FUNCTIONAL SERVICING REPORT

STACKED TOWNHOME DEVELOPMENT

3897 Welland Street

Niagara Falls, ON

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Niagara Falls, ON

Functional Servicing Report

Contents

Appendix

1.0 Introduction

This functional servicing report (FSR) serves to demonstrate how servicing of the subject development can be appropriately achieved and to provide a basis for detailed engineering. This FSR will discuss the following key aspects of municipal design:

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

2.0 Background

This proposal contemplates the re-development of the subject residential property at the northwest intersection of Oliver Street and Welland Street in the Village of Chippawa in Niagara Falls. An aerial map highlighting the subject property is shown in Figure 1.

The subject property is 0.13 ha in total, currently developed as a single-detached house, with approximately 23m of frontage along the Welland Street right-of-way and 57m of side yard along Oliver Street right-of-way.

The Official Plan (OP) currently designates the lands as Residential Built-Up Area. This FSR is developed in support of the amendments to the OP and the Zoning By-Law (ZB).

The property is adjacent to neighbouring residential properties developed as 1-2 storey single-detached houses.

3.0 Development Proposal

The current proposal is to develop (8) residential townhouse units, three (3) storey, stacked configuration in one block, complete with five new driveway accesses from Oliver Street only, ten (10) on-site parking spaces, site lighting, and landscape screening. An architectural site plan with conceptual servicing design is provided in Appendix ‘A.

The City has requested a 5m by 5m daylight triangle at the southeast corner.

Figure 1 Proposed Townhome Development
3897 Welland Street, Niagara Falls, ON

4.0 Water Supply and Distribution

Water supply will be taken from an existing municipal 150mm diameter PVC watermain in the Welland Street right-of-way.

A new fire-hydrant is required to be compliant with Ontario Building Code 3.2.5.7.: “Hydrants shall be located within 90 m horizontally of any portion of a building perimeter that is required to face a street in Subsection 3.2.2.”. Based on existing hydrant coverage, the proposed building has deficient existing coverage along its Oliver Street face. The nearest municipal hydrant is at the driveway entrance of Sacred Heart Catholic School on Oliver Street. The most westerly point of the proposed development measures 100m from this hydrant.

The fire demand flow rate for the townhouse block is computed at 2,700 L/min (715 USGPM) as per the OBC method, assuming a contiguous dwelling structure with combustible construction with fire separations and fire-resistance ratings compliant with section 3.2.2 of the OBC.

A new hydrant and secondary valve are proposed in the Oliver Street boulevard as shown on the attached conceptual servicing overlaid on the site plan.

Three nearby hydrants on Welland, Main and Oliver are colour-coded NFPA 'light blue' which indicates a flow of 1500 USPGM (95 L/s) or greater can be delivered at, or above, minimum residual pressure. Given this, water supply for fire protection is anticipated to be adequate.

Computation of domestic water demand as follows: Each dwelling is assumed to be equipped with the following plumbing fixtures (fixture units 'FU' derived from OBC 7.6.3.2: four water closets with <6LPF flush-tank toilet (14.4 FU), 2 kitchen sinks (2.8 FU), 1 dishwasher (1 FU), 1 clothes washer (3 FU), 1 outdoor hose bibb (2.5 FU) for a total of ~24 fixtures units per dwelling. Given 8 dwellings, total fixtures unit for the development is 192. Using Table 7.4.10.5 in the OBC, this converts to 70 USGPM or 4.4 L/s.

The site configuration will require a new 75mm nominal diameter polyethylene, (PE4710) water service connected to the existing 150mm municipal cast-iron watermain on Welland Street right-of-way. A 75mm diameter water meter in below-grade chamber is proposed on the private side. Dynamic headloss under the fixture-unit method flow is anticipated to be 4psi (using C=150) including meter pressure loss, using distributed node analysis. Static pressure loss at a third-storey fixture could be 12psi compared to local hydrant port pressure, which is within reasonable limits.

The site will have a single meter chamber in the front yard on private land near the property line. Each unit will have a 1" (25mm) diameter copper service. It is assumed that the City will *not* require each dwelling to have a fire sprinkler system installed.

Design parameters for water supply and distribution are outlined in the table below:

Design Demand Method	OBC (fixture unit)
No. of Dwelling Units	8 (current proposal)
Fire Flow Min. Residual Pressure	20 psi (14.1m head)
Max-Day Minimum Residual Pressure	40 psi (28.2m head)
Hazen-Williams 'C' Value	150 (polyethylene and PVC pipe)
Design Pipe Specification	75mmØ: 4710 PE DR-11 (202psi working pressure) 150mmØ: PVC, DR-18 (235psi working pressure)

5.0 Sanitary Sewerage

The internal development's sanitary sewage collection system will cater for peak domestic flows and potential infiltration for the development. Sanitary flows will be collected from each domicile through 100mm diameter service pipes per City engineering standards.

Key design data for sanitary sewage servicing is as follows:

No. of Dwelling Units (full build-out)	8
Population Density	2.42 persons/unit (Region standard)
Total Design Population	19 persons
Peaking Factor	Babbitt
Mean sewage flow	300 L/cap/day
Sewage shed area (total)	0.13 ha (whole property)
New Lateral Pipe Specification	PVC, DR-28, 100mm & 150mm dia.
Manning's 'n'	0.013
Infiltration Rate	0.286 L/ha•s

From the above, it is estimated that **peak sewage flow generation is 0.33 lps** under wet weather flow.

It is noted that capacity of the contemplated receiving sewer, identified as 250mm diameter sanitary sewer at 0.40% grade flowing north, has an estimated flow capacity of 37.6 lps. Accordingly, the peak sanitary flow from the proposed development represents 0.9% of existing sewer capacity.

The connection structure will be a factory insert-a-tee (or approved equivalent) matching springline and installed at 1% slope, which yields an estimated pipe obvert 172.50m of at the most westerly unit. Proposed FFL of 175.6m could permit 8' clear height basements.

Based on the preceding, it is expected that there are no impediments to connecting this this development to the existing municipal sewage works.

As per the Niagara Regional sewer use by-law (27-2014), a maintenance access point is proposed at the Welland Street frontage.

6.0 Drainage and Stormwater Management

Proposed Design

Review of preliminary digital terrain mapping suggests the subject site drains overland to the north property corner. Front and side yard areas appear to currently drain to the Oliver and Welland Street boulevards.

City staff has indicated that stormwater management will be required to ensure that there is no increase in peak runoff from the site as modelled under a 5-year return-period storm. Given the proposed increase in impervious area, the current residential proposal will necessitate detention works on site, as determined by stormwater modelling using MIDUSS (Micro-Interactive Design of Urban Stormwater Systems) software.

Preliminary review of aerial mapping suggests that the current site impervious surface coverage is approximately 25% and post-development impervious surface coverage measures approximately 60%. Anticipated detention volume could be 12 cu.m, with the peak 5-year discharge rate controlled by vortex valve in the control maintenance hole structure on site.

Post-development flows are to meet MECP (Ministry of Environment, Conservation, & Parks) 'normal' quality level. To this end, catchbasin inserts, specifically, CB Shield devices, are proposed in the parking lot catchbasin sump(s) to meet MECP guidelines for sediment and pollutant capture.

Areas of surface storage could be designed to spill into the Oliver Street right-of-way if topography permits.

Foundation drainage is intended to be collected and conveyed by a conventional sump pump system located in each unit's basement and discharged at the building rear to grade. It is assumed that each unit's sump pit will be connected to a contiguous weeping tile laid at all points along exterior footings.

Maintenance Program

- All catchbasins and maintenance hole sumps on site should be inspected at least semi-annually and is anticipated to require hydro-vac cleanout annually.
- Swales should be kept mowed between 75 and 150mm in height for the purpose of flow conveyance.

7.0 Parking and Roadways

Per the attached conceptual site plan, four single-width driveway and one double-width parking lot entrance is proposed for the subject development. Fire access route is from Oliver Street. A total of 6 parking spaces are provided in the parking lot are and 1 space per driveway for a total of 10 spaces on site.

Proposed curbs within the development are concrete barrier (per OPSD 600.110). Driveway will be minimally sloped away from Oliver to facilitate on-site surface storage of stormwater.

8.0 Utility Servicing

Hydro, gas, Cogeco, and Bell utilities do not anticipate any challenges in providing their respective service for this development proposal.

9.0 Service Locations

Conceptual site plan with servicing markup is attached identifying the location of existing and proposed municipal services for the development.

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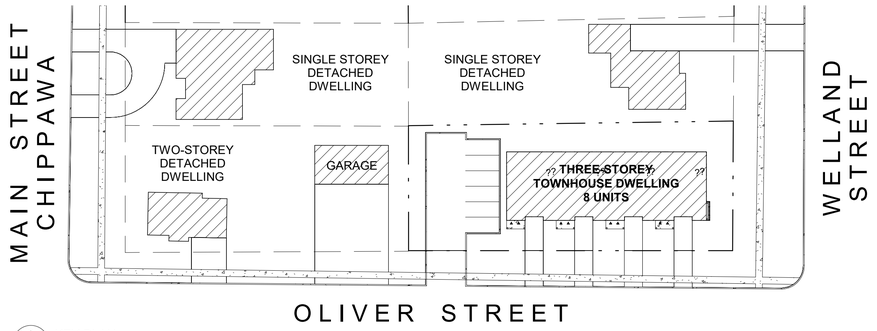
Niagara Falls, ON

APPENDIX

Conceptual Servicing Overlay on Site Plan



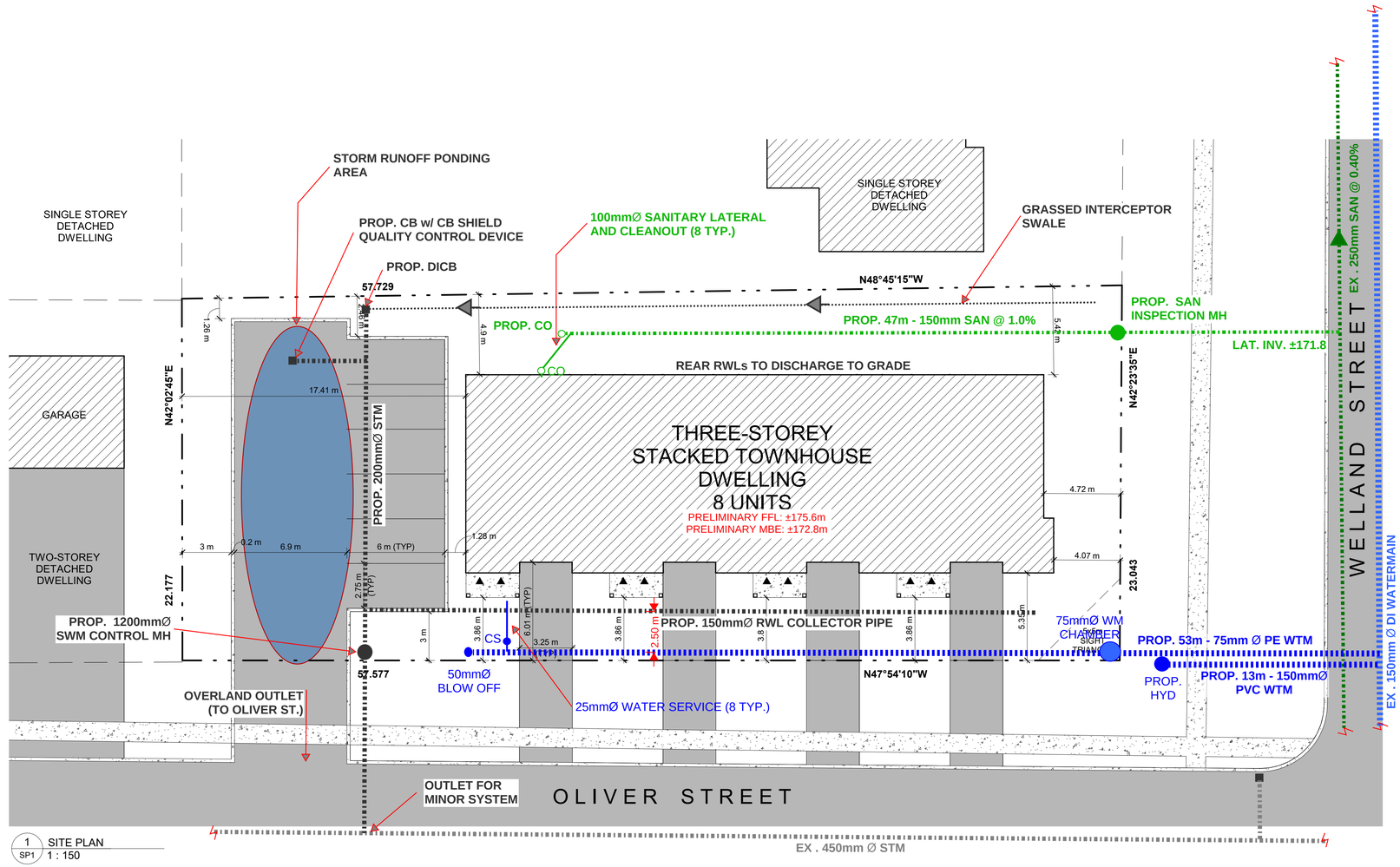
2 SP1 KEY PLAN
1 : 500

SITE STATISTICS

SITE AREA	1303 SM	100%
BUILDING AREA	423.1 SM	32.5%
ASPHALT/PAVING	334.8 SM	25.7%
CONCRETE	12.2 SM	0.9%
LANDSCAPE	532.9 SM	40.9%

BUILDING STATS

DWELLING UNITS	8
BUILDING HEIGHT	9.74m
PARKING SPACES	10



1 SP1 SITE PLAN
1 : 150

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B	CLIENT REVIEW	30AUG2021	NY
A	CLIENT REVIEW	19APR2021	NY
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Project Title

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3897 WELLAND STREET, CHIPPAWA

Drawing Title

SITE PLAN

Drawn	Designed by
NY	NS

Scale	Date Created
As indicated	01JAN2021

Job Number	Issue
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Drawing Number

SP1