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Technical Memorandum

DATE: February 7, 2020

TO: Natalie Tokgoz, P.Eng., Capital Regional District

FROM: Hua Bai, M.Eng., P.Eng.

RE: **CAPITAL REGIONAL DISTRICT BYLAW 2312 UPDATE**
CRD Core Area Flow Allocation Methodology Summary
Our File 0283.435-300

1. Introduction

The Capital Regional District (CRD) operates an extensive network of sanitary flow monitoring sites in the Core Area which serves the municipalities of Victoria, Esquimalt, Saanich, Oak Bay, View Royal, Langford, Colwood, and the Esquimalt and Songhees Nations. Data gathered from the flow monitoring sites is used for allocation of operating costs for the CRD Core Area wastewater system as well as for system planning and inflow and infiltration (I&I) measurements. To ensure the most accurate and complete measurement of sewage flows into the CRD system, and subsequent billing to each participant area connected to the system, the CRD retained Kerr Wood Leidal Associates Ltd. (KWL) to perform an audit of flow meters to ensure correct reporting and calibration. The CRD is currently constructing a new wastewater treatment plant (WWTP) for the Core Area that is to be operational by December 31, 2020. This provides an opportunity to optimize the meter locations and to utilize more accurate technology now that the Core Area sewers are being connected together into one system with treatment and disposal at the new McLoughlin WWTP.

As a result of making changes to the Core Area system, *Bylaw 2312 – Liquid Waste Management Core Area and Western Communities Service Establishment*, is being updated to reflect the new system. KWL had recently developed the CRD wastewater hydraulic model based on the most recent infrastructure, flow, and operational information. KWL was therefore requested by the CRD to assist in the Bylaw 2312 update, in particular, to update the allocated capacities for the participants of the system in Schedule A of the bylaw, using the new hydraulic model as a tool.

This technical memorandum summarizes the methodologies used to estimate the allocated capacities for each participant of the system at select flow monitoring and billing locations.

2. Methodology Overview

Each member municipality and First Nation partner has requested capacity at the new WWTP to meet the future wastewater needs of their municipality. These design capacities were then used to allocate capital costs for the Core Area Wastewater Treatment Program. The planned design capacity of the WWTP is 108 MLD (megaliter per day) measured on the basis of Average Dry Weather Flow (ADWF). The design capacity allocated to each municipality and First Nation partner is shown in Table 1.

Table 1: Allocation of Design Capacity as Measured by ADWF

Participant	% of Total	Design Capacity (MLD)
Colwood	4.35%	4.70
Esquimalt	6.57%	7.10
Langford	13.08%	14.12
Oak Bay	6.13%	6.62
Saanich	30.45%	32.89
Victoria	35.46%	38.30
View Royal	3.28%	3.54
First Nations	0.68%	0.73
Total	**100.00%**	**108.00**

The bylaw update requires the allocated capacity for each participant to be distributed to each applicable metering location, as shown on the draft *Schedule A to Bylaw 2312* attached in Appendix A of this technical memorandum. According to the CRD Core Area Liquid Waste Management Plan (LWMP) McLoughlin WWTP is to provide full treatment for flows up to two times average dry weather flow (2xADWF), and flows that are between 2 and 4xADWF are to receive primary treatment and be blended with the fully treated flows prior to discharge. The maximum allowable flow at the WWTP is 4xADWF. Flows that exceed 4xADWF are allowed to be screened and discharged at Clover and Macaulay pump stations until year 2030. Beyond 2030, it is expected that the municipalities will lower their inflow and infiltration so that the total flow will remain less than 4xADWF. Therefore, 4 x ADWF at each metering location is also provided in the updated bylaw. A 4 x ADWF modelling scenario has also been analyzed to determine capacity upgrade requirements in the CRD trunk sewer system to convey this flow to the WWTP.

Each partner's capacity allocation may enter the CRD system at one or more locations. To asses system capacity, the CRD wastewater hydraulic model has been used to distribute the flow allocations spatially. The steps taken to model the flow in the CRD system include:

- Step 1: Distribute 2016 census population to each residential parcel based on the latest BC Assessment Authority's (BCAA) Actual Use Code (AUC) assigned for each parcel; and estimate Industrial-Commercial-Industrial (ICI) population equivalents (PE) in the non-residential properties based on density assumptions (PE/ha), which are verified by the model dry weather flow calibration process;
- Step 2: Estimate future (2045) populations at a parcel level using the CRD traffic zone population and employee count projections;
- Step 3: Assign each parcel with the participant name and the catchment tributary to each metering location and establish gross catchment and sub-catchment relationships;

- Step 4: Calculate future (2045) ADWF at each metering location for each participant, based on future equivalent population estimates obtained from Step 3 and the future base sanitary flow and GWI rates established in the hydraulic model for each catchment. The calculated future ADWFs (in Table 1) for some members exceed the allocation, and for others fall below the allocation. This is addressed in the following steps;
- Step 5: Summarize total ADWF at McLoughlin Point for each participant and calculate a purchase ratio (allocated ADWF to modelled ADWF) for each participant to match the allocated design capacity;
- Step 6: Apply the purchase ratios to the calculated ADWF in Step 4 at each metering location to obtain allocated capacity for the applicable participant and calculate 4 x ADWF; and
- Step 7: Run hydraulic model with 4 x ADWF loading to identify capacity-deficient trunk sewers.

3. CRD Wastewater Hydraulic Model

The hydraulic model used for this assignment was developed for the *2019 Core Area Wastewater Flow Study*.[1] The population estimates and model loading assumptions have been used as the basis for the flow allocations in this assignment.

3.1 Use of CRD GIS Data

The CRD provided several GIS data layers for the development of existing and future population estimates, including:

- a land parcel GIS layer for the CRD Core Area member municipalities and First Nation partners. The GIS data contains information such as civic address, postal code, governing jurisdiction, and most importantly, existing land uses based on the latest BCAA AUC for each parcel. The AUC identifies the primary purpose or activity for which a property is being held or used;
- a sanitary catchment GIS layer for the CRD Core Area sanitary trunk sewer systems. The GIS data represents the current catchment delineations or service boundaries according to flow monitoring locations. The catchments form the basis for the generation of sanitary flows as model input at each loading junction.
- Figure 1 and Figure 2 show the tributary catchments for the NET/ECI (Northeast Trunk and East Coast Interceptor) and NWT (Northwest Trunk) systems respectively;
- a future growth boundary GIS layer. This GIS data defines the future boundaries within which properties will contribute sanitary flows to the CRD trunk sewer system. Along with other planning information, the GIS data has been used to project future serviced populations and equivalents; and
- Traffic Zone population and employee estimates GIS layers for 2011, 2021, 2031, and 2038. The GIS data contains 576 traffic zones that cover the entire CRD Core Area for this study. Population and employment growth rates for each traffic zone were calculated to forecast and distribute future population and equivalents at each planning horizon. The traffic zone population and employment projections for each member municipality are generally consistent with the numbers presented in the CRD's Regional Growth Strategy (Jan 2018).

[1] Sanitary Model Update and Flow Study, Draft Report prepared for CRD, June 2019, KWL File #283.431

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Capital Regional District

CRD Bylaw 2312 Update

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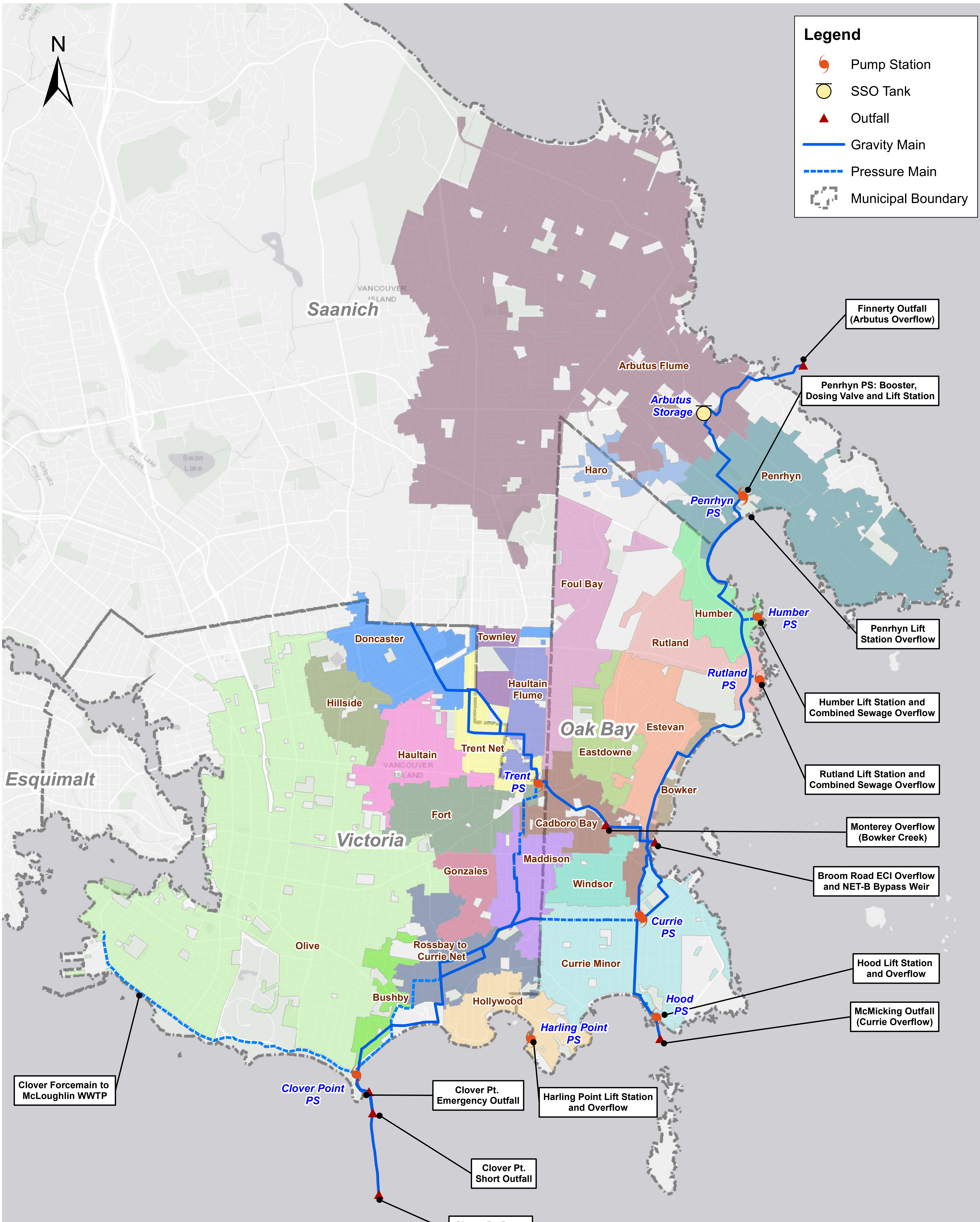

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Service Layer Credits: Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community

Coordinate System: NAD 1983 UTM Zone 10N

Scale Disclaimer: The map scale of 1:40,000 is only valid on a 11"x17" print.

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Date November 2019

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ECI/NET Catchments and System Overview

Figure 1

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Capital Regional District
CRD Bylaw 2312 Update

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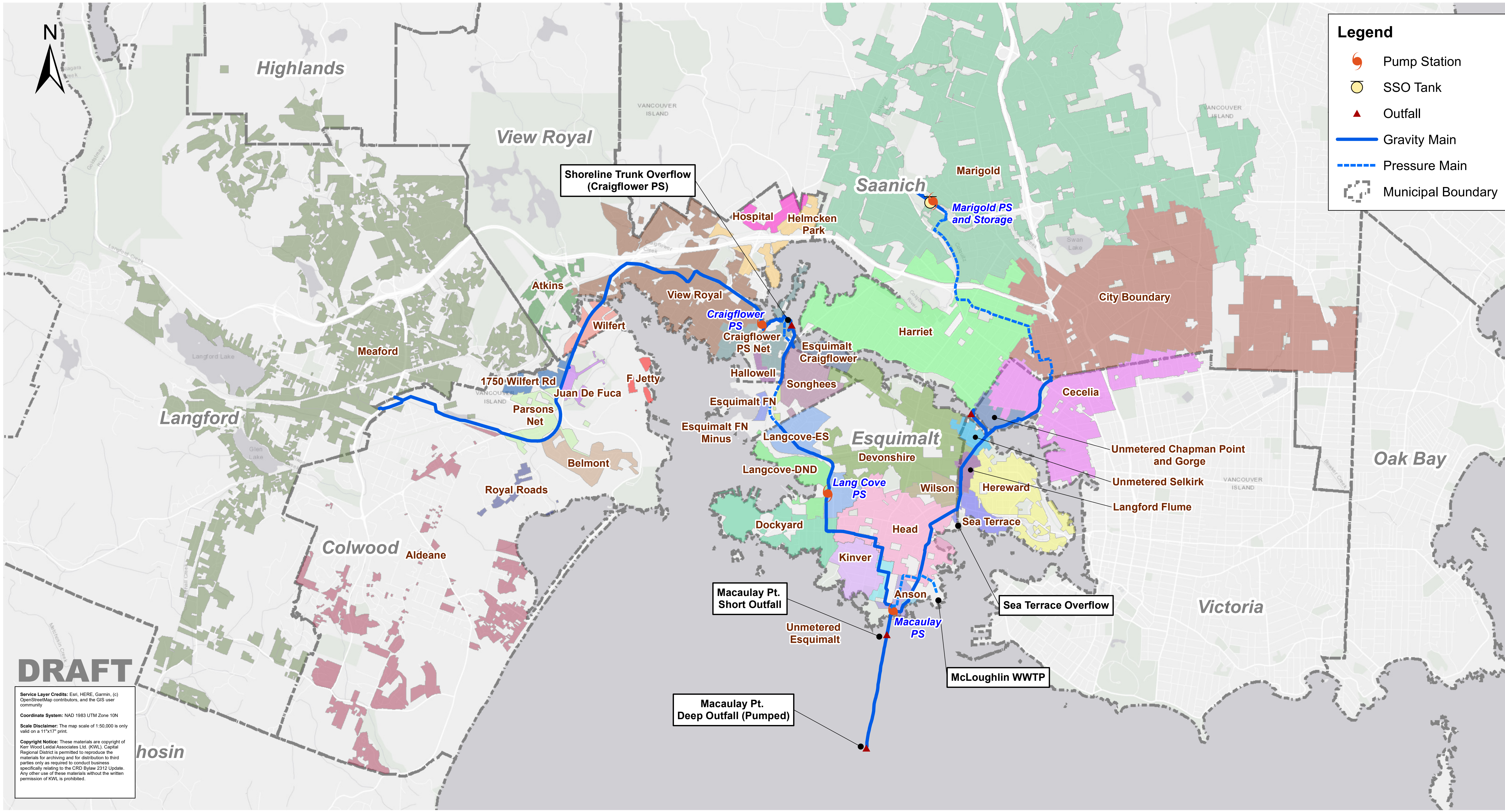

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NWT Catchments and System Overview

Figure 2

3.2 Existing Population Estimates

Existing Residential Population

Residential land use represents single-family detached dwellings and multi-family attached dwellings (duplex, townhouse, condominiums). A census population distribution exercise was conducted to allocate residential people at a parcel level.

KWL acquired 2016 census data from Statistics Canada, along with Dissemination Block Boundary files in GIS format. The files portray the dissemination block boundaries for which 2016 census data are disseminated. A dissemination block is a small area composed of one or more neighbouring blocks and is the smallest standard geographic area for which all census data are distributed. Each dissemination block area has residential population associated with dwelling unit estimates.

Using the 2016 BC Assessment Authority Actual Use Code (BCAA AUC), which describe the land use of each legal lot, the 2016 dissemination block census data was intersected with the parcel GIS layer and distributed to lots where BCAA AUC indicates residential use. The general steps taken to distribute population to each parcel are described below:

- Step 1: Identify census dissemination blocks that contain only single-family residential land use;
- Step 2: For each dissemination block identified in Step 1, allocate average household size (people/ dwelling unit) to each active parcel. The average household size for the dissemination block is calculated as total population in that dissemination block divided by total active parcel count. No people are assigned to inactive parcels where BCAA AUC indicates the parcel is vacant;
- Step 3: calculate the overall average household size for single-family land use from all parcels identified in Step 1;
- Step 4: identify census dissemination blocks that contain residential people, where residential land uses indicate single-family and multi-family;
- Step 5: Allocate the overall average single-family household size (Step 3) to single-family lots identified in Step 4, then calculate total multi-family population for each dissemination block by subtracting single-family populations from the dissemination block total population; and
- Step 6: Distribute the multi-family population to each parcel based on the ratio of the individual parcel area over the aggregated multi-family parcel area in a specific dissemination block.

With the distributed residential population at a parcel level, a GIS analysis was carried out to determine the existing serviced population by overlaying the sanitary catchment layer with the parcel layer. The existing serviced residential populations by participant are shown in Table 2:

Table 2: 2016 Census and Serviced Residential Population Estimates

Participant	2016 Census Population	Serviced Population	Notes
Colwood	16,859	6,616	
Esquimalt	17,655	18,210	Manually adjusted people on DND lands
Langford	35,342	20,298	
Oak Bay	18,094	18,091	
Saanich	114,148	107,140	
Victoria	85,792	84,950	
View Royal	10,408	9,738	
Esquimalt First Nation	N / A	97	Estimated based on dwelling counts
New Songees First Nation	1,842	1,771	

Existing Equivalent Population from Non-Residential Land Use

In order to account for wastewater generation from industrial, commercial, and institutional (ICI) areas, a unit-area method was first applied to each catchment. The general land use categories were applied to each catchment and converted into an equivalent population using the conversion rates in Table 3.

Table 3: Unit-Area Rates for Population Equivalents

Land Use Category	PE/hectare
Agricultural	2
Commercial	60
Downtown Commercial	150
Regional Shopping Commercial	120
Car Wash	180
Industrial	25
Institutional	50
Hospital	120
Mixed Use	90

The values presented in Table 3 represent KWL's ongoing experience with sanitary flow data and model calibration, representing average values that have been observed over time. A detailed analysis of the per-capita loading rates for catchments across the entire Core area indicated that four areas required additional population equivalents to be added (above the unit-area rate method) as follows:

1. **Downtown Core** – the downtown core also supports substantial office space above the retail and commercial areas at street level, therefore additional population equivalents are required to account for this;
2. **UVIC** – the portion of the University of Victoria (UVIC) that contributes to the Haro catchment is monitored by a new meter that allows for better estimation of the total student loading;
3. **DND Belmont** – this area is a Department of National Defense (DND) base, and population equivalents were added to match flow monitoring information; and
4. **Victoria General Hospital** – population equivalents at the hospital located in View Royal were added based on flow monitoring data.

Summary of Existing Serviced Populations

Table 4 summarizes the existing serviced residential, ICI, and total population estimates using the methodologies described above.

Table 4: Summary of Existing Serviced Populations

Participant	Residential Population	ICI Population Equivalent	Total
Colwood	6,616	3,333	9,949
Esquimalt	18,210	5,171	23,381
Langford	20,298	7,768	28,066
Oak Bay	18,091	1,072	19,163
Saanich	107,140	21,925	129,065
Victoria	84,950	39,297	124,247
View Royal	9,738	4,382	14,120
Esquimalt First Nation	97	-	97
New Songees First Nation	1,771	156	1,927
Total	**266,911**	**83,104**	**350,015**

3.3 Future Population Estimates

Population and Equivalent Growth

Except for the City of Langford, future growth of population and ICI equivalents has been estimated based on growth rates derived from the traffic zone future population and employee counts at different timeframes. It is assumed that the growth of ICI population equivalents can be reflected by the growth of employee counts. Therefore, population and employment growth rates from 2011 to 2021, 2021 to 2031, and 2031 to 2038 were calculated for each traffic zone and applied to the existing population and ICI equivalents to obtain 2021, 2030, and 2045 population and ICI equivalent numbers. Where a traffic zone is found to have an existing population and/or ICI equivalent count that is higher than the projected future numbers, the existing numbers have been retained.

For Langford, the future population and equivalents were based on the City's sewer master plan study completed recently (in draft format at present), where the projected future populations based on land use plans are more conservative than the traffic zone projections.

Other municipalities can provide information from their sewer master plans or models to the CRD, and the CRD model can be updated to reflect updated projections to see if there are any impacts on the regional system, but the total allocated flows must not exceed McLoughlin's design capacity of 108 ML/day.

Summary of Future (2045) Serviced Populations

Table 5 summarizes the future (2045) serviced residential, ICI, and total population estimates using the methodologies for growth projection described above.

Table 5: Summary of Future (2045) Serviced Populations

Participant	Residential Population	ICI Population Equivalent	Total
Colwood	34,601	4,980	39,581
Esquimalt	21,234	5,884	27,118
Langford	67,825	13,961	81,786
Oak Bay	18,510	1,176	19,686
Saanich	132,004	27,775	159,779
Victoria	110,020	41,638	151,658
View Royal	15,661	5,139	20,800
Esquimalt First Nation	516	-	516
New Songees First Nation	1,771	156	1,927
Total	**402,142**	**100,709**	**502,851**

3.4 Average Dry Weather Flow Estimates

ADWF is the sum of average domestic flow (ADF) and GWI typically measured in a dry weather flow period in summer. For the hydraulic model development, approximately two months of summer data for years between 2013 and 2018 was analyzed for each flow monitoring site. A suitable allowance for GWI was removed depending on the catchment characteristics, and the ADF was calculated. The ADF was then normalized by the population equivalent estimate to produce a per-capita rate for each catchment.

In order to assess per-capita rates independently of ICI estimates, a total of 25 catchments that are at least 90% residential land use were analyzed. The average of all those sites is 159 L/cap/day.

The CRD has seen notable reduction in the average per-capita water use (and hence sewage produced) since implementation of their rebate program (1994 to 2009). For example, *Options to Encourage Installation of Low-Flow Household Appliances* found the Arbutus catchment reduced from 315 L/cap/day in 1986 to 150 L/cap/day in 2017. [2] This study also indicated that the CRD's 2005 water conservation baseline of 160 L/cap/day (based on 6 L toilets) could be further reduced to 154 L/cap/day (using 4.8 L toilets as specified in the 2012 BC Plumbing Code). Therefore, for modelling existing conditions, the actual sanitary loading rate as observed has been used, with a lower limit of 154 L/cap/day used where the observed value was less.

For future scenarios past 2021, it has been assumed that catchments with per-capita rates above 154 L/cap/day will progress towards that goal at 1%/year (based on a comparison of some sites that were used in both the 2003 *NET/ECI Capacity Deficiency Study* [3] and recent CRD hydraulic model studies of Arbutus, Penrhyn, Esplanade, Currie, Trent, and Hollywood).

To estimate GWI, the minimum hourly flow each night was identified, and the average of the minimum nightly flows over the two-month period was calculated. At this level of analysis, differentiating how much of the minimum flow is groundwater and how much is domestic sewage is an approximation. Based on experience, 85% of the minimum night flow average is taken to be the GWI for most catchments. For the

[2] Options to Encourage Installation of Low-Flow Household Appliances, KWL, October 2017
[3] Northeast Trunk/East Coast Interceptor Upgrade Capacity Deficiency Study, KWL, May 2003

larger catchments, a value of 70% is assumed instead to account for longer transit times and (often) pump stations within the catchment that tend to attenuate the nightly lows. The value can also be lower in catchments where significant industrial activity exists. For areas that are currently outside the existing flow monitoring coverage but are serviced by the CRD Core Area sewer system, GWI rates have been estimated based on weighted average of the nearby or surrounding catchments' GWI rates.

It has also been assumed that the GWI rate (L/ha/day) in the future scenarios is the same as the existing GWI rate. New development in a catchment or connection of existing un-serviced properties with the municipal sewer system will result in additional GWI due to the increase of serviced area.

Based on the above modelling assumptions, ADWF under the future (2045) scenario is calculated for each flow catchment and aggregated by participant, as shown in Table 6.

Table 6: Modelled 2045 ADWF by Participant

Participant	Modelled 2045 ADWF (L/s)	Modelled 2045 ADWF (MLD)
Colwood	79.6	6.9
Esquimalt (incl. DND lands)	68.0	5.9
Langford	170.7	14.7
Oak Bay	53.3	4.6
Saanich	335.0	28.9
Victoria	377.2	32.6
View Royal	42.0	3.6
Esquimalt First Nation	1.0	0.1
New Songees First Nation	6.0	0.5
Total at McLoughlin Point	**1,132.8**	**97.9**

The model results show that estimated 2045 ADWF at McLoughlin Point is 97.3 MLD, less than the design capacity of the WWTP (108.0 MLD). It should be noted that the estimated 2045 ADWF does not include the returned centrate flow (45 L/s) from the residual treatment facility and the leachate flow (39 L/s) from Hartland Landfill. Discharge of these flows can be controlled at the upstream facilities to avoid peak wet weather flow conditions.

To match the allocated capacity for each participant, a ratio of purchased capacity to modelled ADWF for each participant is calculated and applied to the modelled ADWF at each metering location for the applicable participant. The ratios are shown in Table 7.

Table 7: Purchased Capacity Ratios

Participant	Modelled 2045 ADWF (MLD)	Allocated Capacity (MLD)	Ratio of Purchased Capacity
Colwood	6.9	4.7	0.68
Esquimalt (incl. DND lands)	5.9	7.1	1.21
Langford	14.7	14.1	0.96
Oak Bay	4.6	6.6	1.44
Saanich	28.9	32.9	1.14
Victoria	32.6	38.3	1.18
View Royal	3.6	3.5	0.98
Esquimalt First Nation	0.1	0.7	1.21
New Songees First Nation	0.5		
Total at McLoughlin Point	**97.9**	**108.0**	

In summary, 2045 estimated population and equivalent population have been distributed to individual legal lots. The legal lots are each assigned the catchment name they are tributary to (CRD meter location) and the Core Area partner name they are governed by (municipality/FN). At each meter location, the aggregated population and equivalent population are used to generate an ADWF (flow). The total forecast flow for each partner is summed up in Table 7 above, and totals 97.9 MLD. A purchase ratio for each partner is applied so that each partner's flow matches the Allocation Capacity (the total of the allocated capacities is 108 MLD).

A specific example of this is shown in Table 8 below for the Hollywood meter.

Table 8: Hollywood Meter Flow Allocation

Participant	Total Equiv. Population	Modelled ADWF (L/s)	Purchased Ratio	Allocated Capacity (L/s)
Victoria	1,425	3.4	1.18	4.0
Oak Bay	537	1.6	1.44	2.3

The Allocated Capacity for each partner at each meter location is shown on the attached draft map titled *Schedule A to Bylaw 2312*.

3.5 Capacity Deficiency Analysis

The hydraulic model was run with 4 x ADWF loading to identify capacity deficiencies in the conveyance system to McLoughlin WWTP. The model results show that the trunk main from Meaford to the Craigflower Pump Station and the 300 mm dia. Shoreline trunk main are under capacity to convey 4 x ADWF and will require upsizing. The Craigflower Pump Station is also incapable of conveying 4 x ADWF. Capacity upgrade at the Craigflower Pump Station can be achieved by forcemain twinning. These capital upgrades have been identified in the draft *Schedule A to Bylaw 2312*.

4. Summary

This technical memorandum documents the methodology used to estimate the allocated capacities for each participant of the CRD Core Area sewer system at select flow monitoring and billing locations, as shown in the draft *Schedule A to Bylaw 2312*. The flow allocations in the CRD conveyance system are based on the agreed upon allocation of 108 MLD ADWF at McLoughlin WWTP, and this loading has been distributed using the CRD's wastewater hydraulic model. The model uses a lot-by-lot distribution of population and population equivalents to estimate flows during a 4 x ADWF scenario. Model analysis suggests that upgrades (identified on Schedule A to Bylaw 2312) will be required to convey 4 x ADWF to McLoughlin WWTP.

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Encl.: (Draft) Schedule A to Bylaw 2312

Statement of Limitations

This document has been prepared by Kerr Wood Leidal Associates Ltd. (KWL) for the exclusive use and benefit of the Capital Regional District for the CRD Core Area Flow Allocation Methodology Summary. No other party is entitled to rely on any of the conclusions, data, opinions, or any other information contained in this document.

This document represents KWL's best professional judgement based on the information available at the time of its completion and as appropriate for the project scope of work. Services performed in developing the content of this document have been conducted in a manner consistent with that level and skill ordinarily exercised by members of the engineering profession currently practising under similar conditions. No warranty, express or implied, is made.

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Revision History

Revision #	Date	Status	Revision Description	Author
0	February 7, 2020	Final	Final incorporating client comments	HB

OQM CERTIFIED

CRD Core Area Wastewater Service Area Allocated Flow Capacities to Participants

Appendix B

Schedule A to Bylaw 2312 as Amended by Bylaw _____

October 2019

Making a difference...together

1:25,000 NAD 1983 UTM Zone 10N

October 2019 | CoreAreaTrunkSewersAndFlowMeters_v2.mxd | gis@crd.bc.ca

N S E W

Municipal Boundary
CRD Core Area Sewer Service Boundary
DND Areas
1 Wastewater Inflow Allotment at Indicated Location
Existing Sewer Main
Overflow/Outfall
Future Sewer Main
PS Pump Station
TP Treatment Plant

Notes:

1. ADWF = Average Dry Weather Flow (June 1 to August 31). PWWF = Peak Wet Weather Flow. L/s = Litres per second. MLD = Mega Litres per day.

2. The ADWF Allocations are based the Core Area Wastewater Treatment Program where the total ADWF plant capacity of 108 MLD was allocated out to each participant based on their requested capacity.

3. PWWF is based on 4xADWF which the maximum flow allowed at McLoughlin WWTP as approved by the Ministry of Environment. These allocations will be available when the upgrades identified on the map are completed. Capacity upgrade at the Craigflower Pump Station can be achieved by forcemain twinning. Pump upgrades are not required to meet the PWWF allocation.

4. Total peak flows may not add cumulatively at downstream locations due to system attenuation (population-based on Harmon peaking factor).

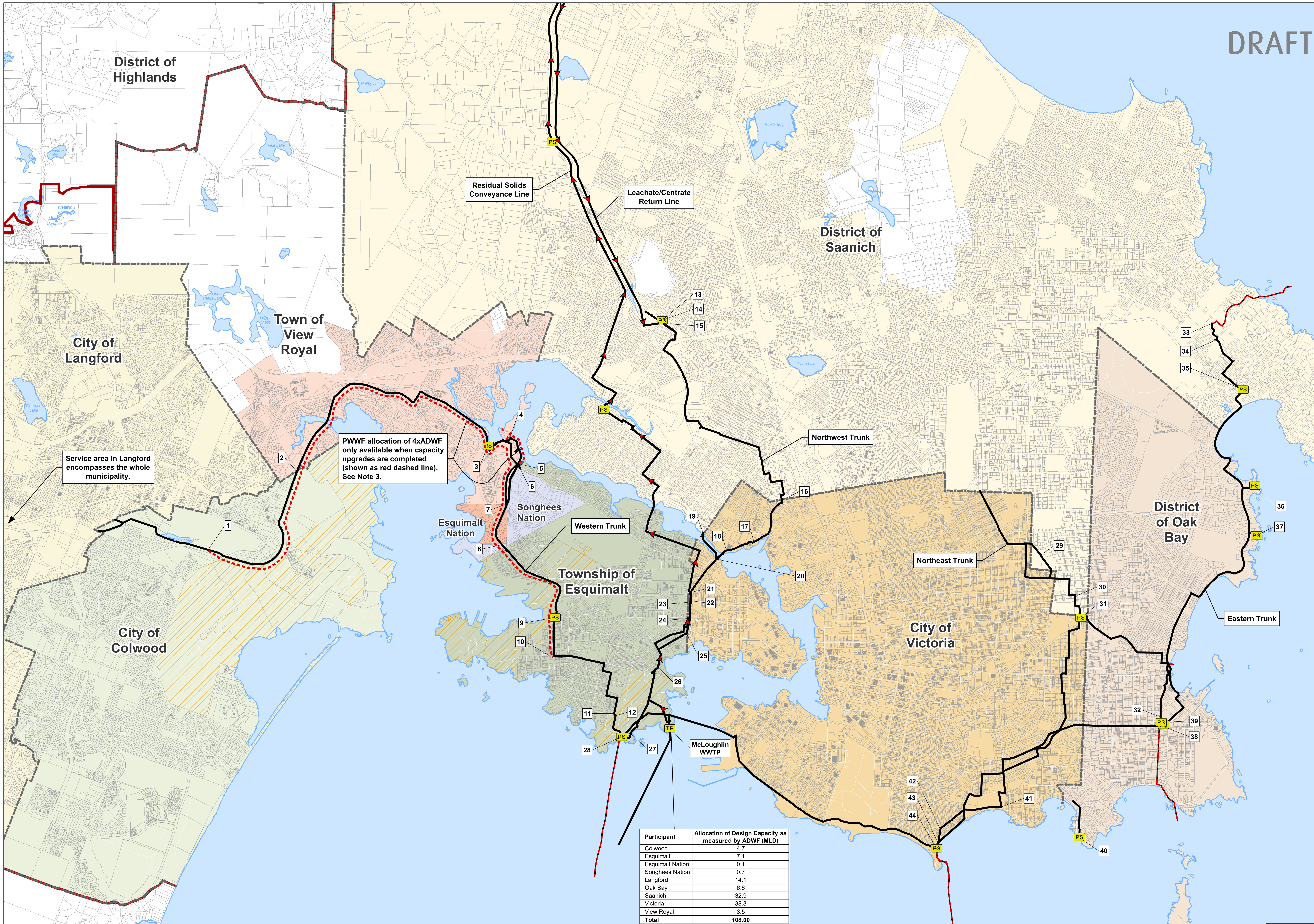
5. Inflow allocations may not add cumulatively to participant totals due to cross boundary connections.

6. Location and extent of future CRD sewers and facilities as depicted are preliminary and may change in accordance with the final system design.

7. Allocations are available up until the capacity at McLoughlin WWTP has been reached. New infrastructure and reallocation of flows will then be required.

8. Note some infrastructure is currently being constructed as part of the Core Area Wastewater Treatment Project but is shown as existing on this map.

9. Flow allocations for Humber and Rutland are based on those catchments being separated from the storm system.



Participant	Allocation of Design Capacity as measured by ADWF (MLD)
Colwood	4.7
Esquimalt	7.1
Esquimalt Nation	0.1
Songhees Nation	0.7
Langford	14.1
Oak Bay	6.6
Saanich	32.9
Victoria	38.3
View Royal	3.5
Total	**108.00**

**See Note 3

Town of View Royal

Inflow ID	Inflow Name	ADWF Allocation (L/s)	PWWF Allocation (L/s)
3	Craigflower PS	41.0	164.0
4	Shoreline Trunk**	1.6	6.4
28	Macaulay Point PS	41.0	164.0
	Total	**41.0**	**164.0**

City of Langford

Inflow ID	Inflow Name	ADWF Allocation (L/s)	PWWF Allocation** (L/s)
1	Meaford	163.5	654.0
	Meaford (Colwood)	0.4	1.4
2	Parsons	163.5	654.0
3	Craigflower PS	163.5	654.0
28	Macaulay Point PS	163.5	654.0
	Total	**163.5**	**654.0**

City of Colwood

Inflow ID	Inflow Name	ADWF Allocation (L/s)	PWWF Allocation** (L/s)
2	Parsons	54.4	217.5
3	Craigflower PS	54.4	217.5
28	Macaulay Point PS	54.4	217.5
	Total	**54.4**	**217.5**

Songhees Nation

Inflow ID	Inflow Name	ADWF Allocation (L/s)	PWWF Allocation (L/s)
6	Songhees Nation	6.8	27.1
4	Shoreline Trunk**	6.8	27.1
3	Craigflower PS	6.8	27.1
8	Maplebank	0.1	0.5
28	Macaulay Point PS	7.3	29.3
	Total	**7.3**	**29.3**

14 Centrate Line

ADWF Allocation (L/s)	PWWF Allocation (L/s)
45.0	45.0

15 Leachate Line

ADWF Allocation (L/s)	PWWF Allocation (L/s)
39.2	39.2

Esquimalt Nation

Inflow ID	Inflow Name	ADWF Allocation (L/s)	PWWF Allocation (L/s)
7	Esquimalt Nation	1.2	4.7
4	Shoreline Trunk**	1.2	4.7
3	Craigflower PS	1.2	4.7
28	Macaulay Point PS	1.2	4.7
	Total	**1.2**	**4.7**

Township of Esquimalt

Inflow ID	Inflow Name	ADWF Allocation (L/s)	PWWF Allocation (L/s)
3	Craigflower PS	1.4	5.7
4	Shoreline Trunk	1.4	5.7
5	Esquimalt Panhandle	1.4	5.7
9a	Lang Cove PS (DND)	5.8	23.1
9b	Lang Cove PS (Esquimalt)	9.0	35.9
10	Dockyard (DND)	6.8	27.2
	Dockyard (Esquimalt)	4.9	19.6
11	Kinver	5.1	20.4
12	Pooley Place	0.7	2.8
21	Devonshire (Esquimalt)	21.0	83.9
	Devonshire (Songhees Nation)	0.4	1.5
24	Wilson (Esquimalt)	4.2	16.6
	Wilson (Victoria)	0.1	0.4
26	Head (DND)	2.9	11.4
	Head (Esquimalt)	16.5	66.1
27	Anson (DND)	2.8	11.2
28	Macaulay Point PS	82.1	328.5
	Total	**82.1**	**328.5**

District of Saanich

Inflow ID	Inflow Name	ADWF Allocation (L/s)	PWWF Allocation (L/s)
13	Marigold PS	152.7	610.9
16	City Boundary	73.2	292.7
19	Harriet	37.8	151.1
28	Macaulay Point PS	266.7	1066.8
29	Townley	2.0	8.2
30	Haultain	6.6	26.3
33	Arbutus	81.9	327.7
34	Haro - Uvic	9.2	36.7
35	Penrhyn LS (Saanich)	10.7	42.9
	Penrhyn LS (Oak Bay)	0.1	0.2
44	Clover Point PS	113.9	455.7
	Total	**380.6**	**1522.5**

City of Victoria

Inflow ID	Inflow Name	ADWF Allocation (L/s)	PWWF Allocation (L/s)
17	Cecelia (Victoria)	33.5	133.9
	Cecelia (Saanich)	2.8	11.0
18	Chapman and Gorge (Victoria)	3.9	15.6
	Chapman and Gorge (Saanich)	0.2	1.0
20	Selkirk (Victoria)	2.6	10.5
	Selkirk (Esquimalt)	0.6	2.3
22	Langford -Vic West (Victoria)	1.9	7.5
	Langford -Vic West (Esquimalt)	0.3	1.3
23	Hereward	22.1	88.2
25	Sea Terrace (Victoria)	3.6	14.5
	Sea Terrace (Esquimalt)	0.2	0.8
28	Macaulay Point PS	67.7	270.6
31	Trent Net (Victoria)	81.5	325.9
	Trent Net (Saanich)	2.9	11.5
41	Hollywood (Victoria)	4.0	15.9
	Hollywood (Oak Bay)	2.3	9.3
42	Olive	266.0	1064.1
43	Clover Net	22.2	88.9
44	Clover Point PS	375.6	1502.4
	Total	**443.3**	**1773.0**

District of Oak Bay

Inflow ID	Inflow Name	ADWF Allocation (L/s)	PWWF Allocation (L/s)
32	Windsor	5.0	19.9
36	Humber	7.1	28.4
37	Rutland	4.4	17.8
38	Currie Net (Oak Bay)	38.5	154.2
	Currie Net (Victoria)	1.9	7.4
	Currie Net (Saanich)	0.6	2.4
39	Currie Lift Station (Oak Bay)	19.2	76.7
	Currie Lift Station (Victoria)	0.03	0.13
40	Harling Point PS	2.3	9.3
44	Clover Point PS	76.6	306.5
	Total	**76.6**	**306.5**