

FUNCTIONAL SERVICING REPORT

Project: 5190 Stanley Avenue, Niagara Falls	
Client: 2742556 Ontario Ltd.	Prepared By: Justin Slovak, B.Eng.
Date: February 12, 2026	UEM Project No.: 24-210

1. Introduction

Urban & Environmental Management Inc. (UEM) was retained by the proponent, 2742556 Ontario Limited to prepare a Functional Servicing Report (FSR) in support of an application for an Official Plan Amendment (OPA) and Zoning By-law Amendment (ZBA) for a proposed development of 3 new commercial units and 2 residential units above the ground floor at 5190 and part of 5204 Stanley Avenue in the City of Niagara Falls. The existing convenience store and gasoline bar at 5204 Stanley Avenue will continue with its current use without any changes to the building with respect to sanitary, water, and storm services. **Figure 1** shows the location of the subject site.



Figure 1: Site Location (Source: Niagara Navigator)

The 5204 Stanley Avenue property contains an existing convenience store and gasoline bar (Petro-Canada). The property is located on the northeast corner of Stanley Avenue and McRae Street, has a lot frontage of 35.3 m along McRae Street and a lot depth of 33.3 m. 5190 Stanley Avenue is a vacant lot located on the east side of Stanley Avenue, immediately north of 5204 Stanley Avenue and south of a single-detached residential dwelling located at 5176 Stanley Avenue. The property has a lot frontage of 16.9 m along Stanley Avenue and a lot depth of 36.9 m. Historical images indicate that there was once a single-family home on the 5190 Stanley Avenue property.

This FSR evaluates the serviceability of the site with respect to requirements for sanitary, water and storm for the proposed development. The following standards and guidelines were reviewed in preparing this report:

- City of Niagara Falls Engineering Design Guidelines Manual
- Ministry of Environment, Conservation and Parks (MECP)
 - Design Guidelines for Sewage Works (2008)
 - Design Guidelines for Drinking-Water Systems (2008)
- Fire Underwriters Survey, Water Supply for Public Fire Protection (2020)
- Ontario Building Code (OBC)
- American Society of Plumbing Engineers (ASPE) Plumbing Engineering Design Handbook – Volume 2 Plumbing Systems

2. Design Considerations

Servicing of the proposed development considered the following:

- The 5190 Stanley Avenue property fronts onto Stanley Avenue. Although the property is now vacant, there was previously a single-family dwelling on the property. Water and sewer for the dwelling would likely have been from/to services on Stanley Avenue. If adequate servicing still exists on Stanley Avenue, then utilizing these services for the new development would be preferred to minimize disruption to the 5204 Stanley Avenue property.
- An existing curb-stop is located in the south boulevard of 5190 Stanley Avenue. The City of Niagara Falls confirmed that the watermain in the east boulevard of Stanley Avenue is a 50mm black polyethylene (PE) series 160 (2000) that is located at a shallow depth under the curb. This watermain is connected to the existing 300mm PVC watermain along Valley Way and dead ends in front of 5190 Stanley Avenue. City staff have indicated that this watermain has a history of multiple breaks and multiple homes are currently serviced upstream along the line. The additional demand generated by the proposed development would be greater than that of the former single-detached dwelling. City staff also indicated that they do not have water pressure and hydrant flow information for this watermain. Due to the existing condition of the watermain, the proposed development will not be serviced from the Stanley Avenue watermain.
- The convenience store and gasoline bar at 5204 Stanley Avenue feature a dense network of underground services between the south side of the building and connections within the McRae Street right-of-way, which include sanitary, water, and storm. Similarly, underground fuel tanks are present between the gasoline bar and convenience store. This presents constraints for servicing the proposed new development through the existing services that connect to McRae Street. Therefore, servicing of the proposed development will try to avoid disturbing the existing underground services for the convenience store and gasoline bar. **Figure 2** illustrates the existing and proposed layout of uses on the site.

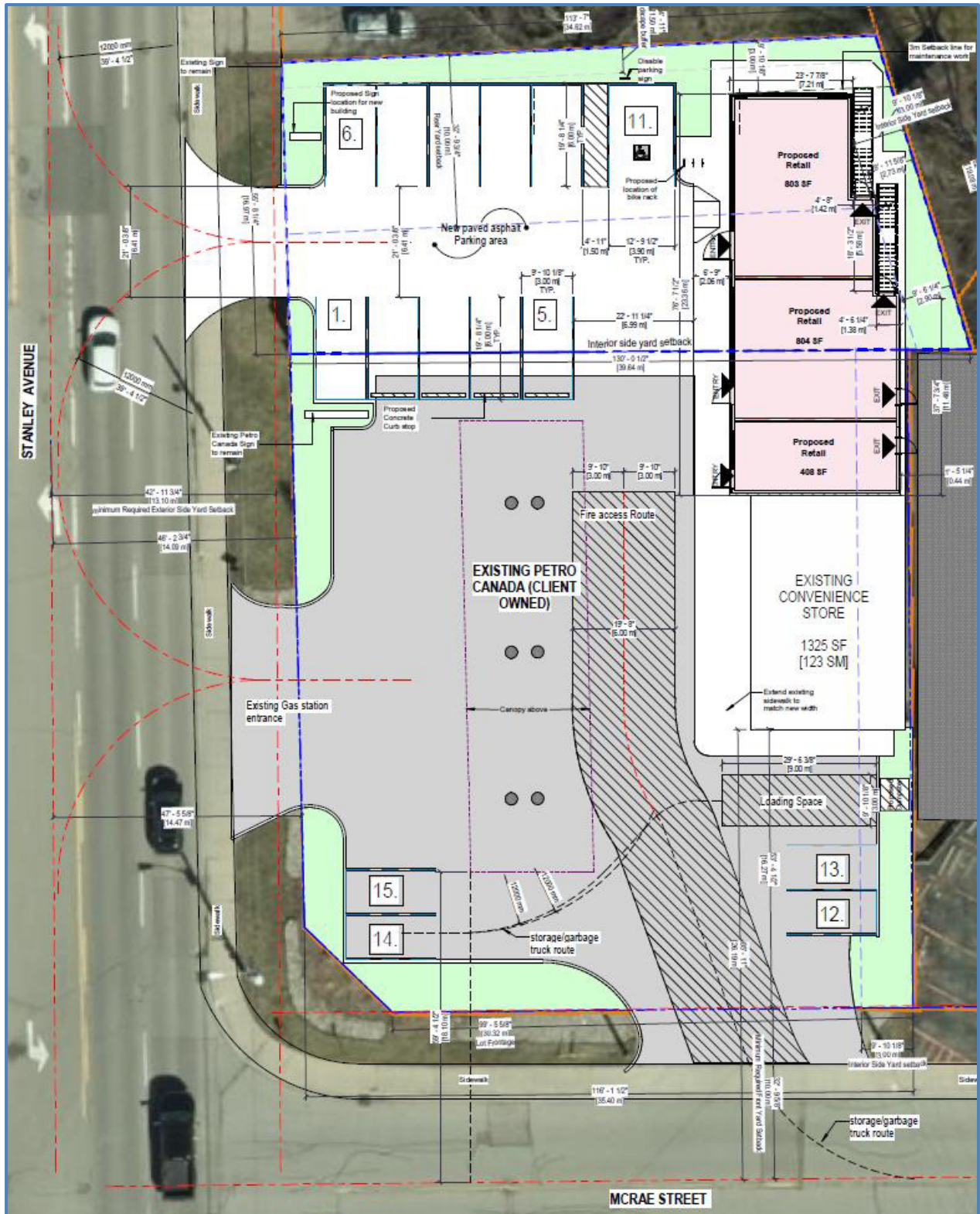


Figure 2: Conceptual Site Plan for Proposed Development (Source: Raimondo + Associates Architects Inc.)

3. Water Demand

3.1 Existing Conditions

There is an existing 150mm diameter PVC watermain (2006) located on the south side of McRae Street. The existing convenience store is serviced by a 25mm diameter copper water service connected to the existing 150mm diameter PVC watermain along McRae Street.

There are existing City fire hydrants located on the southeast corner of Stanley Avenue and McRae Street and on the southwest corner of Stanley Avenue and Valley Way that can provide protection for the entire subject site.

3.2 Proposed Demand

Fire flows were estimated for the existing convenience store and the proposed building based on wood frame construction (see **Appendix A** for calculations). Domestic water for the proposed building addition will be supplied by a second connection to the existing 150mm diameter PVC watermain located on the south side of McRae Street through a new 38mm type k soft copper water service. If the City prefers a single water service connection, the existing 25mm copper water service that supplies the convenience store may be tied into the proposed 38mm water service. This would permit the existing 25mm service connection to the 150mm watermain to be abandoned. Domestic water use for the proposed building addition was estimated based on the MECP Design Guidelines for Drinking-Water Systems and the OBC.

Table 1 summarizes the required water demands (see **Appendix A** for calculations).

Table 1: Summary of Proposed Water Demand for 5190 Stanley Avenue

Peak Hour Flow	Maximum Day Flow	Fire Flow
0.74 L/s 45 L/min	0.49 L/s 30 L/min	10,000 L/min

The total required flow for this site is approximately 10,030 L/min, which includes 30L/min for domestic water use and 10,000L/min for fire flow. According to the information available at the time of this report, UEM concludes that sufficient flow and pressure are likely available to meet the proposed development water demands. A hydrant flow test is recommended at the Site Plan Control approval stage to confirm the available flow and pressure in the area.

4. Sanitary Demand

4.1 Existing Conditions

There is an existing and fully separated 250mm diameter PVC sanitary sewer located on the south side of McRae Street and an existing 300mm diameter sanitary sewer located on the east side of Stanley Avenue. City of Niagara Falls staff have indicated that the Stanley Avenue sanitary sewer features some combined flows. The existing convenience store is serviced by a 150mm diameter PVC lateral connected to the existing 250mm diameter PVC sanitary sewer along McRae Street.

4.2 Proposed Demand

The MECP Design Guidelines for Sewage Works was used to calculate the sanitary peak flow for the proposed development. **Table 2** provides a summary of the required total sanitary demands (see **Appendix A** for calculations).

Table 2: Summary of Proposed Sanitary Demands for 5190 Stanley Avenue

Peak Flow
0.21 L/s

It is proposed that the sanitary service connection for 5190 Stanley Avenue be made to Stanley Avenue rather than McRae Street to avoid disruptions to the existing convenience store operations and avoid underground gasoline bar infrastructure. The proposed development is estimated to generate a peak sanitary flow of 0.21 L/s. Based on that flow a 125mm PVC SDR28 sanitary lateral is proposed. Therefore, the site's sanitary generation contributes approximately 0.2 % to the total capacity of the existing 300mm diameter sanitary sewer along Stanley Avenue. Third party modelling may be completed to confirm the current available capacity of the existing 300mm diameter sanitary sewer.

A connection to the McRae Street sanitary sewer could be considered as an alternative and would only be used if a connection to the 300m diameter sanitary sewer on Stanley Avenue is not feasible. This option would involve connecting to the existing 150mm diameter sanitary lateral that currently services the convenience store. However, the sanitary lateral at the property line has limited cover and the finished floor elevation of the proposed addition is not yet known. This option would also be disruptive to existing underground infrastructure and convenience store operations and is therefore not preferred. If the sanitary service were connected to McRae Street, it would account for approximately 0.6% of the available capacity in the existing fully-separated 250 mm diameter sanitary sewer.

5. Stormwater Management

5.1 Existing Conditions

There is an existing 900mm diameter storm sewer on the north side of McRae Street, wherein the existing convenience store is connected to this storm sewer through a 250mm diameter lateral that conveys all flows on 5204 Stanley Avenue and directs them via a catch basin located immediately north of the gasoline bar.

A catch basin also exists in front of 5190 Stanley Avenue, in the Stanley Avenue right-of-way, wherein a storm sewer of unknown diameter connects to a 1200mm diameter storm sewer.

5.2 Stormwater Demand

Pre-development and post-development drainage area plans were prepared to determine whether the proposed development would increase the existing stormwater runoff from the site. The pre-development and post-development drainage area plans are included in **Appendix B**. The runoff and storage calculations (**Appendix B**) indicate that only the proposed development will generate an increase in stormwater runoff, and therefore, stormwater management is only proposed for the proposed development area at 5190

Stanley Avenue. No stormwater quantity management is proposed for the existing gasoline bar and convenience store area at 5204 Stanley Avenue. The following describes the proposed approach to stormwater quantity and quality control for the development area.

Preliminary stormwater calculations were completed using the Modified Rational Method (MRM) as the subject site is less than 1 hectare in area. The Niagara Region Stormwater Management Guidelines permit the use of the MRM to size volumetric controls for sites up to 1 hectare in drainage area.

The preliminary MRM calculations indicate that approximately 8 m³ of storage will be required to detain the post-development 5-year storm (minor drainage system) to the 5-year pre-development flow rate per City of Niagara Falls requirements (see **Appendix B**). The 5-year storm runoff will drain to the existing catch basin via storm pipe on the east side of Stanley Avenue in front of 5190 Stanley Avenue. The existing catch basin will be replaced with a catch basin manhole (CBMH) to allow a proper connection. The required storage will be confirmed during the Site Plan approval phase. The required storage can be provided using oversized pipes, underground storage structures, or infiltration trenches, and all excavation will be kept as far away from tree roots as possible. Major storm event runoff will be directed overland towards Stanley Avenue via the development driveway.

It is proposed that the storm sewer connection for 5190 Stanley Avenue be made to Stanley Avenue rather than McRae Street to avoid disruptions to the existing convenience store operations and underground gas bar infrastructure. However, an alternative connection to the existing 900mm diameter storm sewer along the north side of McRae Street is feasible via a connection to the existing catch basin within the 5204 Stanley Avenue property located immediately to the north of the existing gasoline bar.

If stormwater for the 5190 Stanley Avenue property is directed to the Stanley Avenue storm sewer, then two oil-grit separators (OGS) will be required to address quality control for the existing and proposed development. If stormwater for the proposed development on 5190 Stanley Avenue is developed to the existing catch basin on the 5204 Stanley Avenue property, then only one OGS is required to service the entire subject site. The OGS units will be sized for enhanced protection with a minimum of 80% total suspended solids (TSS) removal. Preliminary OGS sizing calculations are included in **Appendix B**. Final OGS unit types and sizing will be confirmed during the site plan approval stage, once the preferred stormwater connection is confirmed.

6. Conceptual Servicing Plan

The existing gasoline bar has significant underground infrastructure including tanks, pump service lines, sensor cables, and vent piping in addition to standard site services (water, sewer, and stormwater). To avoid disrupting current gas bar operations and to reduce the risk of damaging this infrastructure, the servicing plan has been designed to service off Stanley Avenue where possible, keeping all new services separate from the existing gasoline bar. A conceptual servicing plan has been prepared (see **Appendix C**) showing storm and sanitary services off Stanley Avenue, in addition to a water service that runs along the perimeter of the subject site, parallel to the Stanley Avenue right-of-way, connecting to the front of the proposed building.

7. Conclusion

Based on the results of this Functional Servicing Review, the following is concluded:

- The domestic water demand was calculated to be 30 L/min.
- The total proposed fire flow demand for the site was calculated to be 10,000 L/min, which can be provided by the fire hydrants located on the southeast corner of Stanley Avenue and McRae Street and on the southwest corner of Stanley Avenue and Valley Way.
- Total water demand is 10,030 L/min. The domestic water supply will be provided by the existing 150mm diameter PVC watermain located on the south side of McRae Street.
- The peak sanitary demand was calculated to be 0.21 L/s which contributes approximately 0.2 % to the total capacity of the existing 300mm diameter sanitary sewer along Stanley Avenue. There is an alternative option that is also feasible to connect to the existing 250mm diameter sanitary sewer along McRae Street.
- The 5-year storm runoff will drain to the existing Stanley Avenue storm sewer while the 100-year storm runoff will drain overland towards Stanley Avenue. There is an alternative option to connect to the existing 900mm diameter storm sewer along McRae Street.
- Oil/grit separators (OGS) will be added to the development. Either one or two OGSs will be installed depending on which stormwater management options, both of which are feasible, is implemented.

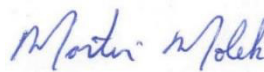
Therefore, UEM concludes that the City's watermain, sanitary sewer, and storm sewer have sufficient capacity and flow available to support the proposed development.

Respectfully Submitted,

Urban & Environmental Management Inc.



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APPENDIX A

WATER AND SANITARY CALCULATIONS





**5190 Stanley Avenue, Niagara Falls
Water Demand**

Peak Flow Calculation

The MOECC Design Guidelines for Drinking-Water Systems 2008 and the City of Niagara Falls Engineering Design Guidelines Manual used for the following calculations.

Site Information

Two-bedroom dwelling: 2
Assuming 3 people/unit
Commercial units: 3
Total store floor area = 188 m²

Equivalent population as per OCB Table 8.2.1.3.A:

Take-out restaurant: 9.25 L/day per m² of floor area

P = 0.010
q = 450 L/per/day
PHF = 14.3
MDF = 9.5

Q (d) = Peak domestic flow (including extraneous flows) in L/s

P = Design population, in thousands

q = Average daily per capita domestic flow in L/cap-d (exclusive of extraneous flow)

PHF = Peak Hour Factor (Table 3-3)

MDF = Maximum Day Factor (Table 3-3)

$$Q (d) = \frac{P \times q \times (PHF \text{ or } MDF)}{86.4}$$

Q (d) = 0.74 L/s (Peak Hour Flow)

Q (d) = 0.49 L/s (Maximum Day Flow)

Table 3-3: Peaking Factors for Drinking-Water Systems Serving Fewer than 500 People

DWELLING UNITS SERVICED	EQUIVALENT POPULATION	NIGHT MINIMUM HOUR FACTOR	MAXIMUM DAY FACTOR	PEAK HOUR FACTOR
10	30	0.1	9.5	14.3
50	150	0.1	4.9	7.4
100	300	0.2	3.6	5.4
150	450	0.3	3.0	4.5
167	500	0.4	2.9	4.3



**5190 Stanley Avenue, Niagara Falls
Fire Flow Demand**

Fire Flow Calculation

1. $F = 220 \times C \times \sqrt{A}$ F = The required fire flow in litres per minute
A = 415.00 m² C = Coefficient related to the type of construction
C = 1.5 A = The total effective area in square metres
- F = 6722.61 L/min
F = 7000 L/min (Rounded to the nearest thousand)

2. Assuming combustible contents hazard: 0% adjustment
- F = 7000 L/min

3. Assuming no sprinkler system 0% adjustment
- F = 7000 L/min

4. If additional structures are exposed within 45m by the fire area under consideration, then the following additional exposures summarized in the table below are applied:

Separation	Charge
0m to 3m	25%
3.1m to 10m	20%
10.1m to 20m	15%
20.1m to 30m	10%
> 30m	0%

Structure	Distance	Charge
House (east)	1m	25%
House (NE)	21m	10%
House (NW)	20.5m	10%

There are three homes within the fire area under consideration. Therefore, the resulting fire flow is:

F = 10150 L/min

Rounded off to the nearest 1000 L/m. The total required fire flow for the development is:

F = 10000 L/min



5190 Stanley Avenue, Niagara Falls
Sanitary Demand

Peak Flow Calculation

The MOECC Design Guidelines for Sewage Works 2008 and the City of Niagara Falls Engineering Design Guidelines Manual was used for the following calculations.

Site Information

Two-bedroom dwelling: 2
Assuming 3 people/unit
Commercial units: 3
Total store floor area = 188 m²

Equivalent population as per OCB Table 8.2.1.3.A:

Take-out restaurant: 9.25 L/day per m² of floor area

P = 0.010
q = 450 L/per/day
I = 0.280 L/ha-s
A = 0.065 ha
M = 3.66

Q (d) = Peak domestic flow (including extraneous flows) in L/s
P = Design population, in thousands

q = Average daily per capita domestic flow in L/cap-d (exclusive of extraneous flow)

I = Unit of peak extraneous flow, in L/(ha-s)

A = Gross tributary area in hectares

M = Harmon Peaking factor

$$Q(d) = \frac{P \times q \times M}{86.4} + IA \quad M = \frac{1+14}{4+P^{0.5}}$$

Q (d) = 0.21 L/s

APPENDIX B

STORMWATER CALCULATIONS



**APPENDIX B - MODIFIED RATIONAL METHOD
PRE AND POST DEVELOPMENT STORMWATER RUNOFF CALCULATIONS**

Jan 28, 2026

Urban & Environmental Mangement Inc.

IDF CURVES (NIAGARA FALLS)

$i = a / (tc + c)^b$

Where: i = rainfall intensity (mm/hr)
 tc = time of concentration (min)

	2-year	5-year	100-year
coeff. a =	521.97	719.5	1264.57
b =	5.28	6.34	7.72
c =	0.759	0.7687	0.7814

OUR FILE: 24-210
 PROJECT: 5190 STANLEY AVE, NIAGARA FALLS

DESIGNED BY: MM
 CHECKED BY: MM

RATIONAL METHOD

Q = 2.78AIR
 Where: Q = Flow (L/s)
 A = Area (ha)
 R = Runoff Coefficient

MODIFIED RATIONAL METHOD

Storage = $Q_{post} \times T_d - Q_{pre} (T_d + T_c) / 2$

Description	Area (ha)	R	A * R	TC (min)	i (mm/hr)	Q (L/S)
PRE-DEVELOPMENT FLOW ESTIMATES						
2-year						
AREA 1						
Buildings / Sidewalk	0.000	0.9	0.000	10.000	74.46	0.0
Pavement	0.008	0.9	0.007	10.000	74.46	1.5
Gravel	0.000	0.2	0.000	10.000	74.46	0.0
Grass	0.075	0.2	0.015	10.000	74.46	3.1
Total Development Area	0.083		0.022			4.6
5-year						
AREA 1						
Buildings / Sidewalk	0.000	0.9	0.000	10.000	89.88	0.0
Pavement	0.008	0.9	0.007	10.000	89.88	1.8
Gravel	0.000	0.2	0.000	10.000	89.88	0.0
Grass	0.075	0.2	0.015	10.000	89.88	3.7
Total Development Area	0.083		0.022			5.5
POST-DEVELOPMENT FLOW ESTIMATES						
2-year						
AREA 1						
Buildings / Sidewalk	0.021	0.9	0.019	10.000	74.46	3.9
Pavement	0.043	0.9	0.039	10.000	74.46	8.0
Gravel	0.000	0.2	0.000	10.000	74.46	0.0
Grass	0.019	0.2	0.004	10.000	74.46	0.8
Total Development Area	0.083		0.061			12.7
5-year						
AREA 1						
Buildings / Sidewalk	0.021	0.9	0.019	10.000	89.88	4.7
Pavement	0.043	0.9	0.039	10.000	89.88	9.7
Gravel	0.000	0.2	0.000	10.000	89.88	0.0
Grass	0.019	0.2	0.004	10.000	89.88	0.9
Total Development Area	0.083		0.061			15.3

Storage Volume Determination (2-Year Storm)

Qtarget (m³/s)	Td (min.)	i (mm/hr)	Td (sec.)	Qpost (m³/s)	Sd (m³)
0.0046	10	74.46	600	0.013	4.9
	15	60.23	900	0.000	-3.4
	20	51.07	1200	0.000	-4.1
	25	44.62	1500	0.000	-4.8
	30	39.80	1800	0.000	-5.5
	35	36.04	2100	0.000	-6.2
	40	33.03	2400	0.000	-6.9
	45	30.54	2700	0.000	-7.6
	50	28.45	3000	0.000	-8.3
	55	26.67	3300	0.000	-9.0
	60	25.13	3600	0.000	-9.7
	65	23.78	3900	0.000	-10.3
	70	22.59	4200	0.000	-11.0
	75	21.53	4500	0.000	-11.7
	80	20.58	4800	0.000	-12.4
	85	19.72	5100	0.000	-13.1
Storage Required (m³)					4.9

Storage Volume Determination (5-Year Storm)

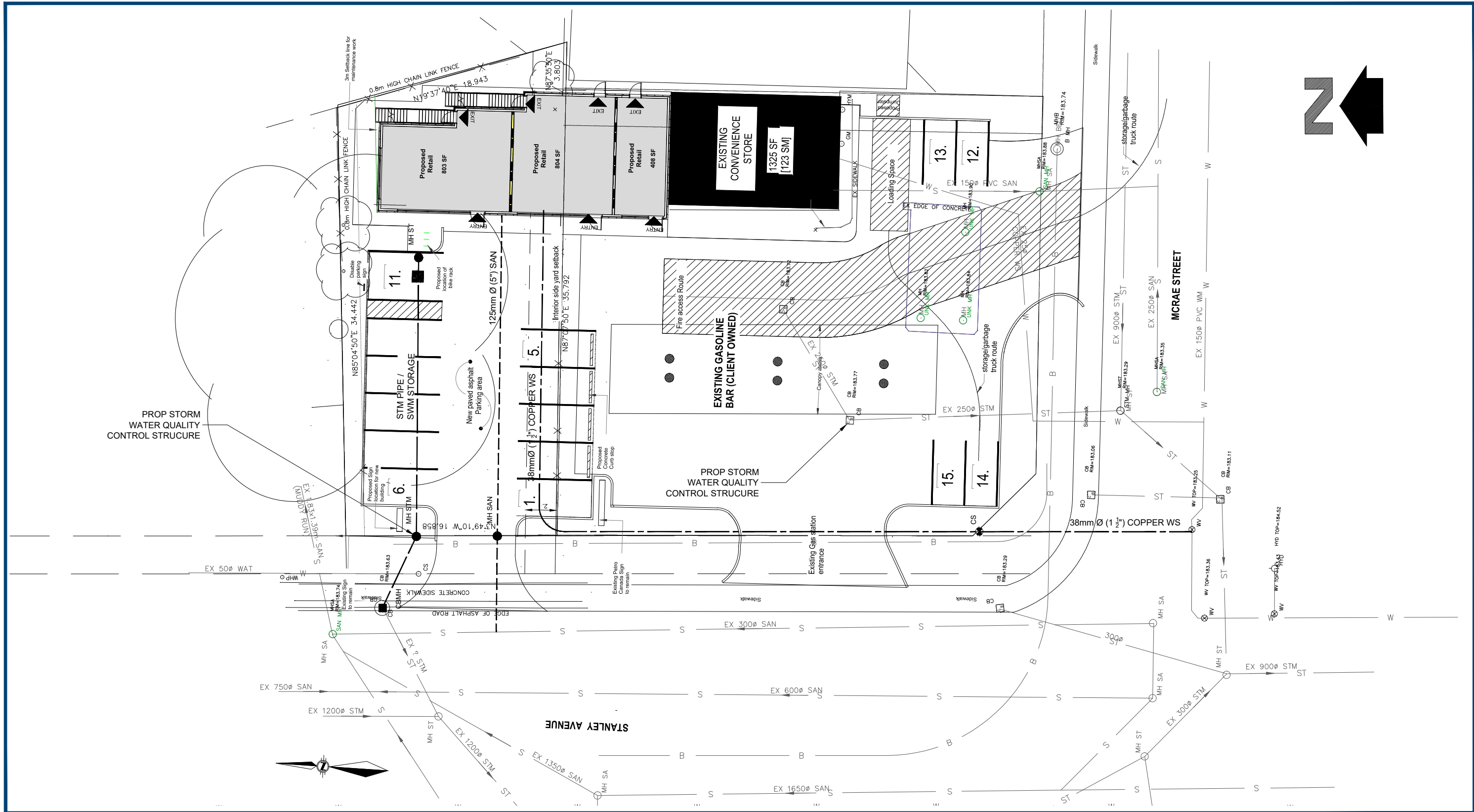
Qtarget (m³/s)	Td (min.)	i (mm/hr)	Td (sec.)	Qpost (m³/s)	Sd (m³)
0.0055	10	89.88	600	0.015	5.9
	15	72.29	900	0.012	6.9
	20	61.09	1200	0.010	7.5
	25	53.26	1500	0.009	7.8
	30	47.44	1800	0.008	7.9
	35	42.92	2100	0.007	7.9
	40	39.30	2400	0.007	7.8
	45	36.31	2700	0.006	7.6
	50	33.81	3000	0.006	7.3
	55	31.68	3300	0.005	7.0
	60	29.84	3600	0.005	6.7
	65	28.24	3900	0.005	6.3
	70	26.82	4200	0.005	5.9
	75	25.56	4500	0.004	5.5
	80	24.42	4800	0.004	5.0
	85	23.40	5100	0.004	4.6
Storage Required (m³)					7.9

Total Required Storage Volume (m³) 7.9

APPENDIX C

CONCEPT SERVICING PLAN





**APPENDIX C
CONCEPT SERVICING PLAN**