

FUNCTIONAL SERVICING REPORT

FERRY STREET RESIDENTIAL TOWER

5438 Ferry Street
Niagara Falls, Ontario

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- Appendix A – Storm Sewage Design*
- Appendix B – Oil/Grit Separator Sizing*

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- Dwg. 21171-A100: Site Plan*
- Dwg. 21171-SSG: Site Servicing Plan*
- Dwg. 21171-DA: Drainage Area Plan*

1.0 Introduction

This updated functional servicing report (FSR) serves to demonstrate how servicing of the subject development will be appropriately achieved and provides design support for the drawings submitted for zoning by-law amendemnt. This FSR addresses the following key aspects of municipal servicing design:

- Water Supply and Distribution
- Sanitary Sewerage
- Drainage and Stormwater Management
- Roadway
- Utility Servicing
- Servicing Locations

2.0 Background

The subject site, at #5438 Ferry Street in Niagara Falls, is roughly square and is located at the south-west quadrant of the intersection of Ferry Street and Fallsview Boulevard. It is noted that older infrastructure drawings indicate multiple parcels that are now consolidated under the single parcel with the address #5438 Ferry Street. The development proposal entails the re-development of a commercial (restaurant and parking) site with a thirty (30) storey mixed-use building comprised of 456 apartment dwelling units, two commercial units comprising 228 s.m. and 6½ levels of parking garage space (2½ below grade and 4 above grade). The property area is approximately 0.37 ha. The current site plan, Dwg. A100 Rev. C, is attached for reference.

Adjacent land uses include commercial (restaurant) and associated parking land north across Ferry Street, retail and vacant land across Fallsview Boulevard to the east, single family residential and parking lot to the south, and commercial (restaurant, gas station and convenience store) and single family residential to the west.

The subject property currently has ±63m of frontage along Ferry Street, and ±62m of frontage on Fallsview Boulevard. At the site location, Ferry Street is under the jurisdiction of the City of Niagara Falls, with Niagara Region jurisdiction over the arterial road (designated Regional Road 20) ending approximately 40 metres west of the subject site's westerly limit. Fallsview Boulevard is a collector road and also under the jurisdiction of the City.

A proposed conceptual servicing drawing is attached to this report. It is based on the currently proposed site plan prepared for by the project architects, also of Quartek Group Inc. Figure 2.1 is a key plan showing the subject property location and the site and surrounding environs, with Niagara Navigator aerial imagery from 2020, is shown as Figure 2.2. The same aerial imagery serves as background for the conceptual servicing plan.

Figure 2.1: Subject Lands
(Source: Niagara Navigator)



Figure 2.2: Subject Lands Aerial View
(Source: Niagara Navigator)



3.0 Water Supply and Distribution

3.1 Existing Conditions

Based on existing infrastructure drawings provided by City of Niagara Falls engineering staff, 250mm diameter cast iron municipal watermain constructed in 1965 exists along the Ferry Street frontage. The 'as-constructed' issue of City Dwg. CC-9248 indicates 300mm diameter City watermain along the Fallsview Boulevard frontage, newly constructed in 2021. This main replaced a 120+ year old Cast iron watermain that is now abandoned.

As the subject site is comprised of several property parcels, there are multiple existing water services supplied to it. The 'as-constructed' issues of City Dwgs. CC-9248 and CC-9250 show 2 new (2021) 20mm diameter water services to the property from the new main on Fallsview Blvd. and 2 previously existing 20mm diameter copper water services to the property from the watermain on Ferry Street. Curb stops are visible at all of these locations.

There are 2 existing fire hydrants in very close proximity to the subject site. One just installed in 2021 is in the west Fallsview Blvd. boulevard, essentially at the south-west corner of the site, and only 10 metres from the face of the building. The 2nd, older hydrant is across Fallsview Boulevard from the north-west corner of the site, 34 metres from the principal entrance of the proposed building.

All of this existing infrastructure is shown on Quartek Dwg. 21171-SSG, Rev. A, submitted herewith.

3.2 Proposed Works

As all of the existing water services to the various former parcels comprising the consolidated site are only 20mm diameter, much too small to address domestic or fire fighting water demands, it is proposed to cut, cap and abandon the existing services and connect a new 200mm diameter PVC service to the 250mm diameter cast iron watermain that runs along the eastbound lane of Ferry Street. The preferred location, with respect to the proposed building, is near the north-west corner of the building, where there will be mechanical room space in the underground parking garage available for metering and associated piping.

It is proposed that the new building complex will be sprinklered and have a fire department connection on the east face of the building approximately 8 metres from the principal building entrance and 28 metres from the existing fire hydrant at the south-west quadrant of the Ferry Street – Fallsview Blvd. intersection. This location is shown on Dwg. 21171-SSG attached.

Given the proximity of two (2) existing fire hydrants very near the proposed development site and building, it is not proposed to provide any additional fire hydrants.

Existing and proposed water supply and distribution plant is shown on the attached Site Servicing Drawing 21171-SSG Rev. A.

3.3 Design Analysis

Design criteria and calculation for water demand is shown in Table 3-1. Peak potable design demand for the building is calculated at ±21.5 L/s.

Table 3.1 Water Demand Criteria

POTABLE WATER DEMAND ANALYSIS							
5438 Ferry Street Residential Tower Niagara Falls						31-Jul-2023	
Building	Suites/Units	Population	Patrons / Seats	Demand Criteria	POTABLE DEMAND		
					Avg. Daily Demand m ³	Max. Day Demand ¹ L/s	Peak Hour Demand ¹ L/s
1- bdrm Apartment	258	439		450 L/day/ capita	197.4	8.22	12.34
2- bdrm Apts, Penthouse Suites	198	535		450 L/day/ capita	240.6	10.02	15.04
Pool / Gym / Spa			40	40 L/patron/day	1.6	0.07	0.10
Party Room			25	125 L/seat/day	3.1	0.13	0.20
SUM LINE	456	973	65	0	442.7	18.4	27.7
Note ¹ : Peaking Factors: 3.6 Max Day Peaking Factor (MOECC Design Guideline DWS Table 3-3) 5.4 Peak Hour Peaking Factor (MOECC Design Guideline DWS Table 3-3)							

Based on the building volume, the maximum fire demand of under the O.B.C. methodology will be 150 L/s.

Accordingly, the estimated water demands are as follows:

Maximum Day + Fire - **168.4 L/s**
 Peak Hour - **27.7 L/s**

We understand that no pressure/flow test data is currently available for the existing fire hydrant at or near the subject site. Test data has been solicited, and it is expected that results will be available shortly. Pending test results, it is assumed that existing pressure for maximum day flow is in the range of 350 kPa (50 psi). Given the short distance of less than 15 metres from the City watermain to the building face, and an assumed service size of 200mm diameter, velocity head loss between the main and the building is estimated to be approximately 2.6 kPa (0.4 psi) for peak hour domestic flows and 78.5 kPa (10.5 psi) in the maximum day plus fire condition. Appropriate distribution pipe sizing within the building can ensure that additional losses are such that residual pressures are 140 kPa (20 psi) or greater. It is noted again that the building will be sprinklered and will require booster pumping, perhaps at/below grade and again at interim floors partway up the building. Booster pumping and sprinkler systems will be designed by qualified firms/persons preparatory to building permit application.

It is our understanding that the City of Niagara Falls will take the estimated demand values presented herein and have their water network management engineering consultant run the model to confirm that the existing network can adequately support these design flows. Meanwhile, we are not aware that there will be any impediments to water supply and distribution servicing for the development using currently existing municipal water supply infrastructure, and based on the drawings and design support presented herein.

4.0 Sanitary Sewerage

4.1 Existing Conditions

According to the notes of the April 21, 2022, pre-consultation meeting, there are 225mm and 450mm diameter clay sanitary sewers existing along the site frontage on Ferry Street. These notes also indicate a 450mm diameter PVC sanitary sewer along the site frontage on Fallsview Boulevard. The latter is confirmed on the construction record issue of Dwg. CC-9248, which also shows a new 150mm diameter sanitary lateral to the site frontage approximately 15 metres from the north limit of the subject property.

4.2 Proposed Works

The anticipated equivalent design population for the proposed development is estimated as follows:

258 1-bdrm units @ 1.7 persons/unit =	439
198 2-bdrm units @ 2.7 persons/unit =	535
Ancillary uses (pool, gym, party room) =	13
Total Equivalent Population =	987

Based on City of Niagara Falls criteria, total peak sanitary sewer flow is calculated as follows:

$$Q_T = Q_p + Q_i,$$

where Q_p = peak domestic sewage flow (L/s)
 Q_i = peak infiltration (L/s)

$$Q_p = P \cdot Q_{avg} \cdot M / 86,400 \text{ s/day}$$

where P = equivalent population
 Q_{avg} = average daily domestic flow = 380 Lpcd
 M = Harmon peaking factor = $1 + 14/(4 + (P/1000)^{0.5})$, [2.0 min., 4.0 max.]
 $= 1 + 14/(4 + 0.766^{0.5}) = 3.87$

Thus, $Q_p = 987 \cdot 380 \cdot 3.87 / 86,400 = \mathbf{16.80 \text{ L/s}}$

$$Q_i = A \cdot I$$

where A = site area – 3.70 (ha)
 I = infiltration allowance = 0.18 L/ha/s

Thus, $Q_i = 3.70 \cdot 0.18 = \mathbf{0.67 \text{ L/s}}$ *and*
 $Q_T = \mathbf{16.80 + 0.67 = 17.47 \text{ L/s}}$

The existing 150mm diameter sanitary lateral will only have adequate capacity for the new development if the slope on the lateral is greater than 1.4%. As this is not currently confirmed, it may be necessary to replace it with a new 200mm diameter lateral with a minimum grade of $\pm 0.5\%$ in order to ensure cleansing velocity. It is intended that the existing lateral slope will be confirmed at the commencement of construction and the existing 150mm diameter lateral replaced with a 200mm diameter lateral at minimum 0.50% grade if the existing lateral proves to have less than 1% grade.

Given a sewer invert of ± 187.4 metres at the location of the new sanitary lateral from Fallsview Boulevard to the east property boundary, it can be assumed that the lateral invert at the streetline is no lower than ± 187.6 metres. The proposed ground floor elevation of the building of 189.90 metres suggests that there will be adequate depth to accept flows by gravity from the ground floor and anything above. However, below-grade parking floors will only be serviced with sanitary sewage collection using grinder pumps. This will be dealt with by mechanical designers at the time of building permit submission.

While City of Niagara Falls sanitary drainage area plan 81-CB-1 shows a good portion of this site serviced by the Fallsview Blvd. sewer, it is our understanding that the City of Niagara Falls will take the estimated demand values presented herein and have their sanitary sewer network management engineering consultant run the model to confirm that the existing network can adequately support these design flows. Meanwhile, we are not aware that there will be any impediments to sanitary sewer servicing for the development using currently existing municipal sewage works, and based on the drawings and design support presented herein.

Existing and proposed sanitary sewage servicing plant is shown on the attached Site Servicing Drawing 21171-SSG Rev. A.

5.0 Drainage and Stormwater Management

5.1 Existing Conditions

The existing site generally drains from the south-east to the north-west, around the existing restaurant building onto the Ferry Street road allowance.

As described in Section 1.0 above, the subject site is fully developed with a restaurant building and associated parking lot. The site is entirely covered with impervious roof and paving surfaces. Topographic survey carried out by our firm in 2022 indicates that essentially no external area drains onto the subject site. Runoff from the south drains primarily westerly along the rear of the site and the property immediately adjacent to the west appears to generally drain to the west and north away from the subject site.

Ground elevations generally vary from 190.5 metres at the southerly limit of the site to 189.2 metres at its north-east corner along the Ferry Street frontage

5.2 Minor Storm Drainage System

The on-site minor storm drainage system is designed to convey the 1-in-5 year storm event, in accordance with City of Niagara Falls standards. Minor system stormwater flows will be collected by new swales, catchbasins and storm sewers in the landscaped areas, driveway and parking areas will be conveyed to existing municipal storm sewers on the fronting municipal roadways. It is noted that the driveways, apart from the immediate access/egress between the building face and the existing roadway curbs, is below building cover. Accordingly, this area is expected to receive very little runoff as precipitation will be landing on the roof above and collected into the building drainage system before being discharged to the on-site storm sewer and from there to the storm sewer on Ferry Street. The minor system storm sewer design sheet is included in Appendix A hereto.

It is proposed to discharge runoff from the building and most of the surrounding site to the existing 900mm diameter storm sewer on Ferry Street, near the north-west corner of the site. The lowest preliminary proposed surface grade on the site is approximately 189.25 metres. Extrapolation from information on City Dwg. CC-9250 Rev.2 suggests that the existing 900mm diameter storm sewer on Ferry Street at the anticipated outlet location near the north-west corner of the site has an invert of ± 186.52 . This will provide adequate depth to receive the proposed 300mm diameter outlet sewer

While runoff from the building and most of the surrounding site is expected to be discharged to the Ferry Street storm sewer near the north-west corner of the site, a very small portion may be collected and discharged to the existing municipal storm sewer on Fallsview Blvd. near the south-east corner of the site, where proposed surface grades generally in the vicinity of 190 metres of elevation. City Dwg. CC-9248 Rev.2 indicates an invert elevation on the existing 600mm diameter storm sewer of ± 188.65 at this location. A 250mm diameter outlet sewer at 0.50% is proposed to connect with the existing storm sewer without interfering with existing shallow utilities.

Also, a small portion of minor storm site runoff will flow from the north and east building faces over the boulevard to the pavement on Ferry Street and Fallsview Boulevard, draining into existing catchbasins on the south and west sides of these streets respectively.

5.3 Major Storm Drainage System

Notwithstanding that the intent is to design the minor storm drainage system to provide capacity for 5-year return period storm flows, $\pm 83\%$ of the site will be covered by roof and there will be little in the way of surface flows that will not be captured by the minor system and eventually conveyed to the storm sewer. Flows in excess of the minor system for the narrow landscaped areas along the south and west perimeters of the site will generally be directed around the building to the City road allowance. The small, uncollected area along the east and north building frontages will flow away from the building directly to the Ferry Street and Fallsview Boulevard road allowances. Dwg. 21171-SSG indicates anticipated overland flow patterns.

Site grading design directs storm runoff away from the buildings to the on-site collection points. Site grading takes into consideration the following:

- matching existing grade elevations along the property limit;
- minimizing disruption to existing municipal rights-of-way containing existing utilities and services;
- promotion of drainage into the minor storm sewer system;
- building floor level set to avoid building/property damage during all design storms.
- quality control treatment for runoff provided via an oil/grit separator structure prior to discharging to the storm sewer.

5.4 Design Criteria

The stormwater drainage and management criteria used for the analysis of the site is as follows:

1. Peak post-development flow not to exceed peak pre-development flow for the 5-year return period storm, and any detention required to achieve this to occur on site.
2. Water quality control is required prior to the discharge of runoff from the site.
3. Major storm flows temporarily stored on the surface of the parking lot.

Peak runoff values for the conceptual design for minor system piping and overall runoff from the site for pre-development and post-development conditions are calculated using calculated blended site runoff coefficients and the rational method formula with City of Niagara Falls IDF curve values as follows:

$$Q \text{ (L/s)} = 2.78AIR$$

$$\text{where: } I \text{ (mm/s)} = 719.50 / (t + 6.34)^{0.769} = 84.02 \text{ mm/s}$$

5.5 Stormwater Management

5.5.1 Stormwater Quantity Management

It is proposed that runoff flows from the subject site will be managed for quantity *if and as required*. The City requires that storm runoff be managed such that peak post-development flow for storms up to the 5-year return period not exceed the peak pre-development flow. A simple analysis of site surface coverage for the pre-development and post-development conditions as follows suggests that detailed modeling of storm flows for stormwater management design is not required.

The existing, pre-development site condition is a restaurant building with parking. As can be seen from the aerial imagery in Figure 2.1, there is no existing soft landscaping within the site boundaries, and therefore no pervious area.

Total area: 3700 m², including:

- impervious area: 3700 m²
- pervious area: 0 m²
- impervious percentage: 100.0%

Blended site runoff coefficient: 0.90

The proposed development is comprised of a high-rise building with hard and soft landscaping (refer to attached site plan Dwg. A100) surrounding the building.

Total area: 3700 m², including:

- impervious area: 3100 m²
- pervious area: 600 m²
- impervious percentage: 83.5%

Blended site runoff coefficient: 0.79

The resulting peak runoff values can be seen in Tables 5.1 and 5.2. Pre-development and post-development drainage areas are shown on attached drawing 21171-DA. The proposed impervious site coverage and resulting peak runoff in the post-development condition can be seen to be substantially less than the pre-development condition.

Table 3-1: Pre- and Post Development Areas and 5-Year Return Period Peak Flow

	Area No.	Drainage Area (ha)	Blended Site Runoff Coefficient	Peak Runoff (m ³ /s)
Pre-Development	101	0.370	0.90	0.082
Post-Development	201-205	0.370	0.79	0.070

Proposed peak post-development flows will be less than pre-development peak flows, and no stormwater runoff quantity containment is considered to be required before discharging to the existing municipal storm sewer. For the 5-year return period storm, the estimated reduction in peak flow post-development is approximately 15%. As previously discussed, stormwater will be collected on site with a buried pipe system prior to discharging to the existing storm sewer.

5.1.2 Stormwater Quality Control

Proposed grading will direct runoff from the asphalt driveway and parking areas, building and landscaped areas to the piped minor system drainage system. All of the storm drainage piping will connect to an oil/grit separator before outletting to the existing municipal storm sewer. The oil/grit separator specified is a Hydrodome HD 4 (by HydroGuard) or approved equivalent. Based on the catchment area of 0.33 ha, and an overall impervious coverage of 83.5%, this unit is expected to provide annual TSS removal and net runoff volume treatment in excess of the criteria established by the MOECC (now MECP) for 'Enhanced' receiving waters of 80% TSS removal and 90% net annual volume treated. Oil/grit separator sizing is presented in Appendix B hereto.

6.0 Parking and Roadways

Where required for fire access routes, proposed roadways are 6m wide with minimum 12m centreline curve/bend radii, consistent with Ontario Building Code requirements.

Concrete barrier curb, 150mm height, complying with OPSD 600.110, is generally proposed within the new development.

Two vehicular access points are proposed. One will be at the north-west corner of the site to/from Ferry Street and the second at the south-east corner of the site to/from Fallsview Boulevard.

Traffic issues are to be addressed in a separate Traffic Impact Brief prepared by others.

7.0 Utilities

Hydro, Gas, Cogeco, and Bell services are located in the adjacent rights of way. Utilities have been notified of the proposed development plan and have not expressed any challenges to servicing this development.

8.0 Service Locations

Refer to attached Drawing 21171-SSG for existing and conceptual proposed municipal services.

Prepared by:



Doug Peters, P. Eng.,
Senior Civil Engineer

Appendix A – Storm Sewage Design

STORM SEWER DESIGN COMPUTATION SHEET

PROJECT: **5438 Ferry Street Residential Tower** FILE #: **21171** DATE: **20-Dec-22** COMPUTED BY: **JM** CHECKED BY: **DP**

DRAINAGE AREA PLAN: **21171-DA** REV #: **A** OUTFALL: **Ferry Street and Fallsview Blvd Storm Sewers**

RETURN PERIOD: **5 yr.** RAINFALL INTENSITY CURVE: **I = 664/(4.7+t)^0.744** MANNING'S 'n': **0.011**

RUN-OFF COEFFICIENTS

PARK, OPEN SPACE: **0.25** SINGLE FAMILY RES.: **0.40** SEMI-DETACH. RES.: **0.50** TOWN HOUSING RES.: **0.65** HIGH DENSITY RES.: **0.70**
 ROAD RIGHT-OF-WAY: **0.55** INDUSTRIAL: **0.70** COMMERCIAL: **0.75** PARKING LOTS, ROOF AREAS: **0.90**

LOCATION	DRAINAGE AREA #	FROM	TO	RUN-OFF						DESIGN									
				AREA (ha)	RUN-OFF COEFF.	A x R INCR.	ACCUM.	T of C (min)	I (mm/s)	FLOW (cms)	PIPE Ø (mm)	SLOPE (%)	CAP. (cms)	VEL. (m/s)	LENGTH (m)	TIME (min)	FALL (m)	INVERT ELEV. (m)	
																U/S	D/S		
On Site / Under Roof	201	CB 1	CBMH 3	0.272	0.90	0.245	0.245	10.00	0.023	0.057	300	3.00	0.198	2.80	11.3	0.07	0.34	187.73	187.39
On Site	202	CB 2	CBMH 3	0.037	0.25	0.009	0.009	10.00	0.023	0.002	300	1.00	0.114	1.62	24.3	0.25	0.24	187.92	187.68
On Site	203	CBMH 3	MH 4	0.015	0.25	0.004	0.258	10.25	0.023	0.059	300	1.00	0.114	1.62	2.1	0.02	0.02	187.39	187.37
On Site / Fallsview Blvd. R.O.W.	204	CB 5	MH 6	0.007	0.56	0.004	0.004	10.00	0.023	0.001	250	0.50	0.050	1.01	17.1	0.28	0.09	188.84	188.75
	205	Over boulevard to ex. streets		0.039	0.80	0.031	0.031	5.00	0.031	0.010									
Totals				0.370											55				

* Indicates that proposed pipe slope is greater than critical slope and pipe capacity and velocity are calculated using critical slope.

Appendix B – Oil/Grit Separator Sizing



Hydroworks Sizing Summary

**5438 Ferry Street
(21171)**

01-10-2023

Recommended Size: HydroDome HD 4i

A HydroDome HD 4i is recommended to provide 80 % annual TSS removal based on a drainage area of 0.331 (ha) with an imperviousness of 83.26 % and St. Catherines A, Ontario rainfall for the City of Toronto particle size distribution.

The recommended HydroDome HD 4i treats 100 % of the annual runoff and provides 90 % annual TSS removal for the St. Catherines A rainfall records and City of Toronto particle size distribution.

The HydroDome has a siphon which creates a discontinuity in headloss. The given peak flow of .059 (m³/s) is less than the full pipe flow of .1 (m³/s) indicating free flow in the pipe during the peak flow assuming no tailwater condition. Partial pipe flow was assumed for the headloss calculations. The headloss was calculated to be 267 (mm) above the crown of the 300 (mm) outlet pipe.

This summary report provides the main parameters that were used for sizing. These parameters are shown on the summary tables and graphs provided in this report.

If you have any questions regarding this sizing summary please do not hesitate to contact Hydroworks at 888-290-7900 or email us at support@hydroworks.com.

The sizing program is for sizing purposes only and does not address any site specific parameters such as hydraulic gradeline, tailwater submergence, groundwater, soils bearing capacity, etc. Headloss calculations are not a hydraulic gradeline calculation since this requires a starting water level and an analysis of the entire system downstream of the HydroDome .

TSS Removal Sizing Summary

Hydroworks Siphon Separator Sizing Program - HydroDome

File Product Units CAD Video Help

General | Dimensions | Rainfall | Site | TSS PSD | TSS Loading | Quantity Storage | By-Pass | Custom | CAD | Video | Other

Site Parameters
 Area (ha)
 Imperviousness (%)

Units
 U.S.
 Metric

Rainfall Station
 St. Catharines A Ontario
 1971 To 2005 Rainfall Timestep = 60 min.

Project Title
 (2 lines)

ETV Lab Testing Results Post Treatment Recharge

Outlet Pipe
 Diam. (mm) Peak Design Flow (m3/s)
 Slope (%)

HydroDome Annual Sizing Results

Model #	Qlow (m3/s)	Qtot (m3/s)	Flow Capture (%)	TSS Removal (%)
Unavailable	.059	.059	100 %	85 %
HD 4	.059	.059	100 %	90 %
HD 5	.059	.059	100 %	94 %
HD 6	.059	.059	100 %	96 %
Unavailable	.059	.059	100 %	98 %
HD 8	.059	.059	100 %	98 %
HD 10	.059	.059	100 %	99 %
HD 12	.059	.059	100 %	99 %

Particle Size Distribution

Size (um)	%	SG
20	20	2.65
30	10	2.65
50	10	2.65
100	20	2.65
250	20	2.65
1000	20	2.65

Note: Results vary significantly based on particle size distribution

TSS Particle Size Distribution

Hydroworks Siphon Separator Sizing Program - HydroDome

File Product Units CAD Video Help

General | Dimensions | Rainfall | Site | TSS PSD | TSS Loading | Quantity Storage | By-Pass | Custom | CAD | Video | Other

TSS Particle Size Distribution

Size (um)	%	SG
▶ 20	20	2.65
30	10	2.65
50	10	2.65
100	20	2.65
250	20	2.65
1000	20	2.65
*		

Notes:

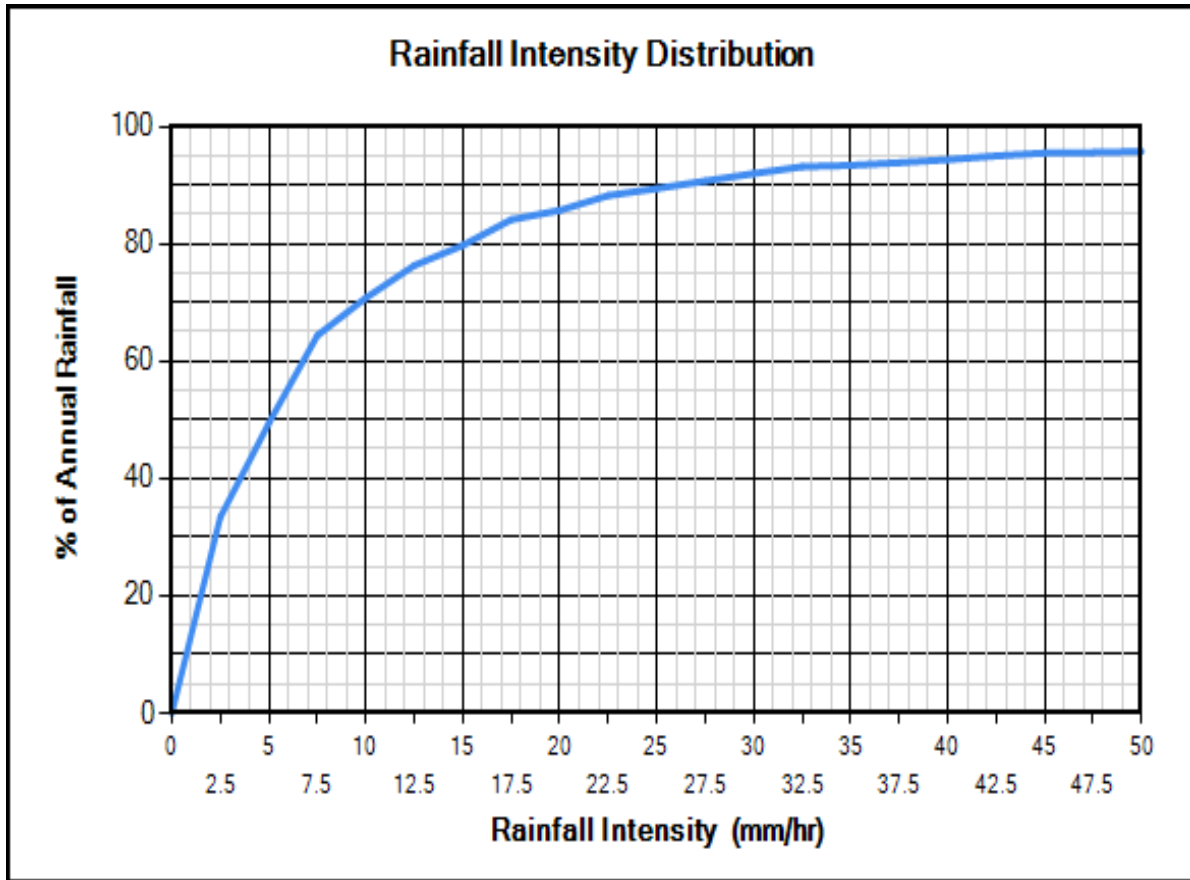
- To change data just click a cell and type in the new value(s)
- To add a row just go to the bottom of the table and start typing.
- To delete a row, select the row by clicking on the first pointer column, then press delete
- To sort the table click on one of the column headings

TSS Distributions

ETV Canada / NJDEP
 Standard HDS Design
 Alden Laboratory
 OK110
 Toronto
 Ontario Fine
 Calgary Forebay
 Kitchener
 User Defined

You must select a particle size distribution for TSS to simulate TSS removal

Water Temp (C)



Site Physical Characteristics

Hydroworks Siphon Separator Sizing Program - HydroDome

File Product Units CAD Video Help

General | Dimensions | Rainfall | Site | TSS PSD | TSS Loading | Quantity Storage | By-Pass | Custom | CAD | Video | Other

Catchment Parameters

Width (m) Imperv. Mannings n Maintenance Frequency (months)

Perv Mannings n

Slope (%) Imp. Depress. Storage (mm)

Perv. Depress. Storage (mm)

Daily Evaporation (mm/day)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	2.54	2.54	3.81	3.81	3.81	2.54	2.54	0	0

Infiltration

Max. Infiltration Rate (mm/hr)

Min. Infiltration Rate (mm/hr)

Infiltration Decay Rate (1/s)

Infiltration Regen. Rate (1/s)

Catch Basins

of Catch basins

Controlled Roof Runoff

Roof Runoff (m3/s)

Dimensions And Capacities

Hydroworks Siphon Separator Sizing Program - HydroDome

File Product Units CAD Video Help

General Dimensions Rainfall Site TSS PSD TSS Loading Quantity Storage By-Pass Custom CAD Video Other

Dimensions and Capacities					
Model	Diam. (m)	Depth (m)	Float. Vol. (L)	Sediment Vol. (m3)	Total Vol. (m3)
HD 3	0.91	1.22	123	0.5	0.8
HD 4	1.22	1.37	266	0.9	1.6
HD 5	1.52	1.68	483	1.7	3.1
HD 6	1.83	1.98	803	2.9	5.2
HD 7	2.13	2.29	1226	4.6	8.2
HD 8	2.44	2.59	1863	6.8	12.1
HD 10	3.05	3.2	3617	13	23.3
HD 12	3.66	3.81	6224	22.2	40

Depth = Depth from outlet invert to inside bottom of tank

Generic HD 4i CAD Drawing

Outlet

Inlet

Plan

1200

Inlet

Outlet

Profile

1400

1200

As Required

Maximum Pipe Size = 525 mm ϕ

ETV Canada Verified
NJDEP Certified
Independent Testing

CDN Patent #3,086,197
www.hydroworks.com
888-290-7900

HydroDome HD4i (1200mm ϕ)	
PROJECT:	
LOCATION:	
REVISION DATE:	

TSS Buildup And Washoff

Hydroworks Siphon Separator Sizing Program - HydroDome

File Product Units CAD Video Help

General | Dimensions | Rainfall | Site | TSS PSD | TSS Loading | Quantity Storage | By-Pass | Custom | CAD | Video | Other

TSS Buildup

Power Linear
 Exponential
 Michaelis-Menton

TSS Washoff

Power-Exponential
 Rating Curve (no upper limit)
 Rating Curve (limited to buildup)

Street Sweeping

Efficiency (%)
 Start Month
 Stop Month
 Frequency (days)
 Available Fraction

Soil Erosion
 Add Erosion to TSS

TSS Buildup Parameters

Limit (kg/ha)
 Coeff (kg/ha)
 Exponent

TSS Washoff Parameters

Coefficient
 Exponent

TSS Buildup

Based on Area
 Based on Curb Length

Upstream Quantity Storage

Hydroworks Siphon Separator Sizing Program - HydroDome

File Product Units CAD Video Help

General | Dimensions | Rainfall | Site | TSS PSD | TSS Loading | Quantity Storage | By-Pass | Custom | CAD | Video | Other

Quantity Control Storage

	Storage (m3)	Discharge (m3/s)
▶	0	0
*		

Notes:

1. To change data just click a cell and type in the new value (s)
2. To add a row just go to the bottom of the table and start typing.
3. To delete a row, select the row by clicking on the first pointer column, then press delete
4. To sort the table click on one of the column headings

Other Parameters

Hydroworks Siphon Separator Sizing Program - HydroDome

File Product Units CAD Video Help

General | Dimensions | Rainfall | Site | TSS PSD | TSS Loading | Quantity Storage | By-Pass | Custom | CAD | Video | Other

Scaling Law

- Peclet Scaling based on diameter x depth
- Peclet Scaling based on surface area (diameter x diameter)

HydroDome Design

- High Flow Weir
- Flow Control (parking lot storage)
Must add Quantity Storage Table

TSS Removal Extrapolation

- Extrapolate TSS Removal for flows lower than tested
- No TSS Removal extrapolation for flows lower than tested
- No TSS Removal extrapolation for lower flows or inter-event periods

HD Hydraulics

HD Model HD 4

- Custom Insert Size

Lab Testing

- Use NJDEP Lab Testing Results
- Use ETV Canada Lab Testing Results

TSS Removal Results

- Required TSS Removal
- Choose Model #

TSS Removal Required

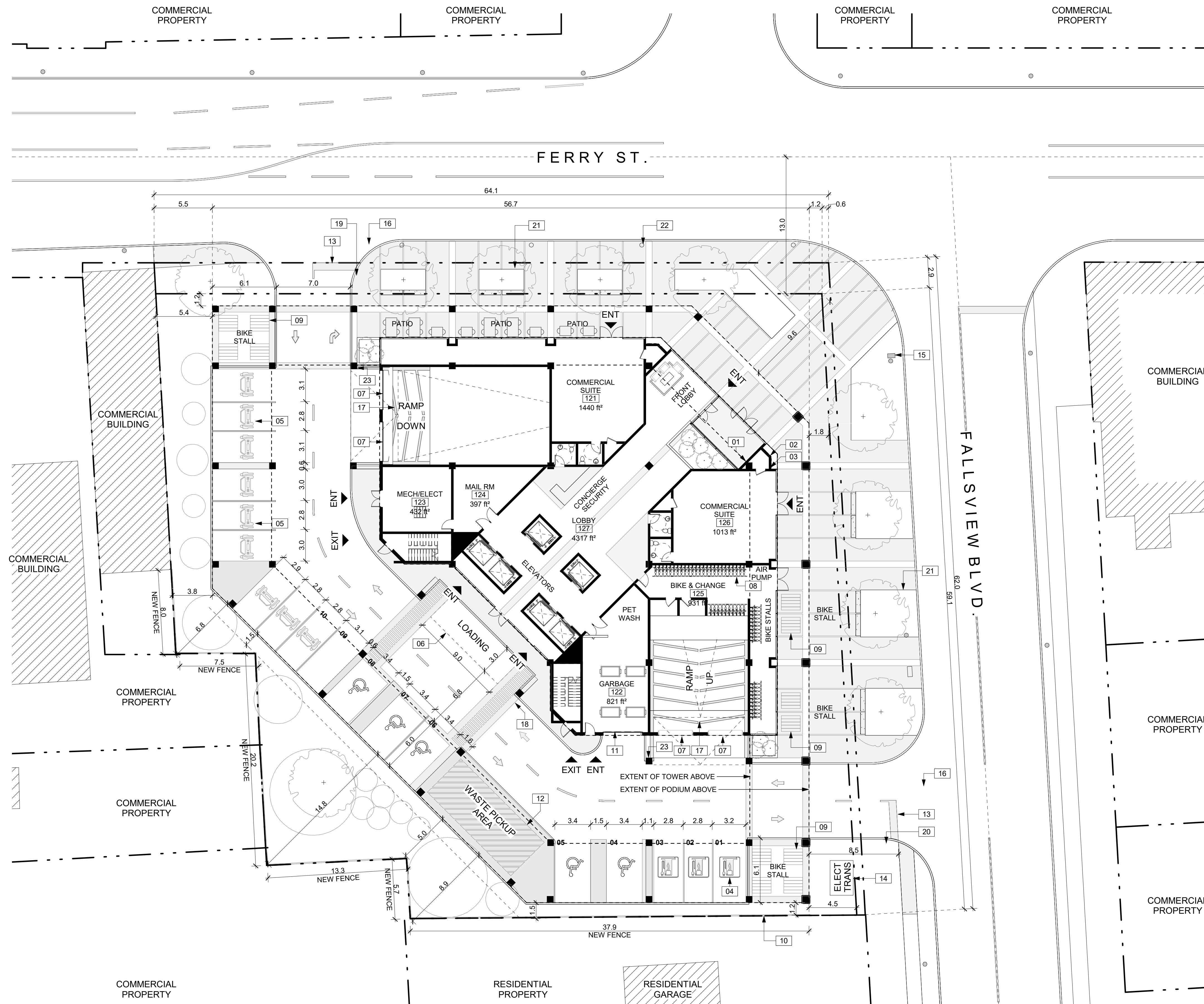
TSS Removal (%) 80.0 Enter required TSS Removal (%)

Flagged Issues

If there is underground detention storage upstream of the HydroDome please contact Hydroworks to ensure it has been modeled correctly.

Hydroworks Sizing Program - Version 5.7
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1-800-290-7900
www.hydroworks.com

Attachments - Drawings



SITE PLAN KEYNOTES

- 01 FIRE ALARM PANEL AND SPRINKLER ANNUNCIATOR PANEL
- 02 FIRE DEPARTMENT SIAMESE CONNECTION
- 03 FIRE DEPARTMENT LOCKBOX
- 04 DEDICATED ELECTRIC VEHICLE CHARGING STALLS, 6 TOTAL
- 05 DEDICATED CAR SHARE VEHICLE STALLS, 8 TOTAL
- 06 3M X 9M LOADING STALL
- 07 HIGH SPEED ROLL UP DOOR ACCESS TO ABOVE AND BELOW GRADE PARKING STALLS, KEYCARD READER.
- 08 INTERIOR BICYCLE COMMUTER FACILITY INCLUDING BICYCLE PARKING STALLS, CHANGE ROOMS, AND SHOWER, KEYCARD ACCESS.
- 09 EXTERIOR COVERED BICYCLE PARKING.
- 10 NEW FENCE, REFERENCE LANDSCAPE.
- 11 ACCESS TO INTERIOR GARBAGE/RECYCLING ROOM VIA DOOR AND OVERHEAD DOOR WITH KEYPAD ACCESS FROM EXTERIOR.
- 12 EXTERIOR GARBAGE/RECYCLING PICKUP STAGING AREA.
- 13 ABANDON 3 EXISTING VEHICLE DRIVEWAY ACCESSES TO SITE AND REPLACE WITH 2 NEW VEHICLE ACCESSES.
- 14 TRANSFORMER LOCATION, BOLLARDS AS REQUIRED BY UTILITY.
- 15 EXISTING CITY AND UTILITY INFRASTRUCTURE TO REMAIN.
- 16 LINE OF GARBAGE TRUCK TURN SWEEP RADIUS.
- 17 HERRING BONE PATTERN VEHICLE TRACTION STRIPS ON RAMPS, MAXIMUM SLOPE 20%.
- 18 CHANGE IN PAVING COLOUR INDICATING PEDESTRIAN CROSSING AREA.
- 19 RIGHT TURN ONLY SIGN FOR VEHICLES EXITING SITE.
- 20 STOP SIGN FOR VEHICLES EXISTING SITE
- 21 NEW LANDSCAPE PLANTING AREAS AND BENCHES, REFERENCE LANDSCAPE PLANS.
- 22 EXISTING STREET LIGHT STANDARDS TO REMAIN
- 23 STOP SIGN FOR VEHICLES EXITING RAMP

C	FOR ZBA	23JUN2023	MT
B	FOR OWNER REVIEW	31MAY2023	MT
A	FOR COORDINATION	19JUL2022	MT
Issue	Issued for	Date	Int.

Seal

Do not scale drawings. Report any discrepancies to Quartek Group Inc. before proceeding.
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 www.quartekgroup.com

Project Title

FERRY STREET RESIDENTIAL TOWER

5438 FERRY ST. NIAGARA FALLS

Drawing Title

SITE PLAN

Drawn: MT Designed by: MT

Scale: 1 : 200 Date Created: 03/28/11

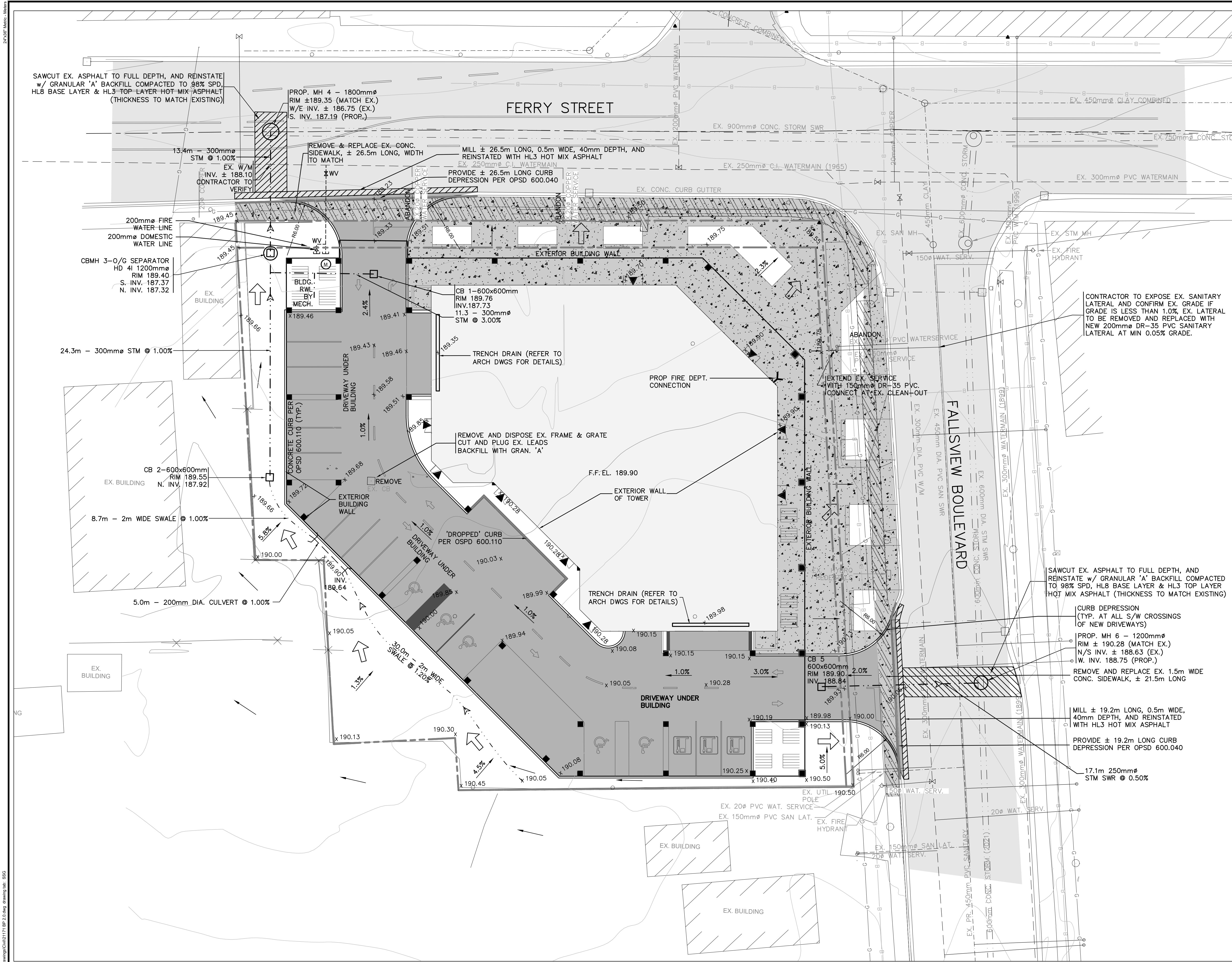
Job Number: 21171 Issue: C

Drawing Number: A100

1 LVL_01 MAIN FLOOR1
 A100 1 : 200



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LEGEND

	PROPERTY LINE
	EXISTING STORM SEWER
	EXISTING SANITARY SEWER
	EXISTING WATERMAIN
	108.00 EXISTING GROUND CONTOUR
	EXISTING FENCE
	EXISTING BELL
	EXISTING GAS
	EXISTING HYDRO
	SITE BOUNDARY
	EXTERNAL PROPERTY LINE
	PROPOSED TEMPORARY SILT FENCE
	PROPOSED CONCRETE CURB
	PROPOSED SWALE
	PROPOSED SILT FENCE
	PROPOSED STORM SEWER
	PROPOSED WATER SERVICE
	PROPOSED WATERMAIN
	PROPOSED SANITARY SEWER
	PROPOSED SANITARY LATERAL
	PROPOSED STORM LATERAL
	EXISTING ASPHALT
	PROPOSED ASPHALT
	EXISTING CONCRETE TO BE REMOVED
	PROPOSED CONCRETE
	EXISTING FOUND IRON BAR
	EXISTING STANDARD IRON BAR
	EXISTING TREE TO BE RETAINED
	EXISTING TREE TO BE REMOVED & REPLACED
	BENCHMARK
	PROPOSED HYDRANT
	EXISTING MAINTENANCE HOLE
	PROPOSED MAINTENANCE HOLE
	PROPOSED CATCHBASIN
	EXISTING CATCHBASIN
	EXISTING HYDRO POLE
	PROPOSED METER (BY MECH.)
	DIRECTION OF PIPE FLOW
	PROPOSED WATER VALVE
	DIRECTION OF POST-DEVELOPMENT OVERLAND FLOW
	PROPOSED GROUND ELEVATION
	EXISTING GROUND ELEVATION

REFER TO DWG. D-1 FOR DETAILS AND SERVICING NOTES

REFER TO SITE DWG. A100 FOR SITE DIMENSIONS, COVERAGES, ETC.

REFER TO LANDSCAPE PLAN DWG. LP1 FOR HARD AND SOFT LANDSCAPING

12 Jan 2023
PRELIMINARY

B ZONING AMENDMENT APPL. 31 JUL 2023 JM
A ZONING AMENDMENT APPL. 11 NOV 2022 RM
Issue issued for date int.

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www.quartekgroup.com

project title

**FERRY STREET
RESIDENTIAL TOWER**

5438 FERRY ST. NIAGARA FALLS

drawing title

**SITE SERVICES AND
GRADING**

drawn by	designed by
RM	DP

scale	date
1 : 200	12 OCT 2022

job number	issue
21171	B

drawing number

SSG

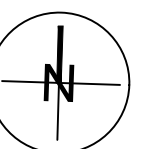
24307-Metric-Metric.dwg
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 plotted by: jmcloed on Jan 12, 2023 - 10:46am

P:\2021 Projects\21111 5438 Ferry Rd\Drawings\21111 5438 Ferry Rd\DWG.dwg drawing job DA
plotted by jmcloed on Dec 21, 2022 - 3:39pm



LEGEND

- POST-DEVELOPMENT DRAINAGE AREA BOUNDARY
- 201 DRAINAGE AREA NUMBER
- DIRECTION OF POST-DEV. OVERLAND FLOW



issue	issued for	date	init.

B ZONING AMENDMENT APPL 31 JUL 2023 JM
A ZONING AMENDMENT APPL 15 NOV 2022 RM
issue issued for date init.



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project title	FERRY STREET RESIDENTIAL TOWER
drawing title	DRAINAGE AREA PLAN
drawn by	RM
designed by	DP
scale	1 : 200
date	15 NOV 2022
job number	21121
issue	B
drawing number	DA