

**FUNCTIONAL SERVICING REPORT
PROPOSED RESIDENTIAL DEVELOPMENT**

**MN 7301 Lundy's Lane
Niagara Falls, Ontario**

Prepared By:

**J.H. Cohoon Engineering Limited
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Job: 16364

September 2023

INTRODUCTION

The following Functional Servicing Report was prepared by J.H. Cohoon Engineering Limited for RPDA Integrated Design Firm in support of future planning applications relating to the site located at MN 7301 Lundy's Lane, in the City of Niagara Falls, Ontario.

The development approach is to develop the site in a single-phase residential development which will consist of 72 stacked townhouse style of residential units as illustrated on the attached plan (Appendix 'A')

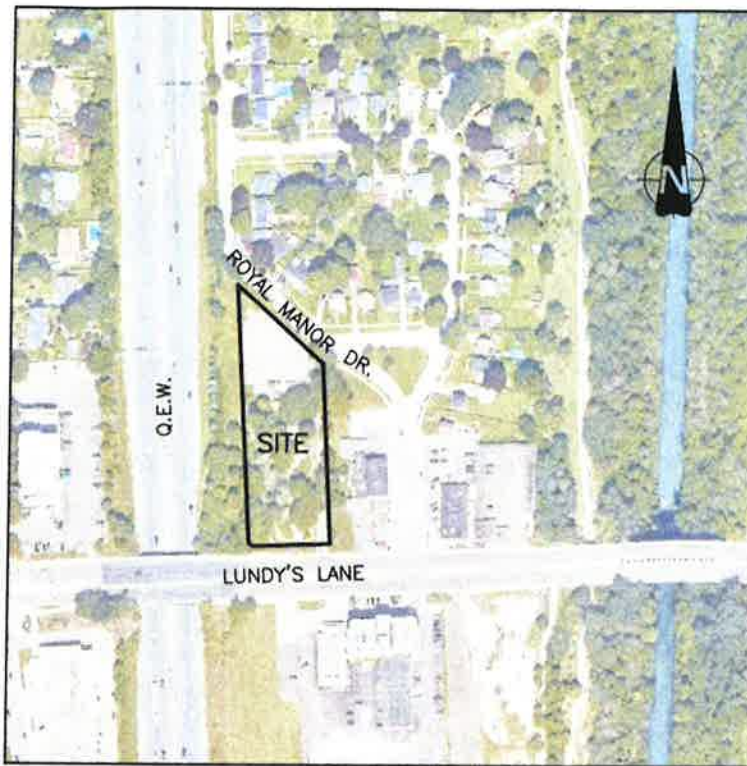
The site is located on the north side of Lundy's Lane adjacent to the Queen Elizabeth Way and backs onto Royal Maner Drive in the City of Niagara Falls. The site is approximately 0.650 hectares in size.

The objective of this report is to document the servicing strategy to be utilized for the site in a proposed initial development. Full services will be installed (i.e., sanitary, storm and water) within the development and connected to the existing municipal system in the existing municipal road allowances or abutting the subject lot. The owner will assume full responsibility for the installation and maintenance of the services on the property.

PROPOSED DEVELOPMENT CONCEPT

The proposed development is to be constructed on the north side of Lundy's Lane consisting of 72 stacked townhouse style residential units on the property. The site proposed for the development as a residential development is 0.65 hectares in size. A key map illustrating the site location is provided in Figure 1.

The anticipated development is intended to be a series of townhouses of various block sizes with a total of approximately 72 total units. The development is illustrated on the plans prepared by J H Cohoon Engineering Limited being drawings which have been included within Appendix 'A' of this report



KEY PLAN

**Site Location – Key Plan
Figure No. 1**

SANITARY SEWERS & APPURTENANCES

3.1 Design Flows

This site is proposed to be fully connected to the municipal sanitary sewer system located north of the site on Royal Manor Drive (east of the Queen Elizabeth Way). The proposed development is proposed to drain by gravity to the existing sanitary sewer.

The proposed development is illustrated on the attached site plan being drawing that is located within Appendix 'A' of this report. In accordance with the current City of Niagara Falls requirements, the design flows are being submitted to the Engineering Department for the review of the conveyance systems within the City of Niagara Falls. The following information was provided to the City of Welland for their use and consideration.

Sanitary Design Flows

Residential Component

72 townhouse style of Residential Units
2.47 people per unit

On the basis of an average discharge in accordance with the Ministry of the Environment standards, the average daily flow is based upon 275 litres per person per day

$$\begin{aligned} 72 \times 2.47 \times 275 &= 48,906.0 \text{ liters per day} \\ \text{Total Average Design Flow} &= 0.566 \text{ liters per second.} \end{aligned}$$

Therefore, the total sanitary effluent from this development will be as following flows:

Summary of Results

$$\begin{aligned} \text{Average Flow Rate} \\ \text{Residential Component} &= 0.566 \text{ liters per sec} \end{aligned}$$

Infiltration Allowance

$$\begin{aligned} \text{Contributing Site Area} &= 0.650 \text{ hectares} \\ \text{Infiltration Rate} &= 0.286 \text{ liters per second per hectare} \\ \text{Infiltration Allowance} &= 0.186 \text{ liters per second} \end{aligned}$$

$$\begin{aligned} \text{Total Average Flow Rate} \\ &= 0.752 \text{ liters per sec} \end{aligned}$$

On the basis of the Harmon Peaking Factor, and a total population this development on the site being 177.84 (178) persons (residential), the peaking factor of 4.166 (Max 4) was applied resulting in a peak design flow for the development being 2.264 liters per second. The peaking factor utilized in this development taken from the Harmon Peaking Factor formula as follows:

$$M = 1.0 + \frac{14}{4 + \text{SQRT}(P)}$$

Where P is the population in thousands

$$\begin{aligned} \text{Peak Flow Rate} \\ \text{Residential} &= 2.264 \text{ liters per sec} \\ \text{Infiltration Allowance} &= 0.186 \text{ liters per second} \end{aligned}$$

Total Peak Flow Rate

= 2.450 liters per sec

Sanitary Outlet

The sanitary sewer system for the subject development will be connected into the existing Sanitary Sewers that are located north of the site. The proposal is to discharge the sanitary effluent into the existing sanitary sewer in this location. The analysis relating to the overall impact of this development on the receiving sanitary sewer system will be reviewed by the City of Niagara Falls.

WATERMAINS & APPURTENANCES

Design Flows

The peak design flow rate from the proposed development using current City of Niagara Falls Standards. As with the wastewater, the estimated average flows have been detailed with the Sanitary Sewer Section of this report. (Section 3.1 above). However, in this case the peaking factor of 2 has been utilized and a demand of 275 liters per person per day.

The summary of the water system demands can be summarized as follows:

	Average Daily Flow Rate (Liters per second)	Peak Daily Flow Rate* (Liters per second)
Residential Component 72 Units	0.566	1.132

* utilizing a peaking factor of 2.0 for the peak daily flow.

With the use of a peaking factor of 3.0, we have determined the following peak flows:

Average Daily	Peak Hourly
---------------	-------------

	Flow Rate (Liters per second)	Flow Rate** (Liters per second)
Residential Component		
72 Units	0.566	1.698

** utilizing a peaking factor of 3.0 for the peak daily flow.

The proposed fire protection to this development will be handled by the proposed fire hydrants to be located on the property and in the vicinity of the site.

Utilizing the requirements of the Fire Underwriters Survey 2020, the following outlines the water demand for the overall building area of the subject building.

This proposed structure is approximately 389.1 sq. m. in size (multi-storey building- 3 to 3.5 storey building). In accordance with the Fire Underwriters Survey 2020, consideration of the floor above results in the building area being increased to 1,556.4 sq. m.

Utilizing the Fire Underwriters Survey Document, our estimation of the required fire demand is as follows:

$$\begin{aligned} \text{Estimate of Fire Flow Required} &= 220 * C * \text{SQRT}(A) \\ \text{Where C} &= \text{Coefficient related to type of Construction} \\ \text{Fire Resistant Construction} &= 1.5 \end{aligned}$$

$$\begin{aligned} A &= \text{Total Area of the Building (As outlined above)} \\ &1,556.4 \text{ sq. m.} \end{aligned}$$

$$\begin{aligned} &= 220 \times 1.5 * \text{SQRT}(1,556.4) \\ &= 13,018.9 \text{ litres per min} \\ \text{Rounded} &= 13,000 \text{ litres per min} \end{aligned}$$

$$\begin{aligned} \text{Modifications} & \\ \text{Occupancy} &= \text{Low Hazard Occupancy} \\ &= -15\% \\ &= -1,950 \text{ litres per min} \end{aligned}$$

$$\text{Net Fire Demand} = 11,050 \text{ litres per min}$$

$$\begin{aligned} \text{Further Modifications} & \text{Automatic Sprinkler System} = 0\% \\ &= 0 \text{ litres per min} \end{aligned}$$

Spatial Exposure (Estimated) –

North Street	+0%
East >30m	+0%
West Street	+0%
South 4.77m+/-	+20%
Total	+20%
Increase	2,210 litres per min

Total Fire Demand 13,260.0 litres per min = 221.0 litres per sec.

The water distribution system for the subject development will be connected into the existing watermain located on Royal Manor Drive. The analysis relating to the overall impact of this development on the existing watermain system will be reviewed by the City of Niagara Falls.

STORM SEWERS & APPURTENANCES

Storm Sewers / Storm water Management

The site is intended to be serviced with municipal storm sewers which are to be designed to handle the 5-year storm event. The overall stormwater management system is to be consistent with the current policies of the City of Niagara Falls which require reduction in the post development flows to below the pre-development rates for all storm events up to and including the 100-year event. A stand-alone Stormwater Management Report will address the quality and quantity controls that are required by this site during the full site plan approval process.

GRADING

Road grades will be established for the proposed development and are illustrated on the plans appended to the report. Minimum (0.50%) and maximum (6.0%) grades have been used in accordance with City of Niagara Falls design criteria.

UTILITIES

Gas, hydro, Bell, and cable utilities are available to service the proposed development. Coordination of these services will be required with Union Gas, the hydro utility, Bell, and the local cable tv provider.

CONCLUSIONS

The preceding sections of this report outline the servicing and grading requirements for the proposed residential development on this site. Based on the work completed to date, it may be concluded that the proposed development may be developed with full municipal services.

Report Prepared By:

J.H. COHOON ENGINEERING LIMITED



R. W. Phillips, P.Eng.

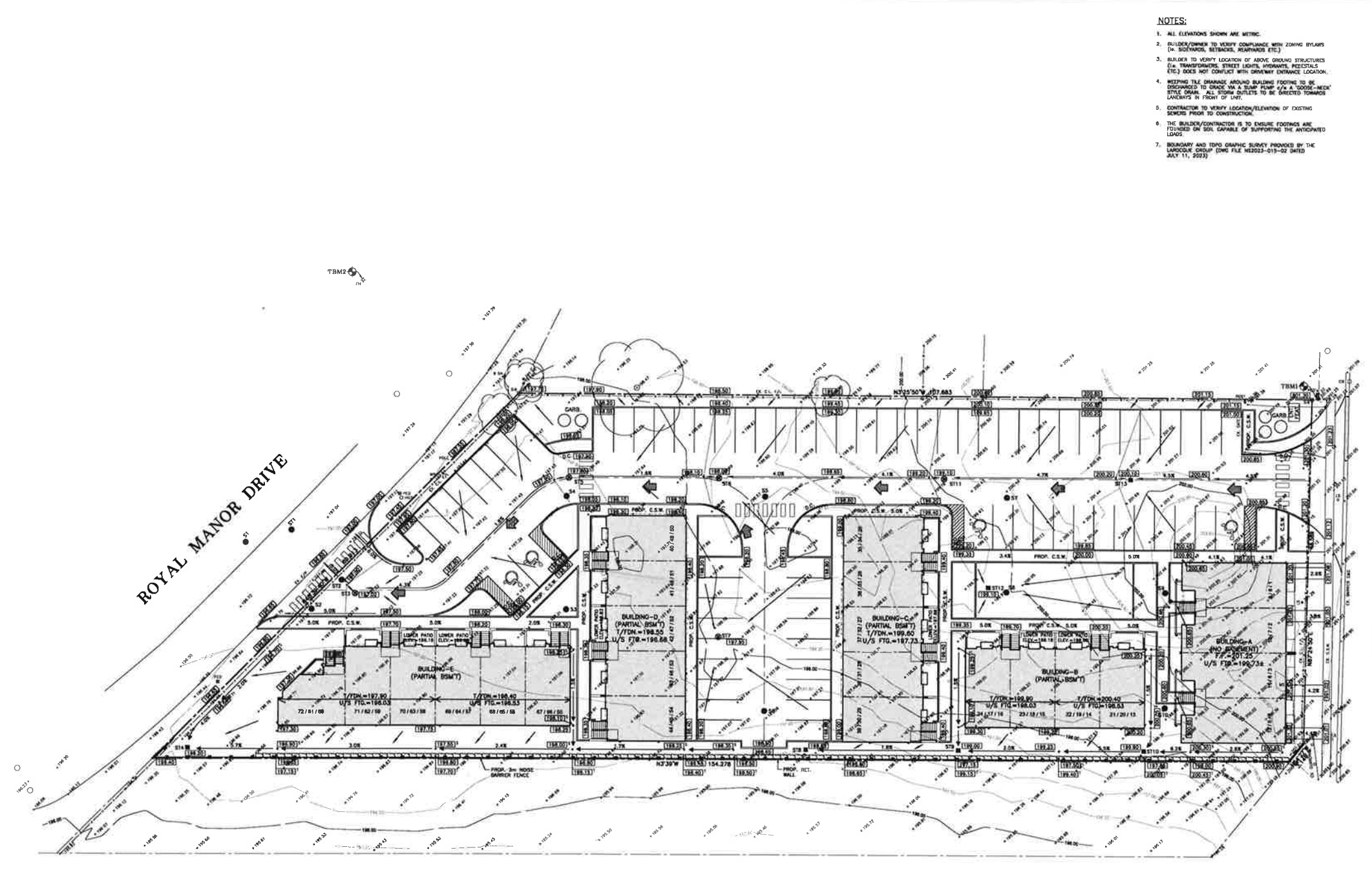


Proposed Residential Development
MN 7301 Lundy's Lane
Niagara Falls, Ontario

Project # 16364

September 2023

Appendix 'A'
Site Development Plan Prepared by J H Cohoon Engineering Limited



- NOTES:**
1. ALL ELEVATIONS SHOWN ARE METRIC.
 2. BUILDER/OWNER TO VERIFY COMPLIANCE WITH ZONING BYLAWS (i.e. SIDEWALKS, SETBACKS, REARWARDS ETC.)
 3. BUILDER TO VERIFY LOCATION OF ABOVE GROUND STRUCTURES (i.e. TRANSFORMERS, STREET LIGHTS, HOVWAYS, RECREATIONAL ETC.) DOES NOT CONFLICT WITH DRAINAGE ENTRANCE LOCATION.
 4. KEEPING THE DRAINAGE AROUND BUILDING FOOTINGS TO BE DISCHARGED TO CURB ON A SLOPE FROM 1/4" TO 1/8" PER FOOT. ALL STORM OUTLETS TO BE DIRECTED TOWARDS LANDSCAPE IN FRONT OF LOT.
 5. CONTRACTOR TO VERIFY LOCATION/ELEVATION OF EXISTING SEWERS PRIOR TO CONSTRUCTION.
 6. THE BUILDER/CONTRACTOR IS TO ENSURE FOOTINGS ARE FOUNDED ON SOIL CAPABLE OF SUPPORTING THE ANTICIPATED LOADS.
 7. BOUNDARY AND TOPIC GRAPHIC SURVEY PROVIDED BY THE LANDCOVE GROUP (DMS FILE #E2022-013-02 DATED JULY 11, 2023)

T.B.M. No. 1 ELEV. = 201.63m (GEO)
 TOP OF SURVEY MONUMENT AT THE S.E. CORNER OF SUBJECT PROPERTY AS SHOWN.

T.B.M. No. 2 ELEV. = 198.07m (GEO)
 TOP SURF OF FIRE TOWER ON THE NORTH SIDE OF ROYAL MANOR DRIVE AS SHOWN.

- LEGEND:**
- EXISTING ELEVATIONS
 - PROPOSED ELEVATIONS
 - PROPOSED SWALE ELEVATIONS
 - PROPOSED SWALE
 - GENERAL DRAINAGE
 - PROPOSED RAINWATER LEADER
 - DC PROPOSED DEPRESSION CURB
 - PROPOSED HYDRO TRANSFORMER
 - PROPOSED LIGHT STANDARD
 - PROPOSED OVERLAND FLOW ROUTE

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No.	Date	Version	Dwn.

PROJECT:
PROPOSED MIXED USE DEVELOPMENT
 7301 Lundy's Lane
 City Of Niagara Falls
 Canada

DRAWING TITLE:
GRADING PLAN

DRAWN BY: K.P.B. **DATE:** OCT. 5/23
CHECKED BY: R.W.P. **SCALE:** 1:250

PROJECT NO.: 16364 **DRAWING NO.:** C-01

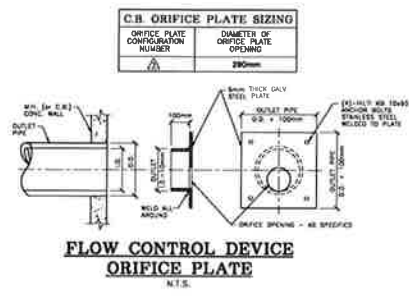


MM No.	DESCRIPTION	I/E	#VERTS
S77	1.2m P/C MH	199.90E	EX. 194.45 SW 194.50
S72	STORMCEPTOR MODEL EP06	197.05	NE 184.34 SW 194.60
S73	1.5m P/C CB/MH	197.02	NE 184.81 NW 184.65 SW 184.70 SE 184.65
S74	0.6x0.6x1.67m P/C CB	198.20	SE 194.77
S75	1.2m P/C CB/MH	197.80	NE 184.80 SW 195.11 S 195.00
S78	1.2m P/C CB/MH	198.00	N 185.31 W 185.40 S 185.35
S77	1.2m P/C CB/MH	197.95	E 185.51 SW 185.55
S79	0.6x0.6x1.67m P/C CB	198.85	NE 198.85 S 198.87
S79	0.6x0.6x1.67m P/C CB	199.00	N 187.48 S 187.80
S710	0.6x0.6x1.67m P/C CB	198.90	N 188.38
S711	1.2m P/C CB/MH	198.10	N 188.02 SW 188.08 S 188.50
S712	1.2m P/C CB/MH	199.10	NE 188.15 N 188.18 W 188.20
S710	0.6x0.6x1.67m P/C CB	200.10	N 188.30

MM No.	DESCRIPTION	I/E	#VERTS
S7	1.2m P/C MH	198.80E	EX. 194.03 SW 194.05
S2	1.2m P/C MH	198.90	NE 184.10 S 184.15
S3	1.2m P/C MH	198.30	N 184.32 E 184.40
S4	1.2m P/C MH	197.85	N 184.48 W 184.48 S 184.60
S2	1.2m P/C MH	198.20	N 184.74 W 184.60 S 184.60
S6	1.2m P/C MH	198.30	E 185.08
S7	1.2m P/C MH	199.40	N 185.70 W 185.97
S8	1.2m P/C MH	199.30	E 188.10 S 188.20
S9	1.2m P/C MH	200.60	N 188.80 W 187.38
S10	1.2m P/C MH	200.40	E 188.00

LOCATION	STM INV.	STM GRV.	SAN INV.	SAN GRV.	W/M INV. AT CROSSING ONLY	W/M GRV. AT CROSSING ONLY
1	184.88	185.28			193.80+	184.05+
2	184.78	185.18			185.85	188.10
3	195.81	195.88			198.65	198.80
4			194.85	185.15	188.65	188.80

1 DENOTES LOCATION WHERE WATERMAIN IS TO BE LOWERED BELOW STORM SEWER (ONLY) OR SANITARY SEWER (ONLY) USING 45° VERT. BENDS (PROVIDE 0.30m MIN. CLEARANCE)
 2 WATERMAIN ELEVATIONS SHOWN ARE THE LOWERED ELEVATIONS AT INDICATED CROSSING LOCATIONS



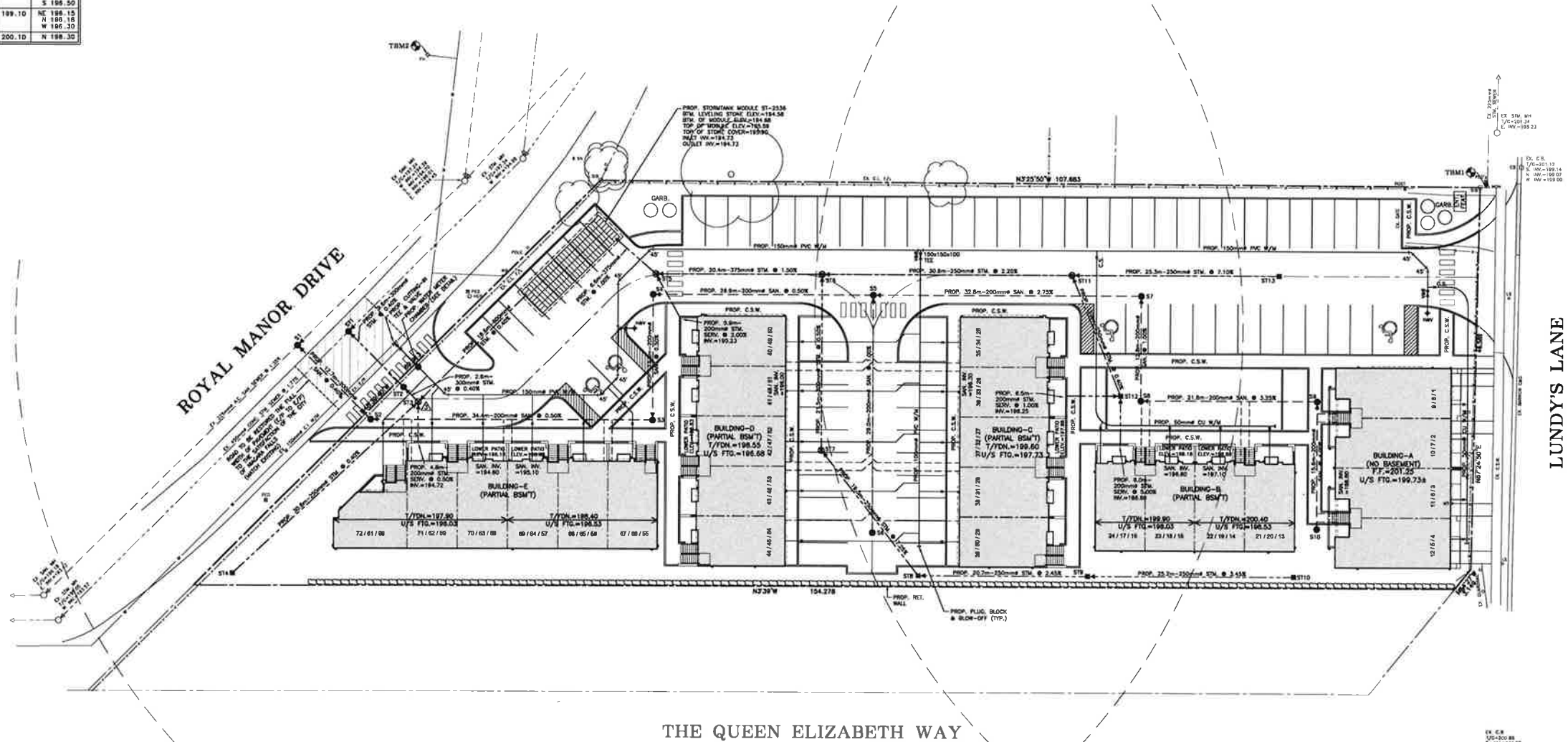
T.B.M. No. 1 ELEV. = 201.63m (GEO)
 TOP OF SURVEY MONUMENT AT THE S.E. CORNER OF SUBJECT PROPERTY AS SHOWN.
 T.B.M. No. 2 ELEV. = 198.07m (GEO)
 TOP NUT OF FIRE HYDRANT ON THE NORTH SIDE OF ROYAL MANOR DRIVE AS SHOWN.

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No.	Date	Version	Dwn.

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PROPOSED MIXED USE DEVELOPMENT
 7301 Lundy's Lane
 City Of Niagara Falls
 Canada

DRAWING TITLE:
SERVICING PLAN

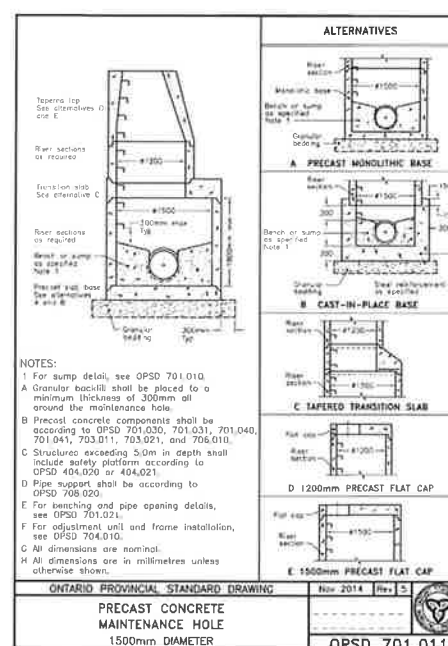
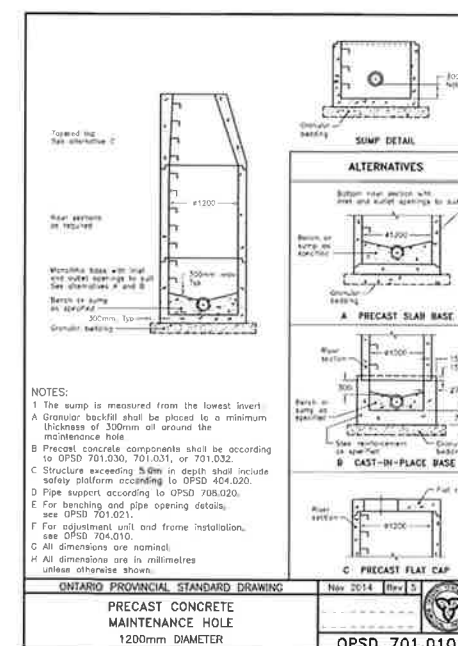
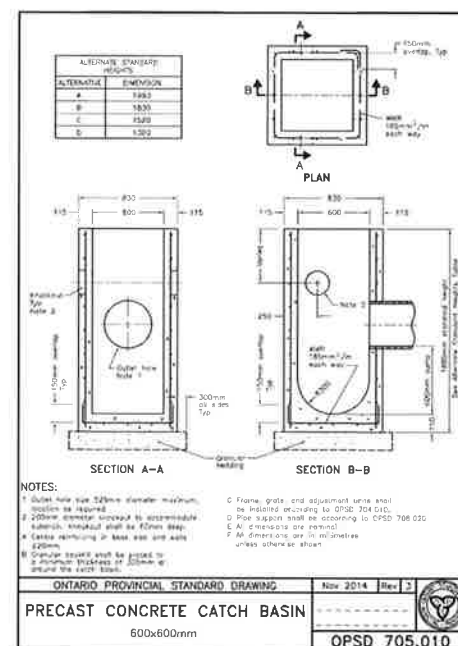
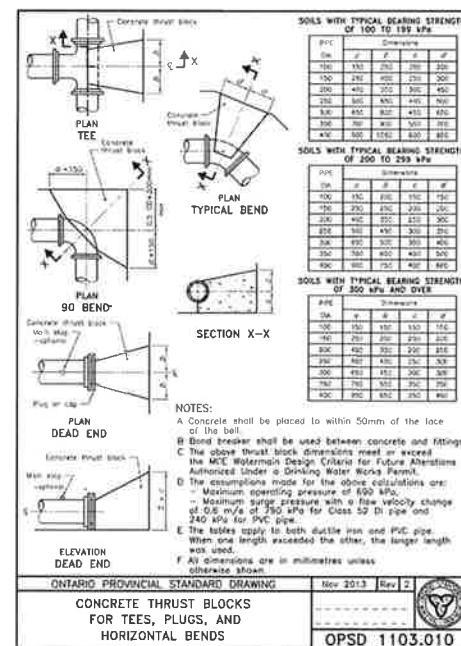
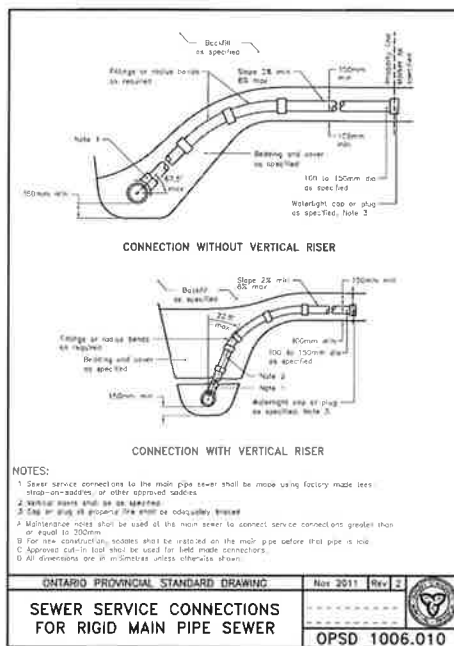
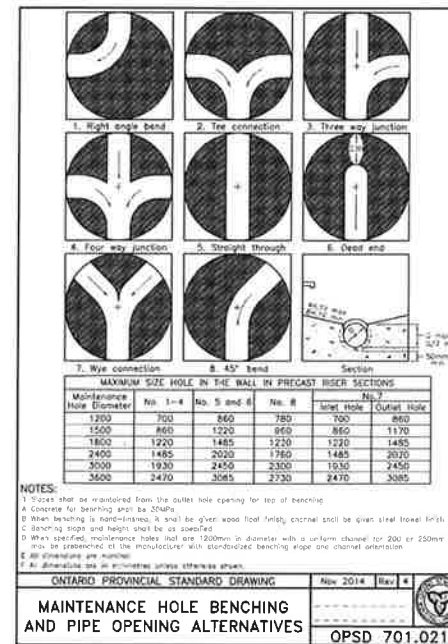
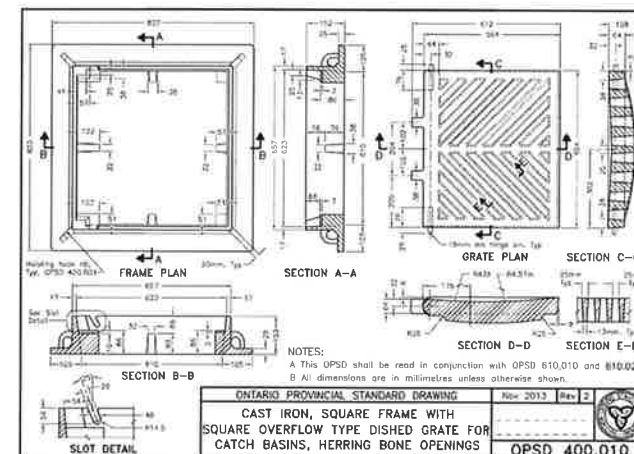
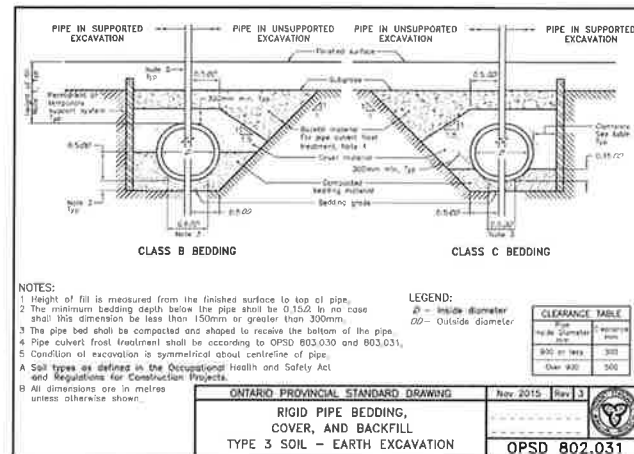
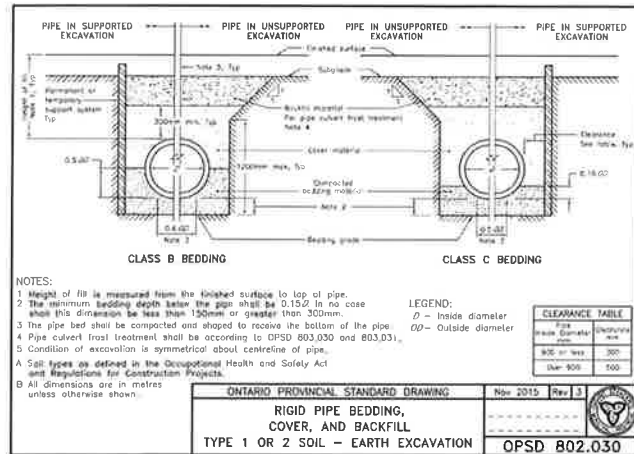
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CHECKED BY: R.W.P. SCALE: 1:250

PROJECT NO.: DRAWING NO.:

16364 C-02





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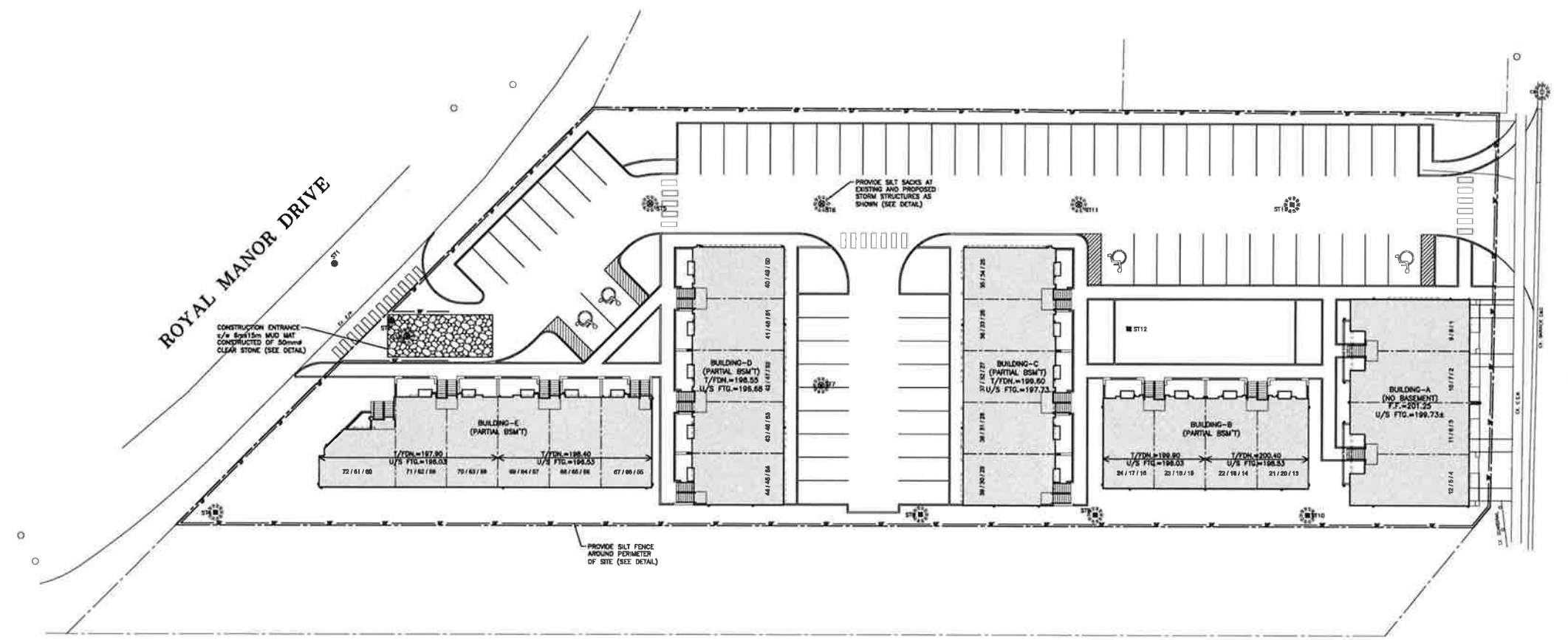
No. Date Version Dwn.

PROJECT:
PROPOSED MIXED USE DEVELOPMENT
 7301 Lundy's Lane
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 Canada

DRAWING TITLE:
TYPICAL DETAILS AND NOTES

DRAWN BY: K.P.B. **DATE:** OCT. 5/23
CHECKED BY: R.W.P. **SCALE:** AS SHOWN
PROJECT NO.: 16364 **DRAWING NO.:** C-04

06/10/23
 J.H. COHOON
 CONSULTING ENGINEERS



LEGEND:

— SILTATION FENCE
 SILT SACK AS SHOWN

- NOTES:**
1. ALL ELEVATIONS & DIMENSIONS SHOWN ARE METRIC.
 2. ELEVATIONS MAY VARY PENDING ENGINEER'S APPROVAL.
 3. WHERE ONLY ONE ELEVATION IS SHOWN, EXISTING AND PROPOSED ELEVATIONS ARE THE SAME.
 4. THE SILTATION & EROSION CONTROL (SEC) MEASURES ILLUSTRATED ON THIS PLAN ARE CONSIDERED TO BE THE MINIMUM REQUIREMENT. SITE CONDITIONS MAY REQUIRE ADDITIONAL MEASURES WHICH WILL BE IDENTIFIED BY THE ENGINEER DURING CONSTRUCTION.
 5. ALL SEC MEASURES ARE TO BE IN PLACE PRIOR TO COMMENCEMENT OF CONSTRUCTION.
 6. OWNER/CONTRACTOR TO MAINTAIN EROSION CONTROL MEASURES THROUGHOUT SITE UNTIL A COMPLETE GRASS/VEGETATION COVER IS ACHIEVED.
 7. ONLY AT THE DIRECTION OF THE ENGINEER ARE THE SEC MEASURES TO BE REMOVED.
 8. ALL SAMMETER LEADERS FROM EACH UNIT ARE TO BE DIRECTED TOWARDS LANEWAY WHERE POSSIBLE.
 9. CONTRACTOR TO PROVIDE SILT SACKS ON TOP OF ALL EXISTING AND PROPOSED STORM STRUCTURES WITHIN THE INFLUENCE OF RUNOFF DURING CONSTRUCTION UNTIL ADEQUATE VEGETATIVE COVER IS ACHIEVED.
 10. CONTRACTOR TO PROVIDE SILT FENCE AROUND PERIMETER OF ALL ON SITE STOOPILLS.

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PROJECT:
PROPOSED MIXED USE DEVELOPMENT
 7301 Lundy's Lane
 City Of Niagara Falls
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DRAWING TITLE:
SILTATION AND EROSION CONTROL PLAN

DRAWN BY: K.P.B. DATE: OCT. 5/23

CHECKED BY: R.W.P. SCALE: 1:250

PROJECT NO.: **16364** DRAWING NO.: **C-05**



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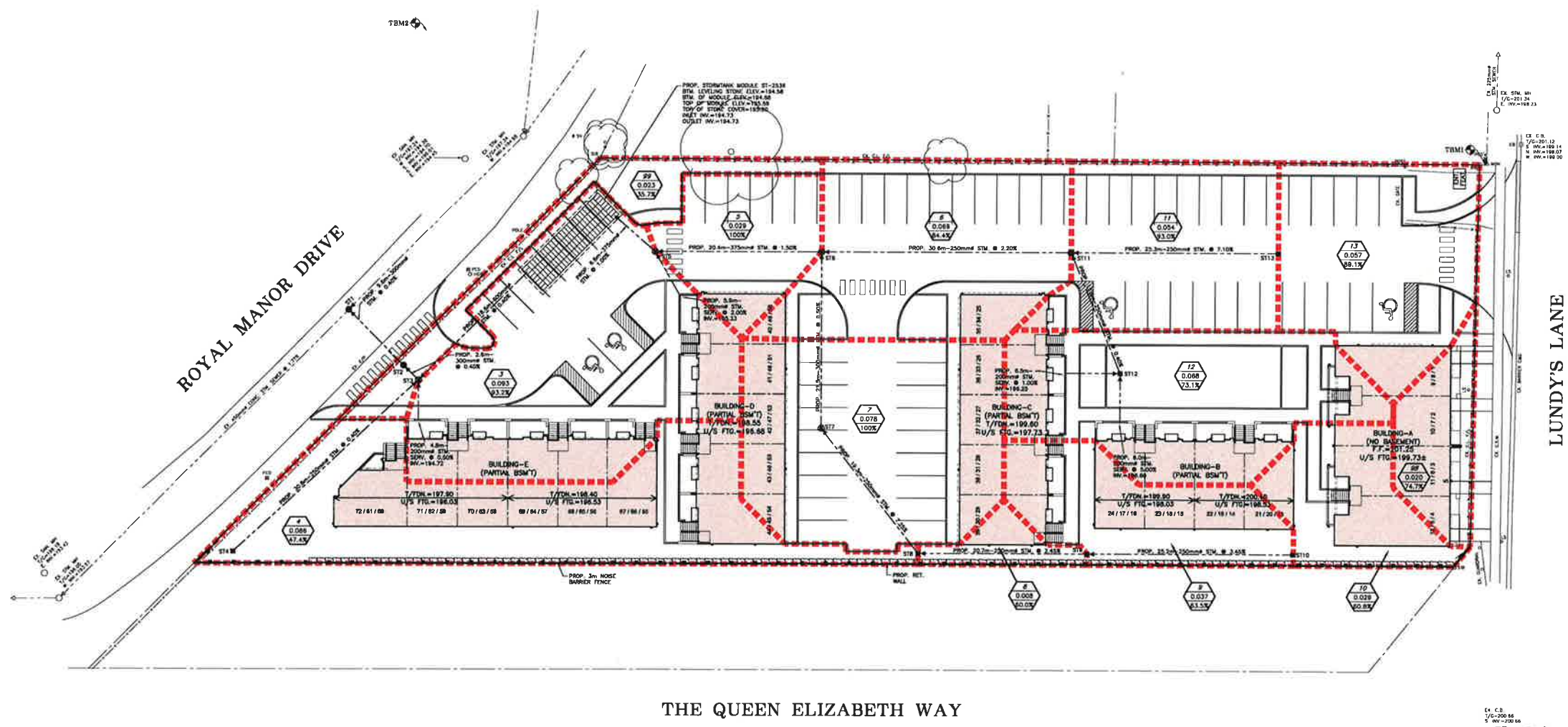
No.	Date	Version	Dwn.

PROJECT:
PROPOSED MIXED USE DEVELOPMENT
 7301 Lundy's Lane
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DRAWING TITLE:
POST DEVELOPMENT STORM DRAINAGE AREAS

DRAWN BY: K.P.B. **DATE:** OCT. 5/23
CHECKED BY: R.W.P. **SCALE:** 1:250

PROJECT NO.: 16364 **DRAWING NO.:** C-07



LEGEND:
 - - - - - STORM DRAINAGE BOUNDARY
 1
 0.200
 35.09
 - - - - - STORM DRAINAGE NUMBER
 - - - - - STORM AREA IN HECTARES
 - - - - - IMPERVIOUS

