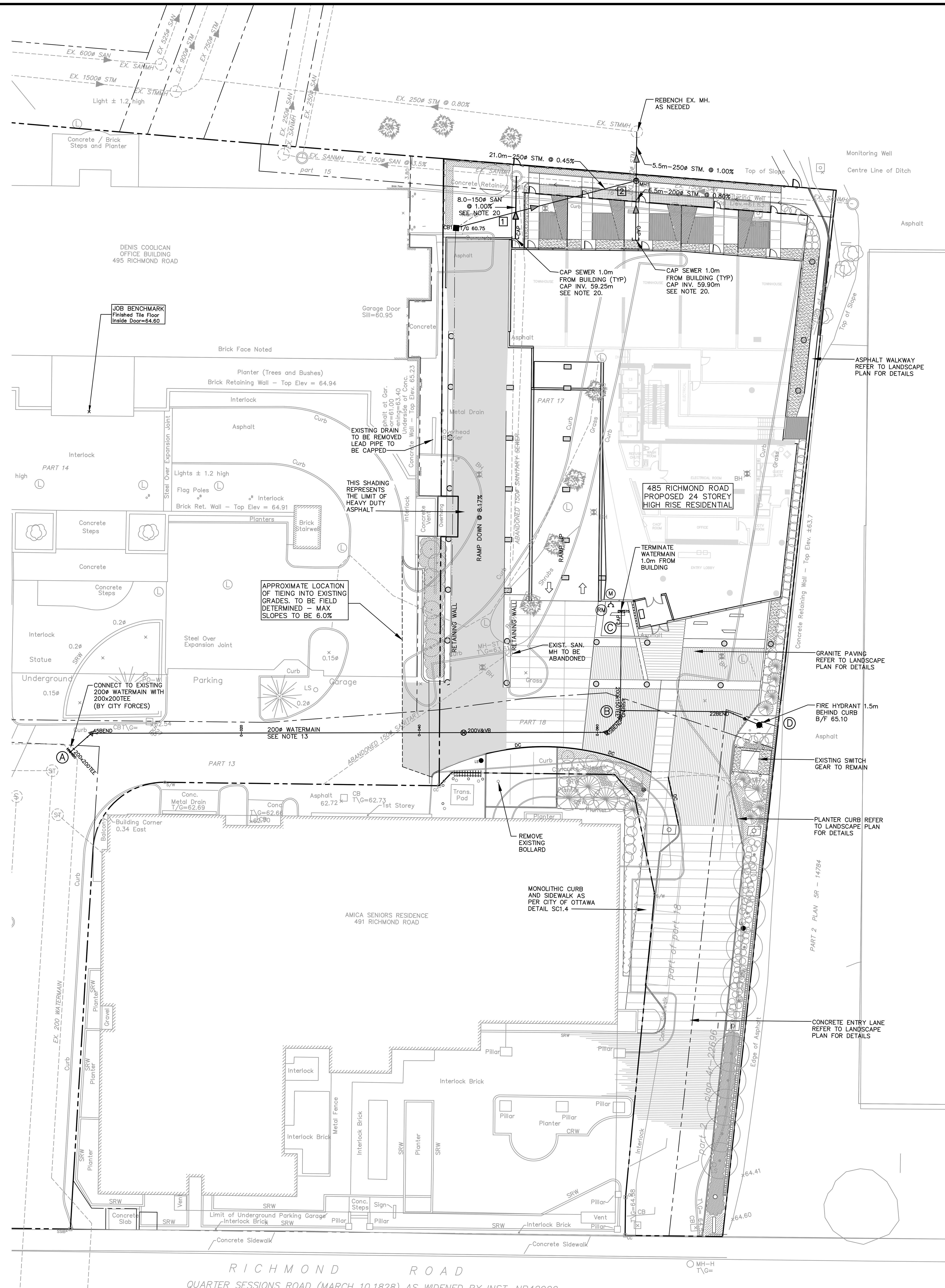
120mm CONCRETE
150mm GRANULAR 'A'
300mm GRANULAR 'B'

HEAVY DUTY CONCRETE

160mm CONCRETE
150mm GRANULAR 'A'
450mm GRANULAR 'B' TYPE II
SEE NOTE 18.

LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
— — —	PROPERTY LINE		EXISTING TRAFFIC SIGN
FF 70.50	FINISHED FLOOR ELEVATION	CB	EXISTING CATCH BASIN
DC	DEPRESSED CURB	STMH	EXISTING STORM MANHOLE
	CURB TAPER	SMH	EXISTING COMBINED MANHOLE
(M)	WATER METER (SEE MECH. DRWG. FOR EXACT LOCATION)	200ø STORM	PROPOSED STORM SEWER
(RM)	REMOTE WATER METER (SEE MECH. DRWG. FOR EXACT LOCATION)	200ø SANITARY	PROPOSED SANITARY SEWER
	SIAMESE CONNECTIONS (SEE MECH. DRWG. FOR EXACT LOCATION)	127ø WATERMAIN	EXISTING WATERMAIN
	PROPOSED CURB	200ø WATERMAIN	PROPOSED WATERMAIN
	EXISTING CURB	200V&VB	PROPOSED VALVE AND VALVE BOX
	DEPRESSED CURB	200x150REDUCER	PROPOSED REDUCER
		HYD	EXISTING FIRE HYDRANT
	UNIT PAVERS	SN	EXISTING SIGN
	PEA GRAVEL	WV	EXISTING WATER VALVE
	LIGHT DUTY CONCRETE DRIVEWAY	SP	EXISTING WATER SERVICE STANDPOST
	HEAVY DUTY CONCRETE DRIVEWAY	BH-3	EXISTING BOREHOLE
			LIGHT DUTY PAVEMENT
			HEAVY DUTY PAVEMENT



No.	REVISIONS	By	Date
14			
13			
12			
11			
10			
9			
8			
7			
6			
5			
4	RE-ISSUED FOR SPA	JIM	13:07:04
3	RE-ISSUED FOR SPA	JIM	13:05:09
2	RE-ISSUED FOR SPA	JIM	12:11:28
1	ISSUED FOR SPA	JIM	12:07:27

minto
CANDEREL

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

Project Title

485 RICHMOND ROAD

LICENSED PROFESSIONAL ENGINEER
J. I. MOFFATT
13/07/04
PROVINCE OF ONTARIO

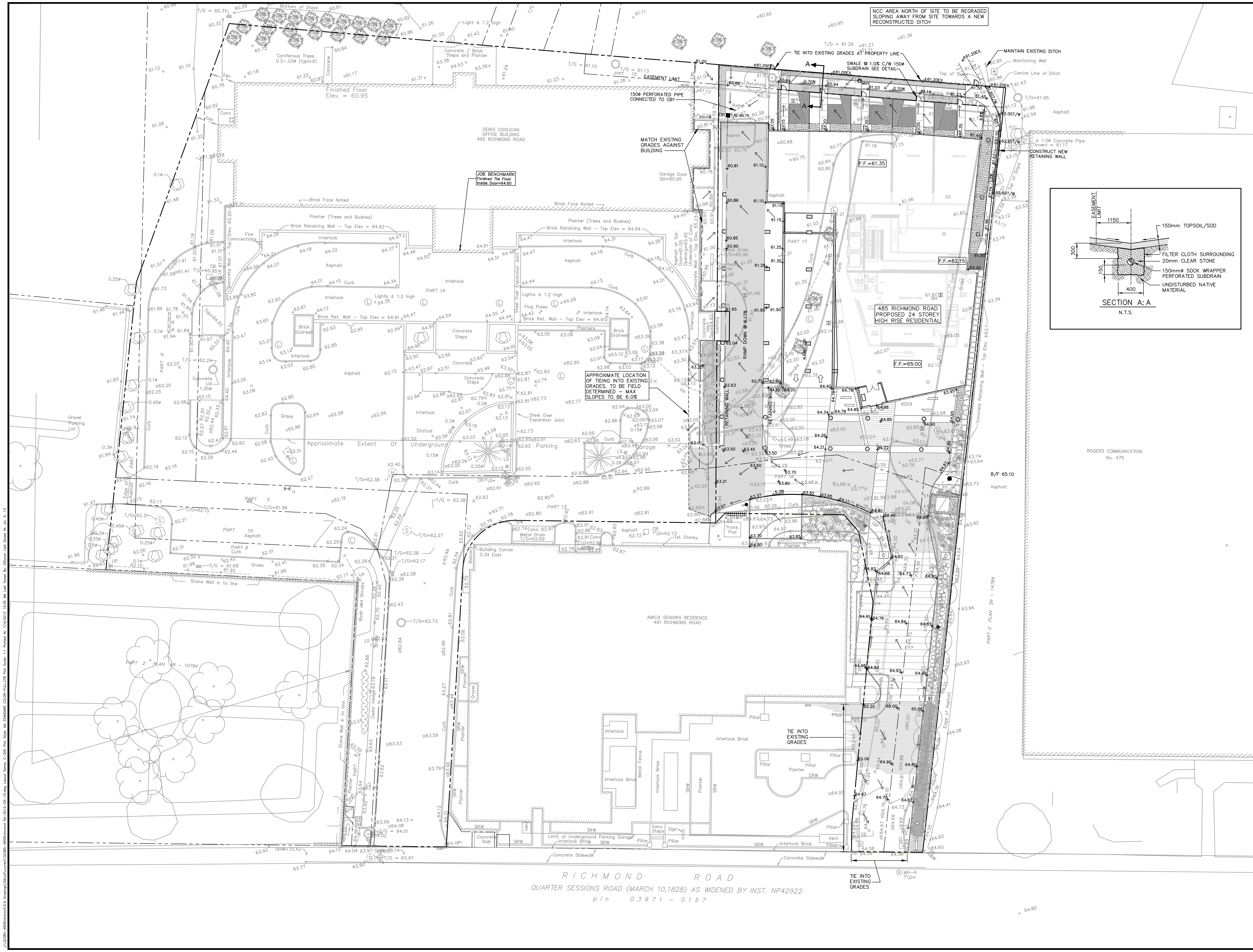
Drawing Title

SITE SERVICING PLAN

Scale 1 : 250

0 10 20

Design	Date
J.I.M.	MAY 2012
Drawn	Checked
D.P.S.	J.I.M.
Project No.	Drawing No.
32385	C-100



No.	REVISIONS	By	Date
14			
13			
12			
11			
10			
9			
8			
7			
6			
5			
4	RE-ISSUED FOR SPA	JM	13:07:04
3	RE-ISSUED FOR SPA	JM	13:05:09
2	RE-ISSUED FOR SPA	JM	12:11:28
1	ISSUED FOR SPA	JM	12:07:27

minto CANDEREL

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Project Title

485 RICHMOND ROAD

LICENSED PROFESSIONAL ENGINEER J. I. MOFFATT 13/07/04 PROVINCE OF ONTARIO

Drawing Title

SITE GRADING PLAN

Scale 1 : 250

Design	Date
J.I.M.	MAY 2012
Drawn	Checked
D.P.S.	J.I.M.
Project No.	Drawing No.
32385	C-200