

Wedler Engineering LLP
211-2459 Cousins Avenue
Courtenay, BC V9N 3N6



WEDLER
ENGINEERING

November 24, 2023

File Ref: V21-0518/A

Broadstreet Properties Ltd.
100 St. Ann's Rd.
Campbell River, BC, V9W 4C4

Attention: Trevor Dickie – Vice President of Real Estate Development – Broadstreet Properties Ltd.

Reference: Site Servicing Report - 2123 Hector Road, Comox, BC

The following servicing report was prepared on behalf of Broadstreet Properties Ltd. and in support of the future residential development for the subject parcel located at 2123 Hector Road, Comox, BC.

This servicing report presents the assumed offsite water, sewer, stormwater, and frontage upgrades anticipated for developing the proposed property.

This report presents the estimated development loads, as well as the general servicing methodology for the proposed site. The subject parcel's suitability for the proposed works have been reviewed in accordance with the design methodologies outlined in the Town of Comox (ToC) Bylaw No. 733 and 1261 Consolidated, as well as the 2022 MMCD Design Guidelines. The results of this report will form the basis for the engineering design.

1.0 Site Information

The subject property is legally described as LOT 4 DISTRICT LOT 170 COMOX LAND DISTRICT PLAN VIP60685. The lot is approximately 4.91 Ha in size, and the current designated land use is Residential: Low Rise Apartments, Townhouses & Ground Oriented Infill per the Town of Comox Official Community Plan (OCP). Current zoning is R3.3 Single-Family – Large Lot per the Town of Comox Zoning Bylaw 1850 SCHEDULE B Zoning Map. The development proposes to a rezone the property to a multi-family residential zone which is suitable and consistent with the OCP designated land use.

The property is bounded by Aspen Road to the west, Hector Road to the north, a single-family residential community to the south and a large undeveloped parcel to the east. *Figure 1* shows the current state of the site, which is undeveloped.

2.0 Proposed Development

A two-phased conceptual site plan is included in **Appendix A**. Phase 1 proposes the development of 69 townhouse units, within the southern portion of the parcel. Phase 2 proposes the development of 183 rental units in the northern portion of the parcel. Overall population count has been estimated at 555 residents, and the developed area is 4.57 Ha.

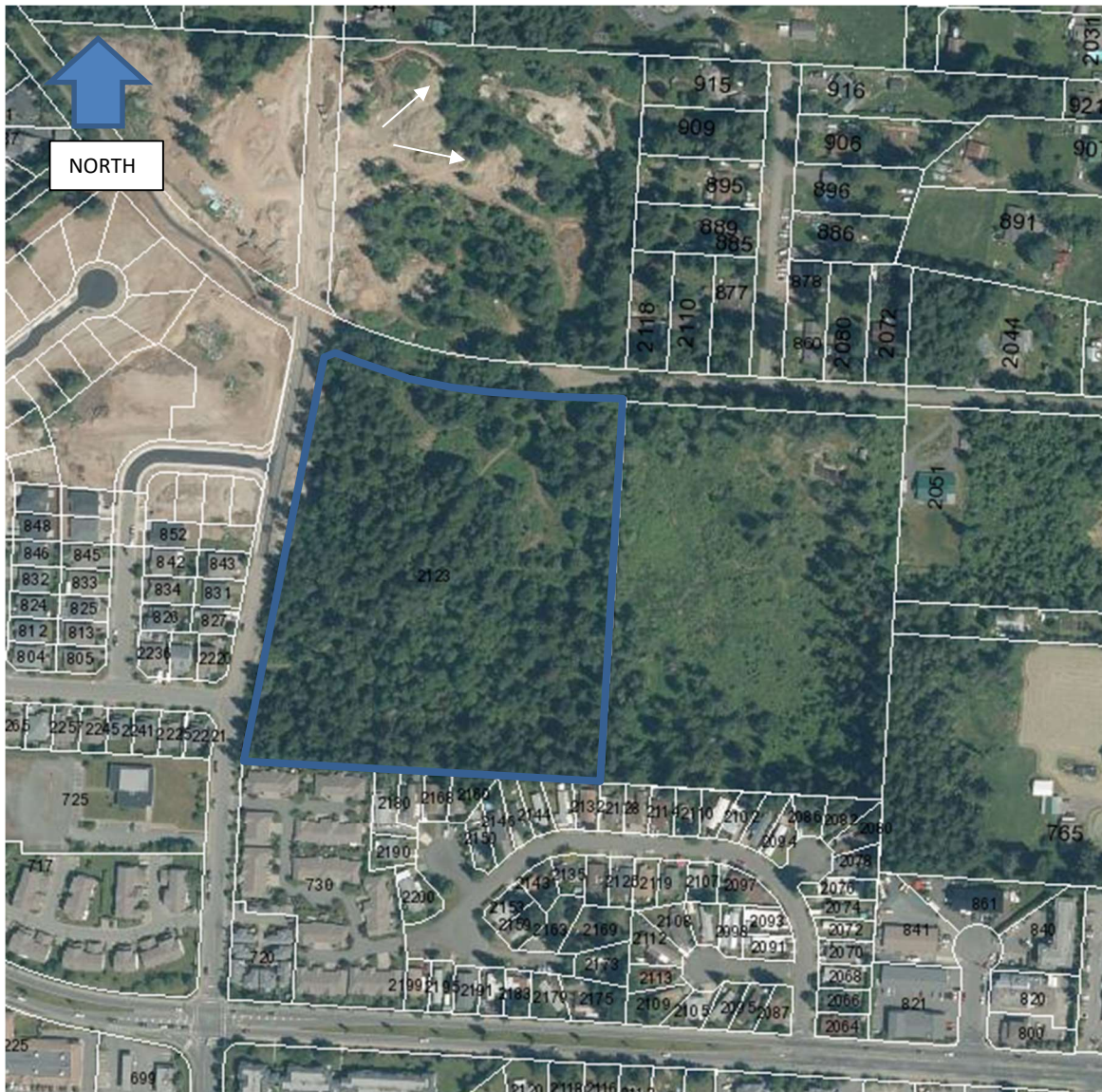


Figure 1 – Current State of Site (subject lot outlined in blue)

3.0 Anticipated Servicing Needs

The anticipated servicing requirements and offsite upgrades associated with the site include:

- Water Distribution System.
- Sanitary Sewer System.
- Stormwater Collection and Detention Facilities.
- Frontage Upgrades.

Each item has been reviewed and summarized in the proceeding sections. Servicing requirements and offsite upgrades have been based on current ToC utility data available to Wedler at the time of this report. A conceptual servicing plan is included in **Appendix A** and all conceptual servicing calculations for the site are included in **Appendix B**.

3.1 Domestic Water and Fire Flow Demands

Per the ToC’s Bylaw No. 1261, Appendix F, Section 1.1, the domestic water, and fire flow demands have been estimated for the development and summarized in Table 1 below. The required fire flow has been based on the current version of the Water Supply for Public Fire Protection calculations (in accordance with the Fire Underwriters Survey).

Table 1 - Potable Water Demands

Number of dwellings	252 units	69 Townhomes, 183 Apartment Units
People per dwelling	2.2 per unit	Based on 2021 Census Profile for the Town of Comox, “Average Household Size”
Equivalent Population	555 ppl	
Average annual daily demand (AADF)	635 l/c/day	Based on ToC’s Bylaw No. 1261, Appendix ‘F’, Section 1.1.1
Maximum day demand	2100 l/c/day	Based on ToC’s Bylaw No. 1261, Appendix ‘F’, Section 1.1.1
Peak hour demand	3000 l/c/day	Based on ToC’s Bylaw No. 1261, Appendix ‘F’, Section 1.1.1
Calculated AADF	4.1 L/s	
Calculated peak day demand	13.5 L/s	
Calculated peak hour demand	19.3 L/s	
File flow	97 L/s	Based on Fire Underwriters Survey 2020
Water Demand	110 L/s	Peak Day Demand + Fire Flow

The site’s water system will require service to all 252 units. Service to the site will require tie-in within the Town’s water system at a location where adequate pressure and fire protection can be achieved in accordance with the demands described in *Table 1*.



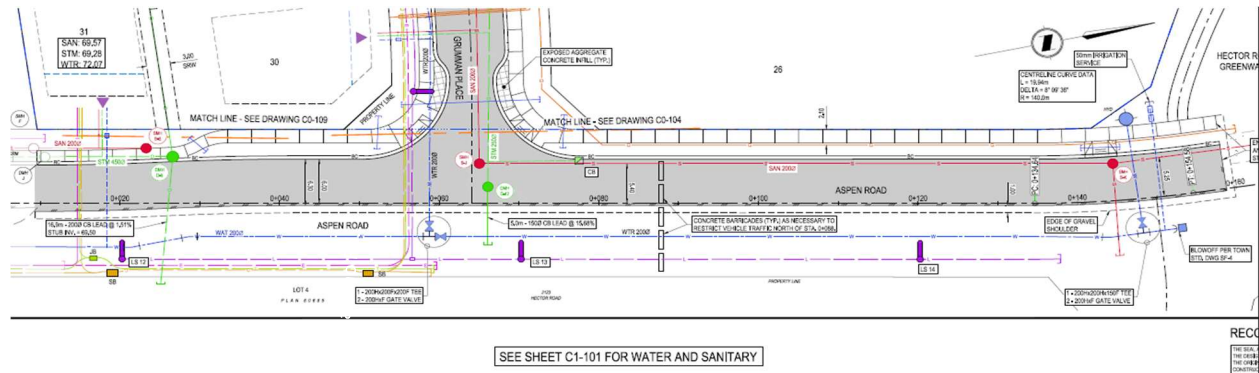


Figure 2 – McElhanney Valley View Estates – Phase 2 Drawing Package (2211-47463-0) - Aspen Road

In review of McElhanney’s Valley View Estates – Phase 2 Record Drawing Package, provided by the ToC, the Aspen Road offsite works include a 200 mm watermain travelling north and capped off with interim blow-off at the Hector Road intersection. Please see *Figure 2* above for the Aspen Road water main.

Per the Water Model Analysis completed by Koers & Associates Engineering Ltd., the available fire flow on Aspen Road is 120 L/s. See **Appendix C** for a copy of the water model analysis report.

Fire flow and water demand requirements, as described in *Table 1*, are estimated to be 110 L/s, therefore the existing main is assumed to be capable of providing sufficient flows. The fire flow requirements are calculated are based on a maximum 3,600 m² building footprint area with vertical firewalls with fire-resistance rating used on two shared walls. Line sizing and layout of the development are assumed at this stage and will require confirmation by the mechanical engineer prior to detailed design.

As there is no current watermain extension along Hector Road, the existing main along Aspen Road is the only available tie-in location for the proposed site. If the existing main is insufficient for providing the required fire flows, upgrading of the main may be required at the developer’s cost, however, this is not anticipated at this time.

3.2 Sanitary Sewer System

Per the ToC’s Bylaw No. 1261, Appendix D, Section 2.1, sanitary sewer demands have been estimated for the development and summarized in *Table 2* below. All conceptual servicing calculations for the site are included in **Appendix B**.

Table 2 - Sanitary Design Flow Calculation

Site Area	4.90 Ha	4.14 Ha will be developed
Infiltration Rate	0.12 L/s/Ha	Based on McElhanney's Hudson Trunk Sewer Study
Number of dwellings	252 units	69 Townhomes, 183 Apartment Units
People per dwelling	2.2 per unit	Based on 2021 Census Profile for the Town of Comox, "Average Household Size"
Equivalent Population	555 ppl	
Peaking factor	3.80	Based on ToC's Bylaw No. 1261, Appendix 'D', Section 2.1.3
Sewerage Rate	360 L/c/day	Based on ToC's Bylaw No. 1261, Appendix 'D', Section 2.1.2
ADWF	2.31 L/s	Average Dry Weather Flow
PDWF	8.79 L/s	Peak Dry Weather Flow
Infiltration	0.5 L/s	Infiltration Based on Site Area
PWWF	9.28 L/s	Peak Wet Weather Flow (PDWF + infiltration)

The proposed development is fronted by an existing 200 mm sewer line along Aspen Rd, with estimated capacity to accommodate the peak wet weather flows (PWWF) in *Table 2*. Tie-in for the development is anticipated to be along this sewer section, between manholes S-J and S-K, with final location to be confirmed upon design.

A desktop downstream capacity analysis has been completed on the receiving sewer network know as the Hudson Trunk Sewer system. Specifically, downstream of the Aspen Road connection, including the Comox Valley Regional District (CVRD) sewer network on Aspen Road, Idiens Way, and Dryden Road which is the upper section of the Hudson trunk sewer system. Sections of the downstream network were found to exceed 80 % design capacity allowances, however, do not exceed full flow pipe capacities. The sewer network collects flow from various areas, including the Town of Comox, City of Courtenay, and CVRD. See **Appendix D** for the additional details pertaining to the downstream sanitary sewer capacity analysis.

3.3 Stormwater

Per ToC's Official Community Plan, Bylaw 1865, the subject property falls within the 'Anderton Corridor' area. A stormwater management report (Anderton SWMP) has been prepared by Jim Dumont for this area. Per this study, stormwater systems should comprise of detention ponds and infiltration systems that will maintain and control both post development rates and durations of discharge to pre-development flow. To implement this, three target values have been identified to be followed at the time of development:

1. **Retention Volume** – detention facilities sized to handle 1 in 100-year storm volumes for both developed property and road ROWs.
2. **Base Flow Release Rate** – average pre-development discharge rate.
3. **Infiltration Area** – volume reduction systems for both developed property and road ROWs.

To provide the required target values, a Type 1 Urban Pond, per Figure 4.3 of the Anderton SWMP, will be proposed on the northeast corner of the site and road/boulevard infiltration galleries, proposed along road ROWs. Both pond and infiltration galleries will be owned and maintained by the ToC and sized to limit post-development flows to pre-development conditions, in accordance with the Anderton SWMP and ToC's Bylaw No. 1261, Appendix E. Per Table 4.2 (Watersheds Targets for Mitigation) of the Anderton SWMP, Section 4.2, *Table 3* below shows the calculated stormwater system sizing for the proposed development.

Table 3 – Stormwater System Sizing

Target	(80% imperviousness assumed)
Infiltration System Area	1758 m²
Base Flow Release Rate	5.27 L/s
Infiltration System Volume	527 m ³
Neighbourhood Detention Volume	2505 m³
Pond Discharge	79.0 L/s

The onsite stormwater collection networks serving both phases will be designed to collect and convey runoff to the detention pond. Private road and parking areas will be sloped towards the center, where a series of catch basins are designed to catch stormwater flows. Roof leaders will discharge into the road/parking areas and again be collected via the onsite catch basins. Onsite playgrounds and green spaces will be graded in a way that overland flows are directed to lawn basins and catch basin manholes.

All onsite facilities should be designed with a suitable overflow and site grading that will convey Major storm (1:100-year) overland flows safely to the stormwater management pond proposed to be located on the lower northeast corner of the development site.

Flows from the proposed detention pond shall discharge into a flow control manhole with flow monitoring equipment to control discharge to pre-development conditions. The controlled outfall will then discharge into the existing roadside drainage ditch along Hector Road and continue through the Comox Valley Regional District drainage network, where it discharges to Brooklyn Creek, north of McQuinn Drive on Anderton Road. It is recommended that a downstream capacity assessment be completed on the existing drainage network upstream of Brooklyn Creek prior to any subdivision or development of the site.

The above measures can be combined to provide more than the required detention volume, mitigating the increases in storm run-off from the Hector Road development.

Additional best management practices recommended for this site which may be implemented as part of construction are as follows:

- Reducing hard surfaces using gravel, permeable pavements, or structural grass systems for parking areas.
- Green roofs to reduce run-off.
- Storage and re-use of rainwater to reduce runoff volume and flows.
- Use of oil-silt separators to treat runoff from hard surfaces.
- Amended soils.

3.4 Frontage Upgrades

Road and drainage improvements fronting the development on Aspen Road and Hector Road are proposed by the developer. These works would be completed in accordance with ToC bylaws and are proposed to generally include:

Aspen Road (Half Road Construction, to ToC Standards)

- Paved travel lane, bike lane, and parking lane
- Concrete curb and 1.8 m wide sidewalk
- Street lighting
- Boulevard street trees and landscaping

Hector Road Greenway (10 m Wide Dedication)

- New 3.0 m wide multi-use trail
- Trees and landscaping

3.5 Erosion and Sediment Control

An erosion and sediment control plan will be developed to manage the quality and quantity of water runoff from the site during construction. The plan will be developed in accordance with the criteria set forth by the ToC.

4.0 Conclusion

The design of all site services will conform to the bylaws of the Town of Comox and will be constructed by a qualified contractor. Service tie-ins, locations, setbacks, and frontages will conform to the Town of Comox standards.

Servicing requirements for third-party utilities including BC Hydro, Telus, Shaw and Fortis BC will be included and coordinated once preliminary design works for the proposed development have commenced.

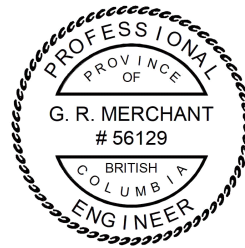
If you have any questions, please feel free to contact the undersigned.

Yours truly,

Wedler Engineering LLP

Per:

Reviewed by:



Marie Xyla Emmanuel Vital, EIT
Civil Design Engineer
#211 – 2459 Cousins Avenue
Courtenay, BC V9N 3N6
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Greg Merchant, P.Eng.
Partner/Project Engineer
gmerchant@wedler.com

List of Appendices

APPENDIX A – Wedler Engineering Drawing No. V21-0518/A-01 Conceptual Servicing Plan

APPENDIX B – Servicing Calculations

APPENDIX C – Water Model Analysis – Koers & Associates Engineering Letter 9336-213-02

APPENDIX D – Downstream Sanitary Sewer Capacity Assessment - 2123 Hector Road Development

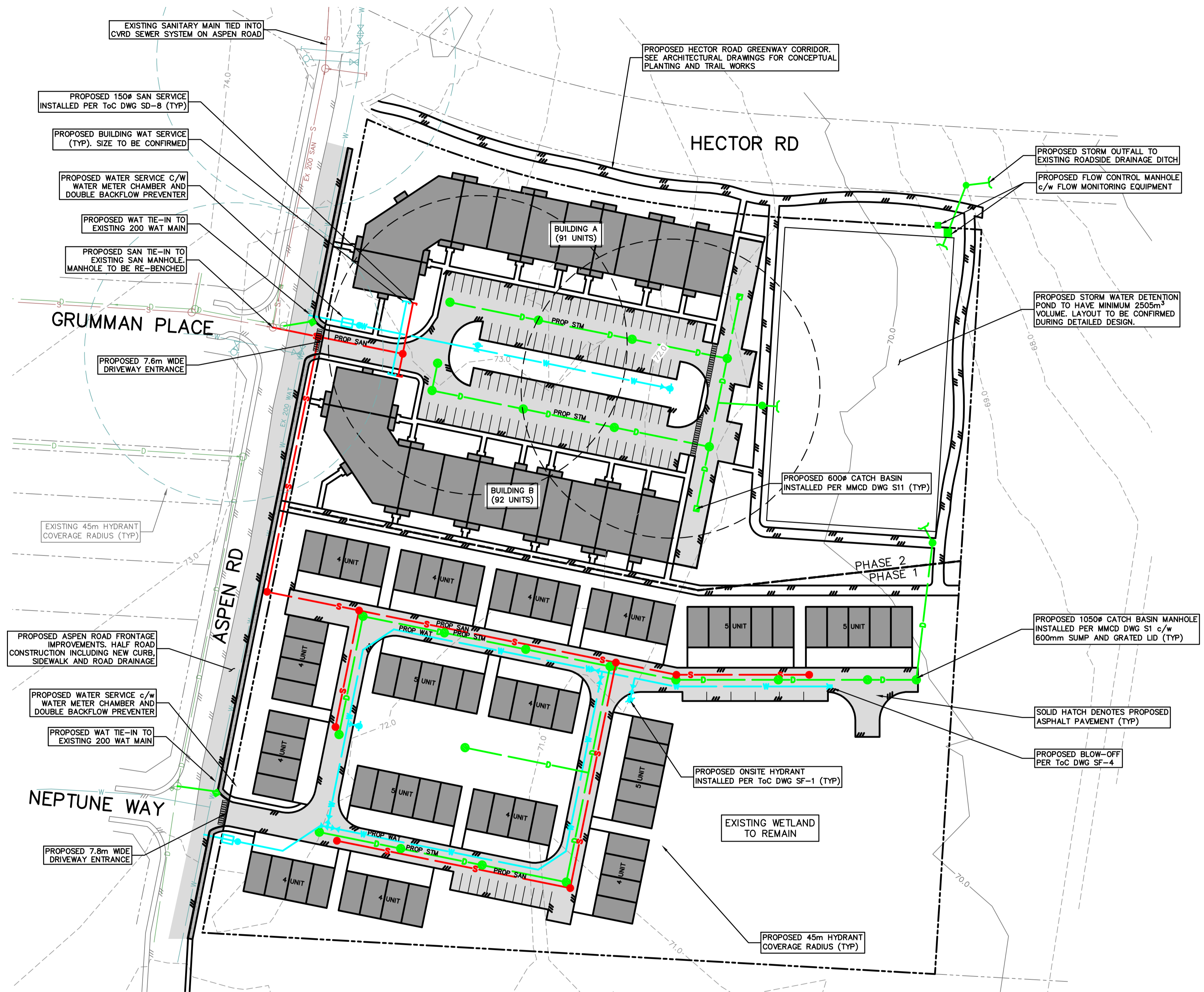
APPENDIX A

Wedler Engineering Drawing No. V21-0518/A-01 Conceptual Servicing Plan





SYMBOL		DESCRIPTION
EXISTING	PROPOSED	
○	●	MANHOLE
⊙	⊙	CATCH BASIN MANHOLE
T	T	CAP
□	□	CATCH BASIN
+	+	GATE VALVE
◇	◇	HYDRANT
D	D	STORM
S	S	SANITARY
W	W	WATER
---	---	LOT LINE
---	---	EDGE OF PAVEMENT / CURBLINE



N:\21\21-0518A-2123 Hecor Road-Comox-Broadstreet\Design\Current Drawing Files\21-0518A.dwg 2023/11/24 05:36:25 PM kbogdale

REV	DESCRIPTION	YYYY-MM-DD	BY	REV	DESCRIPTION	YYYY-MM-DD	BY
A	ISSUED FOR REVIEW	2023-11-15	MXV				
B	REVISED SERVICING LAYOUT - ISSUED FOR REVIEW	2023-11-24	GKB				

LEGAL:	PROJ. MGR.	GRM
	DESIGN/DRAWN	MXV
	PEER REVIEWED	GRM
	HORIZ. SCALE	1:750
	VERT. SCALE	--

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www.wedler.com

THE WEDLER GROUP

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- Courtenay 1.250.334.3263
- Surrey 1.604.588.1919

BROADSTREET PROPERTIES LTD.	
MULTI-FAMILY DEVELOPMENT	
2123 HECTOR ROAD, COMOX, BC	
CONCEPTUAL SERVICING PLAN	

DRAWING NO.	OF --1--
V21-0518/A-01	
LOCAL GOVERNMENT FILE	
PHASE	REVISION
	B

APPENDIX B

Servicing Calculations



Estimation of Water Demand

Domestic

AADF	635 L/c/day	- Based on ToC's Bylaw No. 1261, Appendix 'F', Section 1.1.1
Peak Day	2100 L/c/day	
Peak Hour	3000 L/c/day	

Equivalent Population

2 Bedroom Units	252	- Assumes 2 bedroom units with average 2.2 people per unit
Equivalent population	555	(Average household size estimated based on 2021 census data)

	Residential
AADF	352,425 L/day 4.1 L/s
Peak Day	1,165,500 L/day 13.5 L/s
Peak Hour	1,665,000 L/day 19.3 L/s

Fire Flow Calculation

Per Fire Underwrite Survey 2019 (Draft)		$F=220C(A)^{0.5}$
Residential Buildings		
C	1	Assumes Type IV-C Mass Timber Construction
A	32,292 sq.ft. 3,000 sq.m.	
F=	12,000 L/min	
Occupancy	Limited Hazard	
Decrease	15% Residential Use	
F Decrease	1800 L/min	
Sprinkler Provided		Assumes fully supervised automatic sprinkler system installed to NFPA standards
Decrease	50%	
F Decrease	5,100 L/min	
Exposure	*Assumed exposure based on the following:	
N	0%	sprinklered building >30 m away
E	0%	sprinklered building and 69 length-height factor
W	0%	sprinklered building and 84 length-height factor
S	6%	exposed building within 12 m and 24 length-height factor
F Increase	720 L/min	
Resulting F	5,820 L/min	
Total F =	5,820 L/min	
	97 L/s	
Peak Demand = Peak Hour Demand or Peak Day Demand+Fireflow		
For this site: Peak Day + Fireflow =		110 L/s

Broadstreet Properties Ltd.
2123 Hector Road, Comox, BC
Muti-Family Development



Wedler Project: V21-0518/A
 Calculated: M. Vital
 Date: 24-Nov-23

Estimation of Sanitary Loading

Site Area

Lot Size: 49,000 m²
 4.90 ha

2123 Hector Road Multi-Family	
<u>Residential</u>	
2 Bedroom Units	252
Equivalent Population	555
AADF (L/capita/day)	360
Average Residential Sewerage (L/day)	199,800
ADWF (L/s)	2.31
Peaking Factor (Harmon Formula):	3.80
PDWF (L/s)	8.79
<u>Lot Infiltration</u>	
Lot Portion (ha)	4.14
Infiltration Rate (L/s/ha)	0.12
Infiltration (L/s)	0.50
PWWF (L/s)	9.28
Total Sanitary Design Flows (L/s)	9.28

- Assumes 2 bedroom units with average 2.2 people per unit
 (Average household size estimated based on 2021 census data)
 - Based on ToC's Bylaw No. 1261, Appendix 'D', Section 2.1.2
 - Based on ToC's Bylaw No. 1261, Appendix 'D', Section 2.1.3
 - developed area only (excludes park dedication)
 - Based on McElhanney's Hudson Trunk Sewer Study

APPENDIX C
Water Model Analysis
Koers & Associates Engineering Letter 9336-213-02





**KOERS
& ASSOCIATES
ENGINEERING LTD.**
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January 19, 2022
File No.: 9336-222-01

Town of Comox
1809 Beaufort Avenue
Comox, B.C. V9N 4B8

**Attention: Ms. Patti Wells, P.Eng
Public Works Department**

Re: Water Model Analysis for the 2123 Hector Road Development

As requested, we have conducted a water model analysis for the proposed development. It has been assumed that the development will be serviced from the existing 200 mm dia. watermain on Aspen Road. It should be noted that the adjacent parcels of 2077 Hector Road have been previously modelling and the results of Koers & Associates Engineering Ltd (KAEL) letter 9336-214-01 should be read in conjunction with this report.

It should be noted that for this development is has been assumed that the proposed piping for the development at 2309 Macdonald Road as noted in KAEL letter 9336-213-02 has been constructed.

Water System Demands

Design domestic and fire flow demands for the proposed development were provided by Wedler Engineering and are detailed below.

Scenario	Flow (lps)
Maximum Day Demand	19.3
Peak Hour Demand	27.5
Design Fire Flow	120

Results:

We have assumed a geodetic elevation of 73.7 metres for the site. This produces a static pressure of 449 kPa (65 psi) based on a water level of 119.5 metres at the East Courtenay Reservoir. Analysis of proposed development using the current Town of Comox WaterCAD model shows the expected residual pressures at the main under peak hour demands and under the specified fire flows, during maximum day demands as follows:

Peak Hour

Location	Elevation (m)	HGL (m)	Residual Pressure	
			(kPa)	(psi)
Proposed Connection	73.7	113.1	386	56

.../2

January 19, 2022
File No.: 9336-222-01

2

Town of Comox
Ms. Patti Wells, P.Eng

Fire Flow

For the design fire flow of 120 lps two fire hydrants will be required, and the fire flow has been evaluated at the hydrants on Aspen Road.

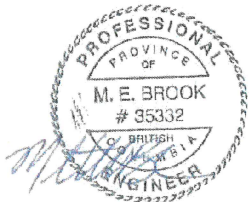
Location	Elevation (m)	Fire Flow (lps)	Residual Pressure	
			(kPa)	(psi)
Hydrant - Aspen Road/Hector Road	73.7	60	254	37
Hydrant - Aspen Road/ Grumman Place	73.5	60	282	41
Total Fire Flow		120		

It should be noted that the maximum velocity in the distribution system piping is 3.0 m/s which is below the maximum requirement of 3.5 m/s specified in the Master Municipal Construction Documents Design Guidelines.

We trust this is the information you require. Please call if you have any questions.

Yours truly,


KOERS & ASSOCIATES ENGINEERING LTD.



Mitchell Brook, P.Eng
Project Engineer
Permit to Practice No.: 1001658

Enclosures

KOERS & ASSOCIATES ENGINEERING LTD.



**KOERS
& ASSOCIATES
ENGINEERING LTD.**
Consulting Engineers

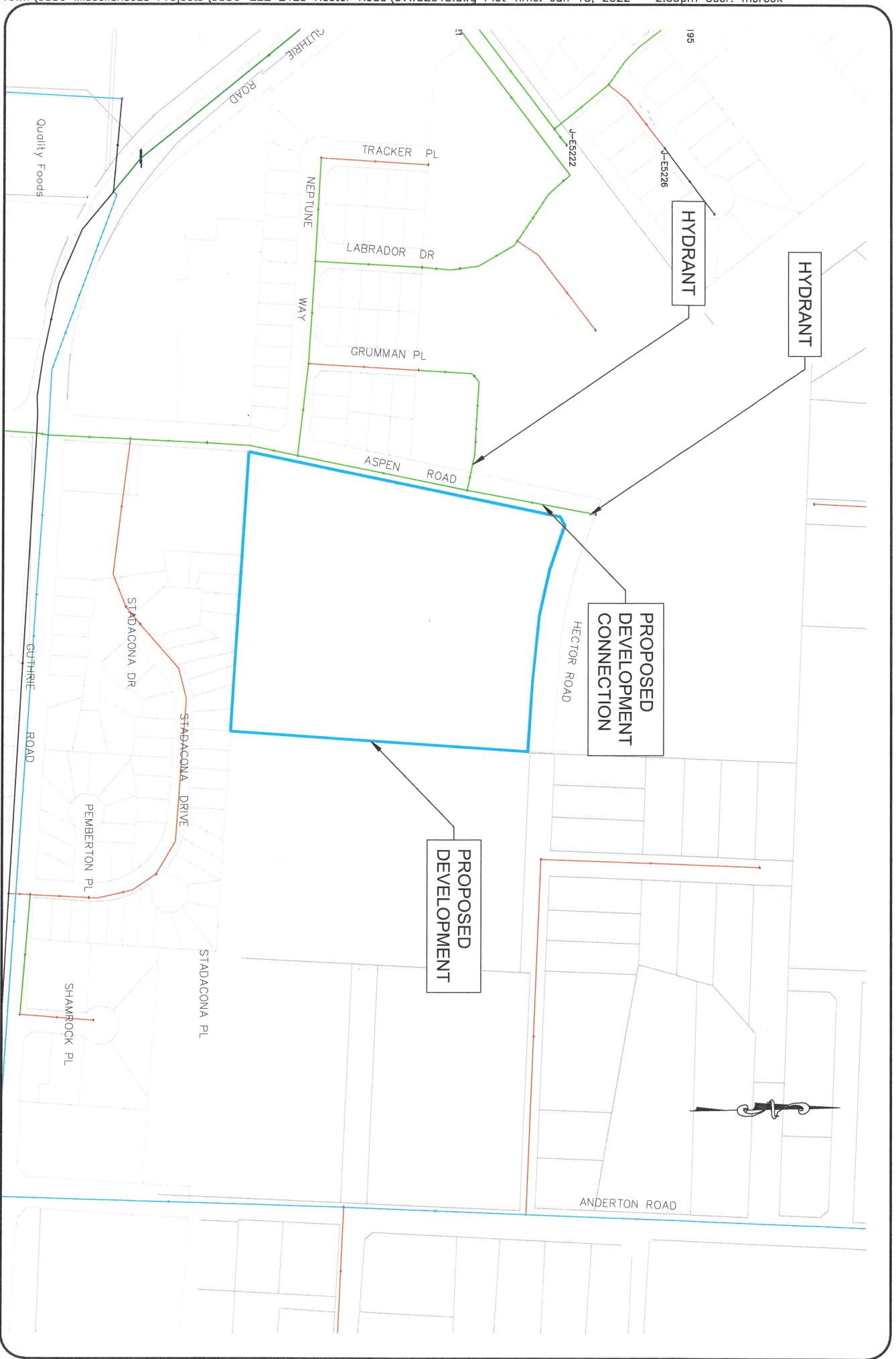
P.O. Box 796, 134 Memorial Ave
Victoria, BC V8Y 1Y9
Tel: 250-363-5362
Fax: 250-363-5362

CLIENT: TOWN OF COMOX

PROJECT: WATER REVIEW
2123 HECTOR ROAD

TITLE: WATER NETWORK

APPROVED	CD	SCALE	NTS
DATE	18JAN22	DWG No.	9336-222-01
PROJECT No.	9336-222		



APPENDIX D
Downstream Sanitary Sewer Capacity Assessment
2123 Hector Road Development



Wedler Engineering LLP
211-2459 Cousins Avenue
Courtenay, BC V9N 3N6



WEDLER
ENGINEERING

November 24 2023

File Ref: V21-0518A

Broadstreet Properties Ltd.
100 St. Ann's Rd.
Campbell River, BC, V9W 4C4

Attention: Trevor Dickie – Vice President of Real Estate Development – Broadstreet Properties Ltd.

**Reference: Downstream Sanitary Sewer Capacity Assessment
2123 Hector Road, Comox, BC**

The following servicing report was prepared on behalf of Broadstreet Properties Ltd. and in support of the future residential development for the subject parcel located at 2123 Hector Road, Comox, BC.

This report presents the assessment methodology and findings of the estimated downstream impact assessment completed on the Comox Valley Regional District's (CVRD) existing sanitary collection network known as the Hudson Sewer Trunk system. Portion of the sanitary sewer system also extends into the Town of Comox (ToC) boundary, along Aspen Road and into Grumman Place.

The purpose of this assessment is to evaluate the effects the increased Hector Road development's sanitary loading will have on the existing ToC and CVRD sanitary sewer system. The works described in this report integrate McElhanney's "Hudson Trunk Sewer" design package, provided to Wedler by the CVRD, as well as record drawings and correspondence with the ToC.

This report presents the estimated development loads as well as the general sanitary servicing methodology for the proposed site. The subject parcel's suitability for the proposed works have been reviewed in accordance with the design methodologies outlined in the ToC Bylaw No. 733 and 1261 Consolidated, as well as the 2022 MMCD Design Guidelines. The results of this report will form the basis for the engineering design.

1.0 Site Information

The subject property is legally described as LOT 4 DISTRICT LOT 170 COMOX LAND DISTRICT PLAN VIP60685. The lot is approximately 4.91 Ha in size, and the current designated land use is Residential: Low Rise Apartments, Townhouses & Ground Oriented Infill per the Town of Comox Official Community Plan (OCP). Current zoning is R3.3 Single-Family – Large Lot per the Town of Comox Zoning Bylaw 1850 SCHEDULE B Zoning Map. The developer proposes to rezone the property as a multi-family residential zone, which is suitable and consistent with the OCP designated land use.

The property is bound by Aspen Road to the west, Hector Road to the north, a single-family residential community to the south and large parcel to the east. *Figure 1* shows the current state of the site, which is undeveloped.

2.0 Proposed Development

For the purposes of this analysis, the development was estimated to consist of a combined 252 residential units, between Phases 1 and 2, made up of 252 multifamily dwelling units. Overall population count has been estimated at 555 residents, and the developed area is considered as 4.14 Ha. Please see *Figure 1* below for an aerial view of the conceptual site layout and service plan created by Wedler Engineering LLP.



Figure 1 - Conceptual Site Layout

3.0 Sanitary Sewer System

3.1 Proposed Development Loading

Per the MMCD Design Guidelines 2014, Section 3.0, sanitary sewer demands have been estimated for the development and summarized in Table 2 below. All conceptual servicing calculations for the site are included in **Appendix A**.

Table 1 - Sanitary Design Flow Calculation

Site Area	4.14 Ha	
Infiltration Rate	0.12 L/s/Ha	Based on McElhanney Design Brief Memo
Number of dwellings	252 units	69 Townhomes, 183 Apartment Units
People per dwelling	2.2 per unit	Based on 2021 Census Profile for the Town of Comox, "Average Household Size"
Equivalent Population	555 ppl	
Peaking factor	3.80	Based on ToC's Bylaw No. 1261, Appendix 'D', Section 2.1.3
Sewerage Rate	360 L/c/day	Based on ToC's Bylaw No. 1261, Appendix 'D', Section 2.1.2
ADWF	2.31 L/s	Average Dry Weather Flow
PDWF	8.79 L/s	Peak Dry Weather Flow
Infiltration	0.5 L/s	Infiltration Based On Site Area
PWWF	9.28 L/s	Peak Wet Weather Flow (PDWF + Infiltration)

The analysis will estimate pipe capacity percentages travelling downstream, based on the peak wet weather flows (PWWF) described in Table 2.

3.2 Existing Sanitary Sewer Network

The existing sanitary collection network is known as the Hudson Trunk line and is primarily owned and operated by the CVRD. A small portion of this line also collects sanitary flows from the Town of Comox, along Aspen Road and part of Grumman Place, which will be the proposed development's tie-in area. The 2123 Hector Road development is fronted by an existing 200 mm sewer line along Aspen Rd, between sanitary manholes (SMH), S-J to S-K. Tie-in for the development is anticipated to be within SMH S-J, with final location to be confirmed upon design. Please see Figure 2 below for the proposed tie-in location and Aspen Road sanitary layout.

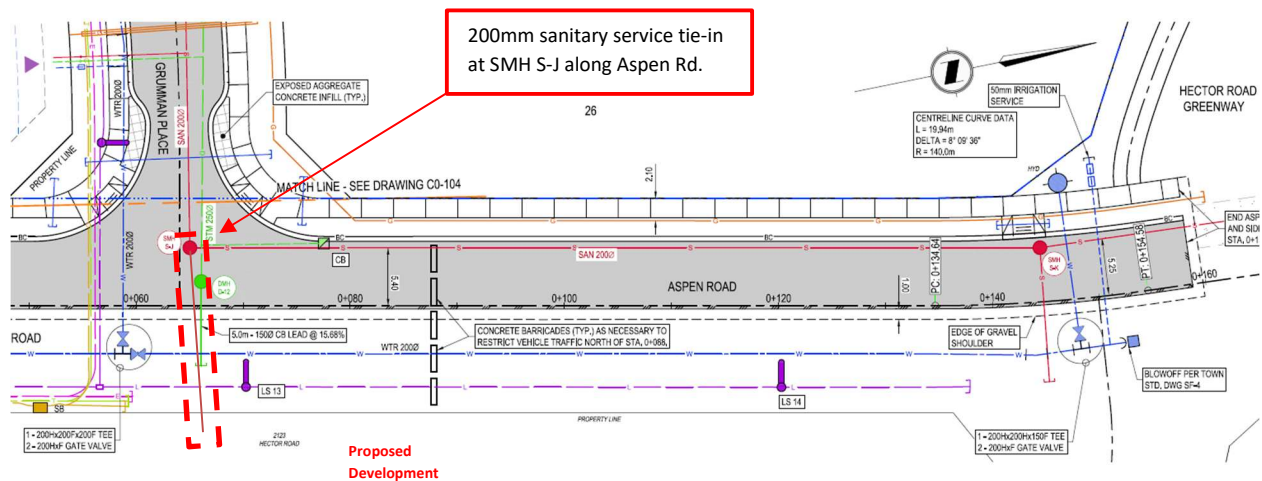


Figure 2 – Potential Aspen Road Sanitary Tie-In (McElhanney's Valley View Estates Record Drawing Package, Project #2211-47463-00)

Sanitary flows are then gravity fed from the Town's portion of the 200 mm Aspen Road sanitary main (ending at northern boundary of Lot 941), into the CVRD Hudson Trunk system. The 200 mm Aspen Road gravity main ends at SMH35, discharging into the Idiens Way. Idiens Way travels east, accepting various tie-ins from surrounding systems. Idiens Way continues east into Dryden Road, then travels north to Hudson Road and further downstream. The area of focus for this desktop study was determined to be Aspen Road, Idiens Way and Dryden Road, to ensure these sewer sections are satisfactory to accommodate the 2123 Hector Road development flows.

A request for record drawings to both the ToC and CVRD resulted in the receipt of the "Valley View Estates" Phase 2 Record Drawings, completed by McElhanney (Project#: 2211-47463-00) for the Town of Comox's Grumman Place and Aspen Road gravity mains, and the CVRD's "Hudson Trunk Sewer" Record Drawing Package and Design Brief Memo, completed by McElhanney (Project#: 2211-47376-01) for the remaining Aspen Road gravity main, Idiens Way and Dryden Road. Please see Figure 3 below for a visualization of the requested record drawing areas.

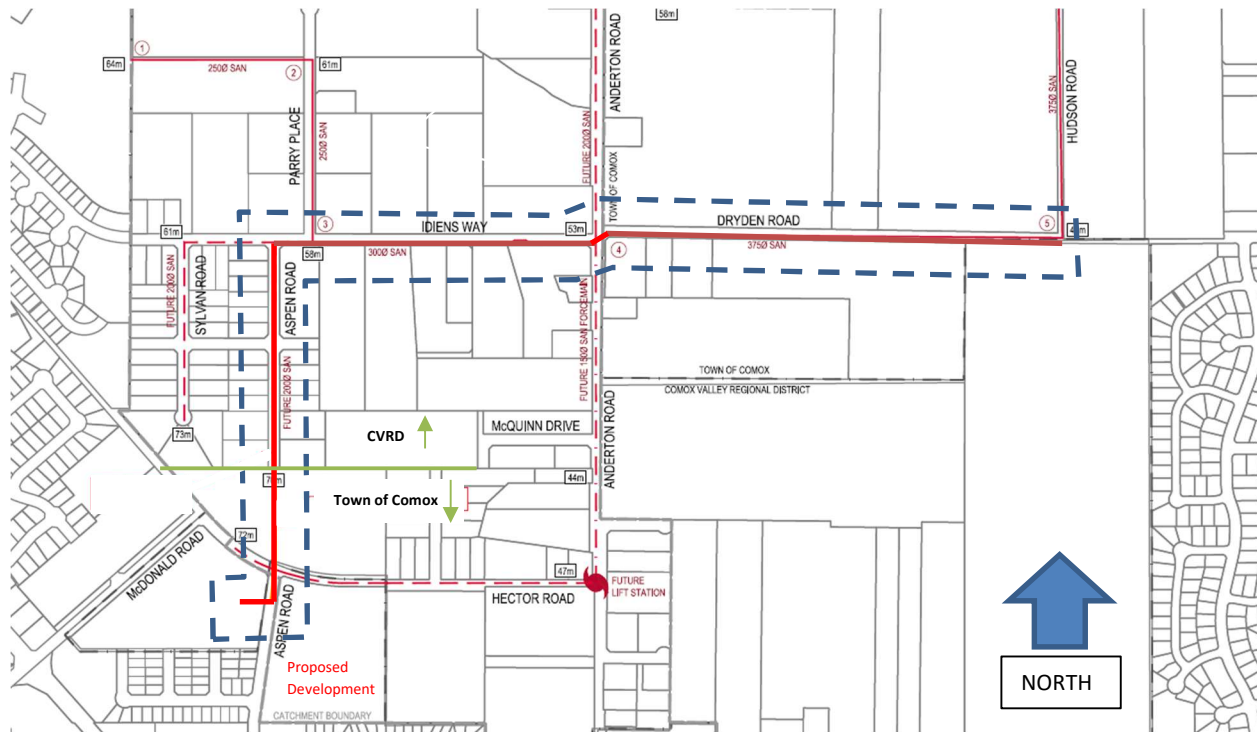


Figure 3 – Downstream Sanitary Assessment Area (Highlighted in Blue)

In review of the existing sewer system, areas with very shallow slopes within Idiens Way and Dryden Road were observed. Pipe slopes in areas were $< 0.5\%$. As capacity within these lines are directly related to pipe slopes, these sections were highlighted as potential capacity concerns. Even though gravity mains increase to 300 mm and 375 mm diameter along these roadways, at the record drawing slope of 0.5%, capacity is only 68.4 L/s and 124.0 L/s, respectfully. The primary sections of concern are shown in Figure 4 below (section identified in red).

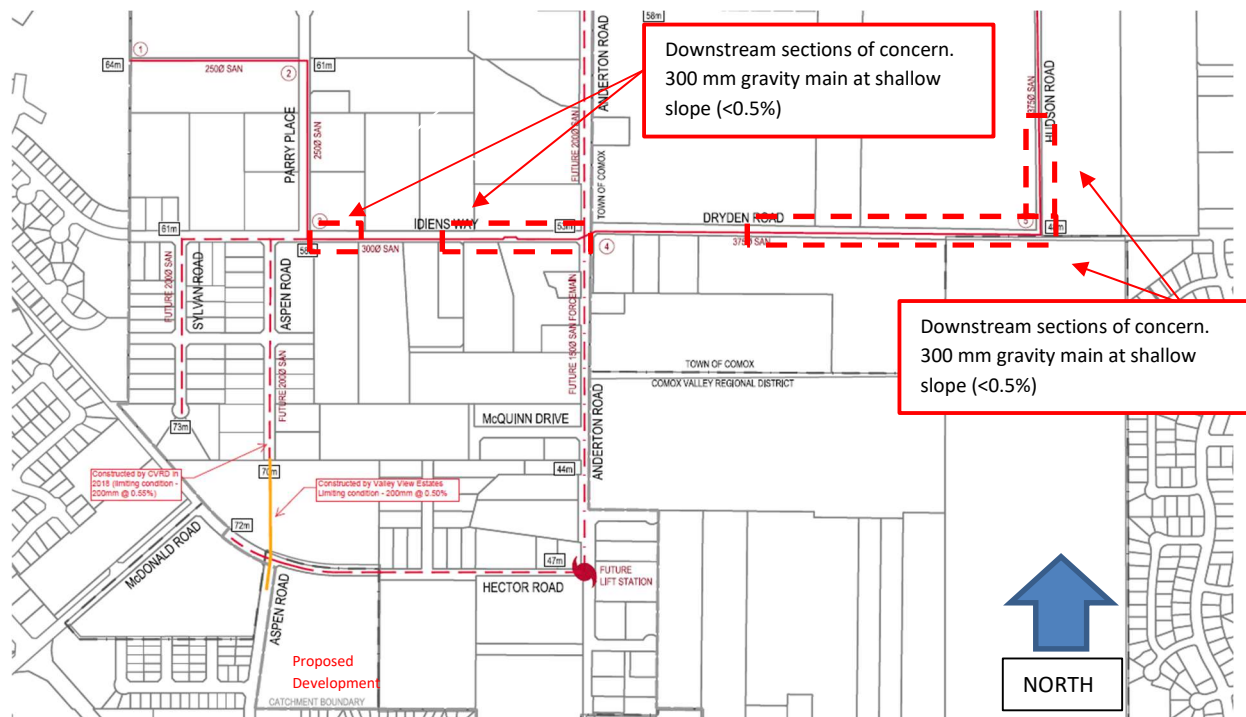


Figure 4 – Potential Downstream Capacity Concern Area

3.3 Design Standards

Since the sewer system passes through two governing agencies, the analysis separated in two ways. Most of the system is within the CVRD systems and regulated by the MMCD Design Guidelines 2022, while the Town of Comox area along Aspen Road and into Grumman Place fall under the Town’s municipal Bylaw No. 733 and 1261, Consolidated.

As part of the Hudson Trunk Sewer Design, McElhanney completed a 50% Design Brief memo, dated July 5th, 2016. The memo included McElhanney’s design calculations for the Hudson Sewer Trunk construction, including capacity and infiltration area calculations. Wedler incorporated the design values included in this report.

3.4 Contributing Parcels

Since the construction and design of the Hudson Sewer Trunk, the gravity main was extended into the Town of Comox area, tying in additional developments including our proposed development. A total of three large contributing parcels are included as part of the Town of Comox extension. Please see Figure 5 for a visual representation of the parcels in question.

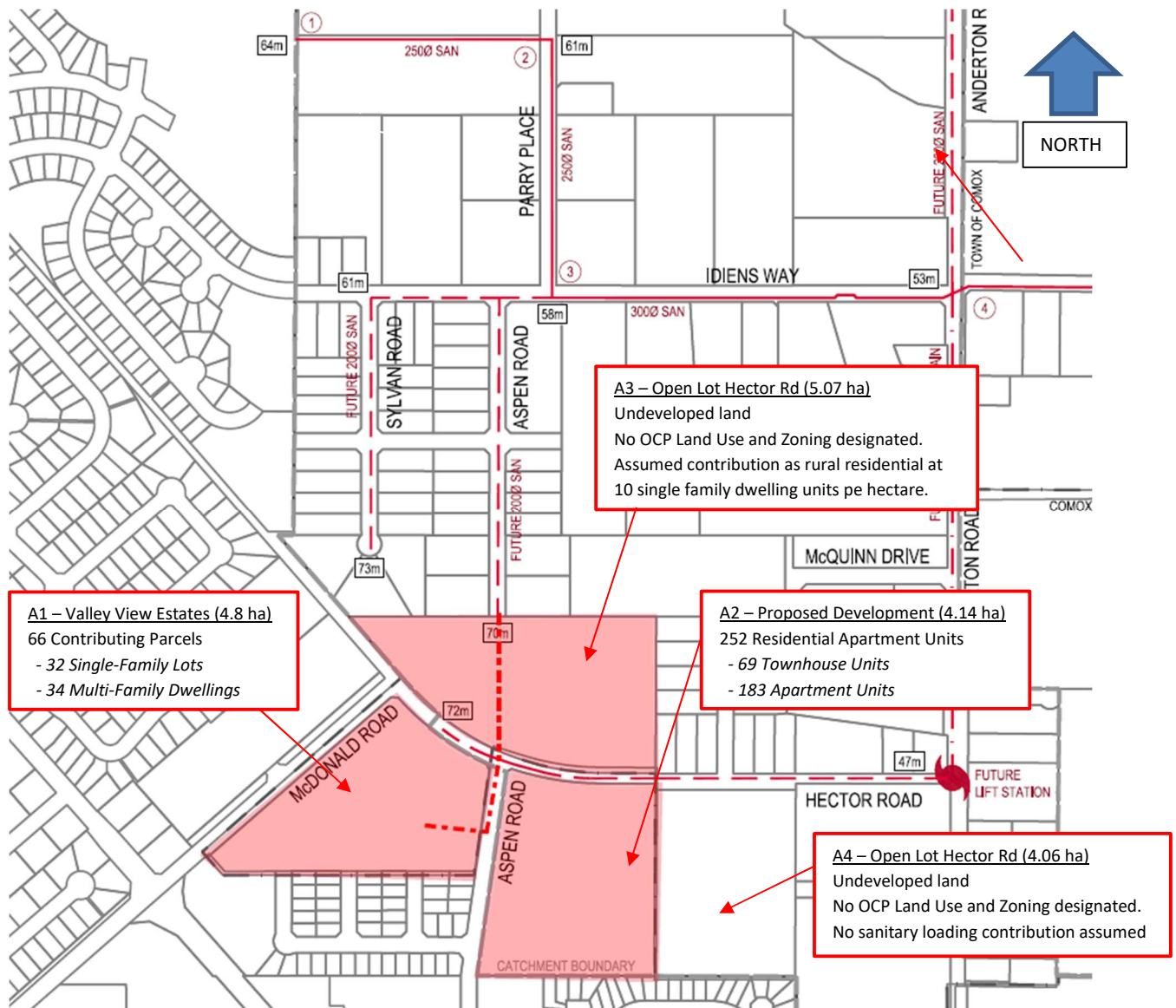


Figure 5 – Upstream Contributing Parcels

The sanitary sewer design flows were estimated using the Manning Formula, based on the Town of Comox Bylaw No. 733 and 1261 Consolidated, as well as the MMCD Design Guidelines 2022, Section 3.0. The parameter used for the estimates are summarized as follows:

- Average Dry Weather Flow (ADWF) = 360 L/cap/day
- Infiltration Rate = 0.12 L/s/Ha
- Minimum Design Velocities = 0.6 m/s
- Peaking Factors were calculated using the Harmon formula.

The estimated flows for the three parcels were used to initiate the review of the downstream capacity analysis.

3.5 Analysis/Results

Using the record drawing data, the estimated flows in Section 3.4 were incorporated to the sanitary network. All piping within the sewer network was assumed to be SDR 35 PVC. Manning’s formula, in conjunction with the record drawing piping data, was used to assess capacity of each downstream sewer segment.

As the Hudson Trunk Sewer Network covers such a large area, and many contributing parcels can be considered low density areas with large lots, it was determined that infiltration estimates along Idiens Way and Dryden Road will be calculated based on pipe length, as per MMCD Design Guidelines 2022, Section 3.5’s, “Old System (25 year or older), values of 1.0 L/mm diameter / 100 m length/ hour. Even though the system is not over 25 years old, the more conservative value was chosen for assessment to account for any inconsistencies or unknown variables within the system. Cumulative Peak Wet Weather Flows (PWWFs) were then derived and compared to the capacity of each sewer section.

The downstream capacity analysis results have been summarized in Figure 6 below. The detailed calculations for each downstream sewer section can be found within **Appendix B**.

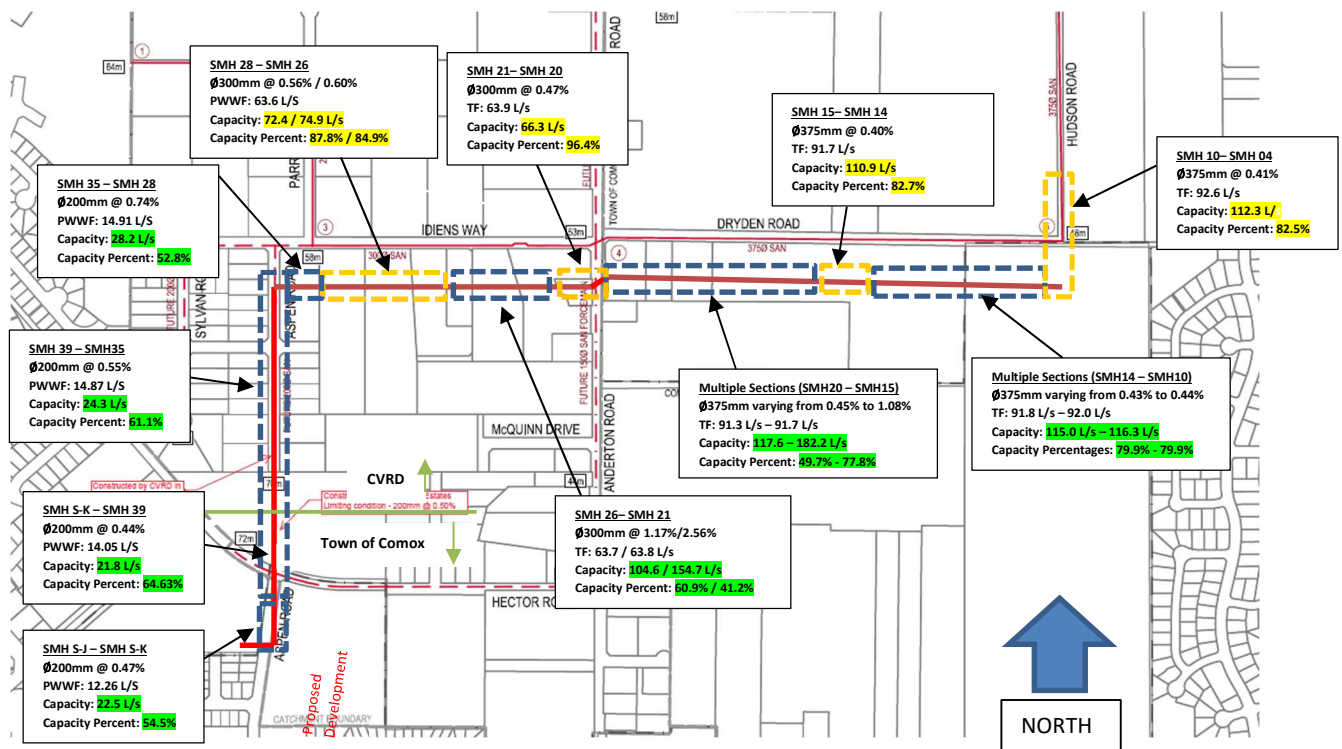


Figure 6 – Downstream Sanitary Analysis Capacity Results

3.6 Summary of Findings

As displayed in Figure 6, various sections of CVRD sewer mains on Idiens Way and Dryden Road are estimated to exceed typical 80% design capacity tolerances during peak wet weather flows, but will remain below full pipe capacity. One section between sanitary manholes SMH21 and SMH20 is estimated to be at 95% capacity. No capacity concerns have been noted within the ToC sewer system. It is recommended that the CVRD be consulted to review and confirm the capacities as noted within their system are acceptable.

The inflow from the City of Courtenay to the CVRD network at Parry Place was found to have a significant contribution to overall sanitary flows within the sewers on Idiens Way. Contributing flows from Perry Place are estimated at approximately 24 L/s, or 33%, of the total contributing flows at that junction. The CVRD has installed a sanitary sewer metering station at Perry Place. If the CVRD has concerns with the sewers identified as exceeding 80% capacity, further analysis can be completed if meter data and updated contributing development information is made available.

One area of potential increased contributing flows identified noted during preparation of this analysis is the undeveloped lands within catchments A3 and A4, shown in Figure 5. These parcels do not have a designated land use or zoning based on the current ToC Official Community Plan or Zoning bylaw. This analysis estimated sanitary loading of 10 dwelling units per hectare for A3, and no contributing flows were estimated for A4 as there is no sewer connection within proximity of the land. As design capacities were found to be high in some downstream sections, any additional loading from A3 and A4 in the future should include additional capacity analysis. It is assumed that since catchments A1 and A2 are designated multi-family development land use in the OCP, these parcels should take precedence for design capacity availability within the downstream system.

4.0 Conclusion

The existing Town of Comox sewer system is estimated to have sufficient capacity to accommodate the proposed 2123 Hector Road development's sanitary flows. The downstream Comox Valley Regional District Hudson Trunk Sewer system appears to be "sensitive" to additional contributing flows due to shallow sloped piping sections along Idiens Way and Dryden Road. As a result, there are a number of sections within the CVRD sewer system that appear to exceed 80% design capacity tolerances. They do not however appear to exceed full flow capacity. It is recommended that the CVRD be consulted to review and confirm the capacities as noted within their system are acceptable.

If you have any questions, please feel free to contact the undersigned.

Yours truly,

Wedler Engineering LLP

Per:

Reviewed by:

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APPENDIX A
2123 Hector Rd. – Sanitary Servicing Calculations



Broadstreet Properties Ltd.
2123 Hector Road, Comox, BC
Muti-Family Development



Wedler Project: V21-0518/A
 Calculated: M. Vital
 Date: 24-Nov-23

Estimation of Sanitary Loading

Site Area

Lot Size: 49,000 m²
 4.90 ha

2123 Hector Road Multi-Family	
<u>Residential</u>	
2 Bedroom Units	252
Equivalent Population	555
AADF (L/capita/day)	360
Average Residential Sewerage (L/day)	199,800
ADWF (L/s)	2.31
Peaking Factor (Harmon Formula):	3.80
PDWF (L/s)	8.79
<u>Lot Infiltration</u>	
Lot Portion (ha)	4.14
Infiltration Rate (L/s/ha)	0.12
Infiltration (L/s)	0.50
PWWF (L/s)	9.28
Total Sanitary Design Flows (L/s)	9.28

- Assumes 2 bedroom units with average 2.2 people per unit
 (Average household size estimated based on 2021 census data)
 - Based on ToC's Bylaw No. 1261, Appendix 'D', Section 2.1.2
 - Based on ToC's Bylaw No. 1261, Appendix 'D', Section 2.1.3
 - developed area only (excludes park dedication)
 - Based on McElhanney's Hudson Trunk Sewer Study

APPENDIX B
Downstream Sanitary Capacity Calculations





SANITARY SYSTEM DESIGN - CALCULATION SHEET

Client: Broadstreet Properties
Project: 2123 Hector Road
Project #: V21-0518A
Municipality: Town of Comox & CVRD
Mun. Project #: _____

Date: April 25, 2023
Date Printed: #####
By: GKB

Average Daily Flow: 360 L/Day/Capita
Infiltration Rate: 0.12 L/S/Ha
Total Population: 6749

Catchment Area Description	Manhole		Length (m)	Area (Ha)	Pop Density (per/ha)	Pop	Cum. Pop	Usage Level L/Pop/day	Cumulative Daily Flow (L/day)	Peak Factor	Peak Flow (L/s)	Infiltration (L/s)	Total Flow (L/s)	Pipe (mm)	Slope (m/m)	Coeff	Capacity (L/s)	Velocity (m/s)	Chk. Vel 0.60m/s	Percent Capacity %
	(From)	(To)																		
A1 - Valley Estates Development	S-J	S-K	79.38	3.50	41.5	145	145	360	52,272	4.20	2.54	0.420	2.96	200	0.0047	0.013	22.5	0.730	OK	13.16%
A2 - Proposed 2123 Development	S-J	S-K	79.38	4.00	138.8	555	700	360	252,072	3.89	11.36	0.900	12.26	200	0.0047	0.013	22.5	0.730	OK	54.53%
A3 - Open Lot Hector Road	S-K	39	198.77	5.07	22.0	112	812	360	292,392	3.86	13.05	1.010	14.06	200	0.0044	0.013	21.8	0.706	OK	64.63%
Aspen Road - CVRD	39	35	382.04	5.52	7.2	40	852	360	306,648	3.84	13.64	1.223	14.87	200	0.0055	0.013	24.3	0.790	OK	61.11%
Idiens Way	35	28	73.42	--	--	-	852	360	306,648	3.84	13.64	1.263	14.91	200	0.0074	0.013	28.2	0.916	OK	52.83%
Parry Place (Nodes 2-3)	32	28	--	74.40	23.6	1757	1757	360	632,520	3.63	26.57	8.928	35.49	250	0.0050	0.013	42.0	0.873	OK	N/A
Idiens Way (Nodes 3-4)	28	27	81.81	7.76	155.6	1207	3816	360	1,373,688	3.35	53.29	10.260	63.55	300	0.0056	0.013	72.4	1.042	OK	87.82%
Idiens Way (Nodes 3-4)	27	26	85	8.06		-	3816	360	1,373,688	3.35	53.29	10.330	63.62	300	0.0060	0.013	74.9	1.078	OK	84.93%
Idiens Way (Nodes 3-4)	26	25	90	8.54		-	3816	360	1,373,688	3.35	53.29	10.405	63.69	300	0.0117	0.013	104.6	1.506	OK	60.89%
Idiens Way (Nodes 3-4)	25	21	120.86	11.46		-	3816	360	1,373,688	3.35	53.29	10.506	63.79	300	0.0256	0.013	154.7	2.227	OK	41.23%
Idiens Way (Nodes 3-4)	21	20	116.62	11.06		-	3816	360	1,373,688	3.35	53.29	10.603	63.89	300	0.0047	0.013	66.3	0.954	OK	96.37%
Dryden Rd. (Nodes 4-5)	20	19	70.65	8.31		2299	6115	360	2,201,328	3.16	80.59	10.677	91.26	375	0.0108	0.013	182.2	1.676	OK	50.09%
Dryden Rd. (Nodes 4-5)	19	18	60	7.06		-	6115	360	2,201,328	3.16	80.59	10.739	91.32	375	0.0102	0.013	177.1	1.629	OK	51.57%
Dryden Rd. (Nodes 4-5)	18	17	100	11.76		-	6115	360	2,201,328	3.16	80.59	10.844	91.43	375	0.0050	0.013	124.0	1.140	OK	73.75%
Dryden Rd. (Nodes 4-5)	17	16	95	11.17		-	6115	360	2,201,328	3.16	80.59	10.943	91.53	375	0.0051	0.013	125.2	1.152	OK	73.10%
Dryden Rd. (Nodes 4-5)	16	15	115	13.52		-	6115	360	2,201,328	3.16	80.59	11.062	91.65	375	0.0045	0.013	117.6	1.082	OK	77.92%
Dryden Rd. (Nodes 4-5)	15	14	90	10.58		-	6115	360	2,201,328	3.16	80.59	11.156	91.74	375	0.0040	0.013	110.9	1.020	OK	82.73%
Dryden Rd. (Nodes 4-5)	14	13	91.55	10.77		-	6115	360	2,201,328	3.16	80.59	11.251	91.84	375	0.0044	0.013	116.3	1.070	OK	78.96%
Dryden Rd. (Nodes 4-5)	13	12	25.59	3.01		-	6115	360	2,201,328	3.16	80.59	11.278	91.86	375	0.0043	0.013	115.0	1.058	OK	79.90%
Dryden Rd. (Nodes 4-5)	12	11	82.87	9.74		-	6115	360	2,201,328	3.16	80.59	11.364	91.95	375	0.0044	0.013	116.3	1.070	OK	79.06%
Dryden Rd. (Nodes 4-5)	11	10	84.06	9.88		-	6115	360	2,201,328	3.16	80.59	11.452	92.04	375	0.0044	0.013	116.3	1.070	OK	79.14%
Hudson Rd. (Nodes 5-6)	10	4	568.68			-	6115	360	2,201,328	3.16	80.59	12.044	92.63	375	0.0041	0.013	112.3	1.033	OK	82.51%
Knight Rd. (Nodes 6-7)	4	EX1	84.73	26.40		634	6749	360	2,429,568	3.12	87.79	12.133	99.92	375	0.0370	0.013	337.3	3.102	OK	29.63%

Catchment A1 - Estimated Population based on 32 SFD lots, 14 SFD Strata(lot 45), and 20 SFD Strata(Lot 46)
 Catchment A2 - Estimated Population based on 52 SFD strata units and 140 rental units
 Catchment A3 - Population Contribution estimated based on a population density of 10 SFD/ha
 Estimated 2.2 people per dwelling unit based on 2021 Statistic Canada for the Comox Valley