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City of Colwood

# Sewer Master Plan

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Prepared for:  
City of Colwood



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## Executive Summary

This Colwood Sewer Master Plan evaluates the existing sanitary sewer system, outlines a plan for servicing the City of Colwood (City) in its entirety, provides an overview of sanitary sewer alternatives, and discusses potential impacts of a future western communities' wastewater treatment plant. In general, this Sewer Master Plan will provide a summary of the existing system and guidance for making decisions regarding the future system.

The City of Colwood's existing sewer infrastructure system includes 32,000 m of gravity sewer mains, 7,350 m of sewer forcemains, and 8 sanitary sewer lift stations. The system currently services a residential population of approximately 5,420. Additionally, the City's system services commercial properties, Royal Roads University, DND lands, two golf courses, grade schools, and the Juan de Fuca Recreation Centre.

The sanitary sewer system was analyzed for the existing and future development scenario. The capacity analysis of the existing system indicates that for the existing populations, all of the City's sanitary sewers have adequate capacity with the exception of a short section. The depth of surcharge in this section of trunk sewer is minimal and upgrades are not necessary.

Future land-use was developed in order to populate the future modelling scenario. As sanitary sewer infrastructure can have a life span of 50 to 100 years or longer, the future land-use projections were made considering time frames in this range. The analysis of the future scenario indicates that there are some capacity limitations with the existing system. The future scenario 100-year return period peak wet weather flow for the City of Colwood is 685 L/s, or roughly double the City's allocation in the CRD's NWT of 347 L/s.

The Capital Regional District has stated that a wastewater treatment plant will be required in the future to service the western communities. Depending on this location, this wastewater treatment plant could eliminate the need for upgrades to Colwood's and the CRD's existing wastewater infrastructure to accommodate the future scenario flows.

As part of this project, a sewage heat recovery demand and supply analysis was completed. The analysis shows that Colwood Corners should have the highest priority for sewer heat recovery of all the potential opportunities in the City. A potentially promising opportunity identified through previous studies is the siting of a wastewater treatment plant in Royal Bay, which would allow the Royal Bay development to access treated effluent as a heat source.

The proposed sewer master plan is illustrated on Figure 7-1 (keyplan plus 8 drawing sheets). This sewer master plan is the proposed servicing strategy for servicing the entire City for the future land-use scenario. The plan includes sizing of future infrastructure as well as identifying required upgrades. These sizes and upgrades are based on the modelling analysis and results.



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Section 1

# Introduction



## 1. Introduction

### 1.1 Purpose and Intent

This Colwood Sewer Master Plan is intended for the following purposes:

- It provides an evaluation of the existing (2012) Colwood sanitary sewer system. This includes sanitary flows, inflow and infiltration rates and an assessment of the capacities of the existing system.
- It outlines a plan for servicing the City of Colwood in its entirety for future development density. This work includes preliminary layout and sizing of sanitary sewer infrastructure, including gravity mains, forcemains and lift stations.
- It provides an overview of sanitary sewer alternatives. These include potential connections to an adjacent municipality sewer system, sewer routes through private properties where a right-of-way would be required and low-pressure-sewer systems instead of a gravity system.
- It outlines some potential impacts of a future western communities' wastewater treatment plant and discuss the potential for a district energy system.

In general, this Sewer Master Plan will provide a summary of the existing system and guidance for making decisions regarding the future system. The Terms of Reference for this assignment were set by the City of Colwood and are included in Appendix A.

### 1.2 Acronyms and Definitions Used

ADWF = Average Dry Weather Flow

BSF = Base Sanitary Flow

CAWT = Core Area Wastewater Treatment

City = City of Colwood

CRD = Capital Regional District

DES = District Energy System

DND = Department of National Defence

GWl = Groundwater Infiltration

I&I = Inflow and Infiltration

ICI = Industrial, Commercial and Institutional

IMA = Inter Municipal Agreement

LPS = Low Pressure Sewer

LWMP = Liquid Waste Management Plan

NWT = Northwest Trunk (CRD sewer servicing the Western Communities)

PE = Population Equivalent

PF = Peaking Factor

PVC = Polyvinyl Chloride

PWWF = Peak Wet Weather Flow (Peak BSF plus I&I)

RDII = Rainfall Dependant Inflow and Infiltration



WSES = West Shore Environmental Services  
WWTP = Wastewater Treatment Plant

### 1.3 Pump Station Names and Locations

For reference throughout the report, the pump station names and locations (street addresses) are summarized in the following Table 1-1.

**Table 1-1: Pump Station Names and Location**

Pump Station Name	Location
Belmont	340 Belmont Road
Metchosin	3548 Metchosin Road
Ocean	3301 Ocean Boulevard
Pelican	3684 Metchosin Road
Hatley	293 Perimeter Place
Portsmouth	205 Portsmouth Drive
Sewell	873 Cuaulta Crescent
Wilfert	1750 Wilfert Road

### 1.4 System Overview

The City of Colwood existing sewer infrastructure and the properties currently connected to the sewer system are illustrated on the attached Figure 1-1. The Colwood system includes the following components:

- 32,000 m of gravity sewer mains ranging from 150 mm to 600 mm in diameter;
- 7,350 m of sewer forcemains; and
- 8 sanitary sewer lift stations.

The system currently services a residential population of approximately 5,420. Additionally, the City's system (or the CRD system through the City) services commercial properties (primarily along Sooke Road), Royal Roads University, DND lands, two golf courses, grade schools, and the Juan de Fuca Recreation Centre.

### 1.5 CRD Capacity Allocation

The City's sewer system connects to the CRD sanitary sewer system at locations between the Aldeane Avenue and Sooke Road intersection, and the Colwood / View Royal municipal boundary. The flows from Colwood are calculated by the CRD by measuring the flows at the Colwood / View Royal boundary (Parsons Mag Meter) and subtracting the flows from Langford (Meaford Weir).

The maximum allocated capacity in the CRD trunks for the western communities is defined in the CRD Bylaw No. 2312<sup>1</sup>. **The City of Colwood's peak sewage flow allocation in the CRD system is 347**

<sup>1</sup> Capital Regional District (CRD) Bylaw No. 2312, (As amended by Bylaws No. 3028, 3319), Consolidated version authorized in accordance with Bylaw No. 3014, CRD Consolidation Authorization bylaw No. 1, 2002, Liquid Waste Management Core Area Western Communities





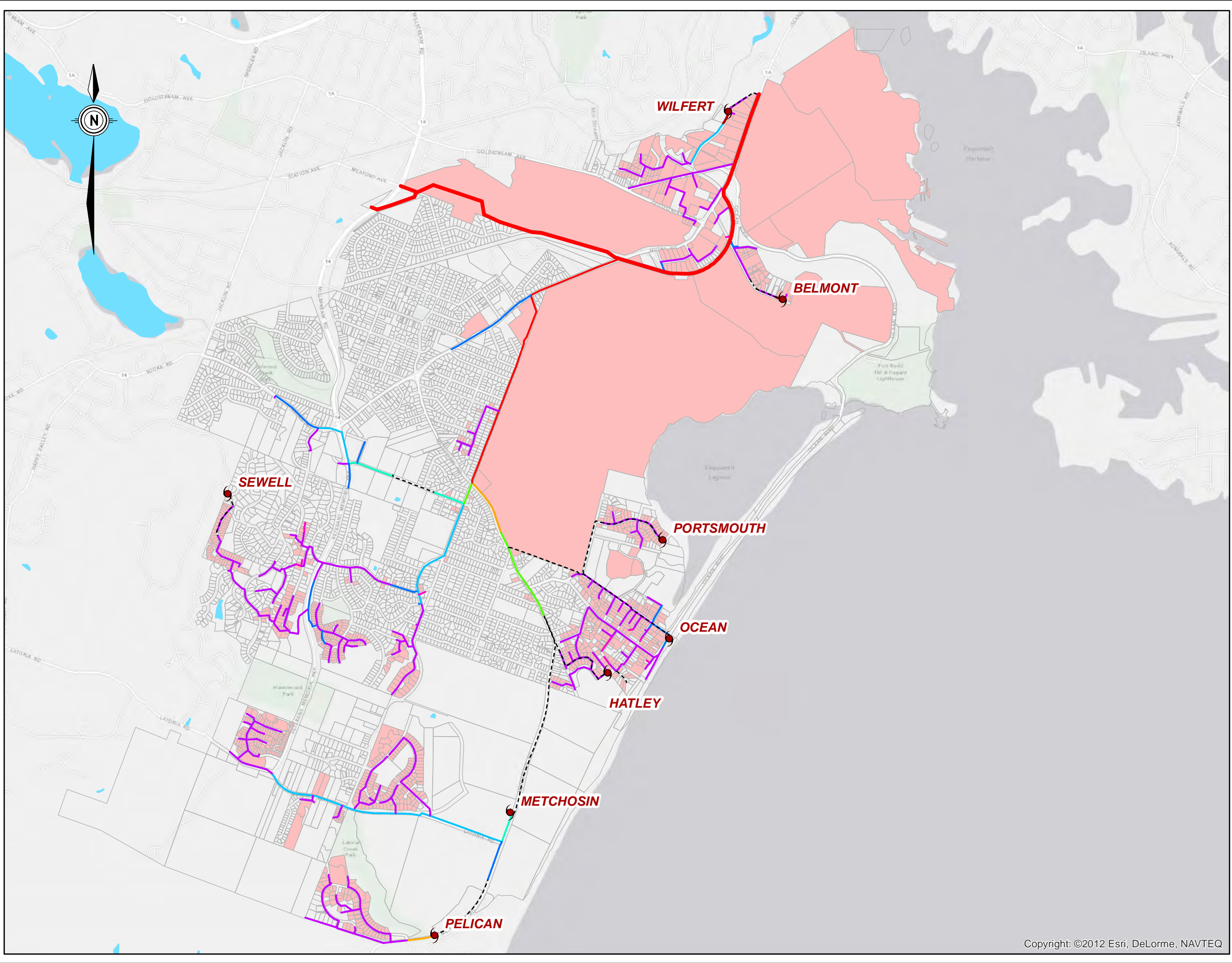
**L/s.** In the event that peak flows from Colwood exceed 95% of the allocated capacity, this triggers required negotiations with the CRD and with the other participating areas for, “reallocation of capacity and the reapportionment of the annual debt cost of participating area facilities for providing increased capacity.”

The City of Langford’s peak sewage flow allocation in the CRD system (upstream of Colwood) is 370 L/s.

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










Establishment Bylaw No. 1, 1995, A bylaw to Convert the Authority for Liquid Waste Management to a Service for the Core Area and Western Communities.

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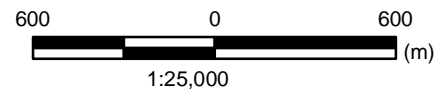
**City of Colwood  
Sewer Master Plan**

**Legend**

-  Sanitary Pump Station
-  CRD Northwest Trunk
-  Forcemains
- DIAMETER**
-  150
-  200
-  250
-  300
-  375
-  450
-  500
-  525
-  600
-  750
-  Existing Serviced Lots



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**Existing Sanitary  
Infrastructure**

**Figure 1-1**

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