March 13, 2026 *Proposal*

Town of Lake Cowichan
39 South Shore Road, PO Box 860
Lake Cowichan, BC V0R 2G0
via email: jas.sandhu@lakecowichan.ca

Attention: Jas Sandhu, Superintendent of Public Works and Engineering Services

RE: *Town of Lake Cowichan – Sewer System Capacity Assessment Engineering Services Proposal*

Thank you for providing TRUE Consulting (TRUE) with the opportunity to submit an engineering services proposal for the preparation of a sewer model for the municipal sewage collection system. It is our understanding that the Town of Lake Cowichan (Town) does not have access to a spatial database of their sewer system and / or does not have a working model of this system. As such, the Town has a significant knowledge gap relating to the existing sewage collection system, which limits decision making abilities by Town staff and elected officials.

Understanding of Sanitary System

According to the Town's Sanitary Sewer System Capacity Study (June 29, 2001) as completed by Bullock Baur, the sanitary sewer collection system includes approximately 24 kms of gravity mains and four lift stations. This sewer collection system serves a 2021 census population of 3,181.

TRUE Consulting understands that the Town intends to utilize a hydraulic model to improve data accuracy, assess existing and future system performance, and identify capacity constraints and infrastructure upgrade requirements. The sanitary model will become an integral component of future sewer system master planning efforts, providing a technically robust and defensible foundation for long-term infrastructure planning, asset management, and capital investment prioritization.

Population and Development Projections

Realistic population projections form the foundation of a reliable hydraulic model. The Town's Official Community Plan (OCP) land use and population growth projections provide key information on anticipated growth patterns and development trends. Particular emphasis will be placed on identifying where future residential and mixed-use development is expected to occur and determining the associated population growth in each catchment area.

Seasonal population fluctuations will also be considered, recognizing that summer activity and tourism contribute additional temporary loading on the Town's sanitary infrastructure. TRUE Consulting will work closely with Town staff to confirm population and development projections for the 5-, 10-, and 20-year planning horizons, ensuring realistic and defendable future demand scenarios.

Design Criteria and Modelling Standards

The sanitary model update will be developed in accordance with the most recent edition of the MMCD Design Guidelines (2022 edition) and the Town's Official Community Plan land-use and population growth projections. Bill 44 (SSMUH) considerations and climate change adaptation principles will also be integrated into the sanitary system analysis and future scenario development.

Data Collection and Review

TRUE will compile and review all relevant data from the Town, including record drawings, as-built information, and prior master planning documents and Bylaws, to ensure a comprehensive understanding of the sanitary sewer system.

Once TRUE staff have a background understanding of the sewer system, the next step will be to collect the field data needed to build the sanitary sewer collection model. Three different options for field data collection have been presented for consideration as follows:

a) **Topographic Survey:** Using GPS, survey all known sanitary sewer manholes and collect pipe invert elevation in each manhole. Approximately 24 km of sanitary sewer pipe and an estimated 500 manholes likely exist in this sewer system. The topographic survey is expected to take approximately 5 to 6 weeks to complete. This estimate is based on collecting data from 3 to 4 manholes per hour complete with time allowances for locating difficult to find / access manholes.

b) **LiDAR and Pipe Invert Measurements:** The Ministry of Water, Land and Resource Stewardship has completed LiDAR work in the Lake Cowichan area, and this dataset is available via LiDAR BC (BCGS Tile Name: 092c090). This resource could be used to locate all known and observable manholes including their coordinates and rim elevations. Although this is not as precise as topographic survey, it can be completed within a matter of days rather than weeks, and is a method used by many Municipalities. This method would still require each manhole having its lid removed and a physical measurement from rim to pipe invert recorded; however, this is not as technically demanding as topographic survey and could be completed by Town staff as a way to reduce project costs (this assumption has been included in TRUE's fee estimate). It is expected that 4 to 5 manholes per hour could have pipe invert information collected if all manholes are located and exposed prior to inspection. Pipe invert data collection is expected to require 4 weeks.

c) **LiDAR and Pipe Slope Assumptions:** This is the least accurate method of preparing the model and involves using LiDAR to locate visible manholes and their rim elevations similar to option b above. Pipe slopes between manholes would typically be assumed based on ground contours or minimum pipe grade depending on what is most reasonable to assume for that particular run of pipe. Record drawing information can also be utilized to further clarify any issues that arise when preparing the sewer model under this method.

   - Of note, the Town's Sanitary Sewer System Capacity Study (June 29, 2001) as completed by Bullock Baur included printouts of modelling results completed at that time. These printouts included pipe slopes, and, within the body of the report, it was

described that record drawings were carefully reviewed during preparation of the original sewer model.

- Also of note, both TRUE and Town staff have repeatedly attempted to obtain the original sewer model from another engineering firm and have not yet had success.
- TRUE had staff on site on another project during the week of March 2nd, 2026 and took that opportunity to obtain rim and invert spatial data for each manhole located immediately upstream of the Town's lift stations. This information could therefore be utilized as the basis for TRUE's GIS team prepare a GIS sewer composite as follows:
    - Digitize the sewer composite from the Bullock Baur report.
    - Assign rim elevations for manholes based on provincially available LiDAR.
    - Digitize modelling printouts from the Bullock Baur report.
    - Calculate each manhole invert based on the recorded spatial invert of each manhole located upstream of a lift station **and** the historical pipe slopes from the Bullock Baur report.

Based on discussions with Town staff, field data collection Option C is considered the most financially desirable option to form the basis for the proposed sewer model. Of note, the Town's chief sewer operator should be made available via video conference for a minimum of 4 hours to review the completed GIS sewer composite and confirm any additional sewer infrastructure that has been constructed in the period since 2001. Ideally, record drawings for any additional sewer infrastructure could then be provided to TRUE. TRUE would then update the sewer model to reflect current day conditions.

Updated system data, including lift station records (4 sites), catchment boundaries, and flow monitoring information (from the Town's previously completed I&I study), will be incorporated to reflect current conditions. It will be important for the Town to provide the following information:

- Daily total flow data entering the wastewater treatment facility for a minimum of 5 years (January 2021- December 2025) from the Town's SCADA system. This data will be important for validating the overall sewer model and ensuring that accurate future flow projections are provided.
- Daily total flow data related to each lift station for a minimum of 5 years (January 2021-December 2025) from the Town's SCADA system. This data will assist with TRUE determining I&I impacts and catchment area flows.
- Lift station flow data for a period of peak dry weather flow on a 5-minute basis. It is best for the daily flow data to be provided to TRUE prior to this dataset being obtained from the Town's SCADA system. This dataset will assist TRUE with determining a diurnal curve for each catchment area. If possible, a similar dataset should be provided for flow entering the Town's wastewater treatment facility.
- Lift station pump curves. If this information is not available, the pump specification should be provided so TRUE staff can obtain the corresponding pump curve.

Model Development and Calibration

TRUE will prepare a PCSWMM sanitary sewer model using previously prepared PDF composite mapping, survey data, historical reporting, and record drawings to ensure an accurate representation of the Town's sanitary infrastructure, which includes approximately 24 km of mains, four lift stations, and about 500 manholes. TRUE prefers to utilize PCSWMM, which is fully compatible with EPASWMM and provides enhanced functionality, improved integration with GIS, and a more user-friendly interface for model visualization and scenario analysis.

Available flow monitoring and SCADA data from the Town's lift stations will be integrated to calibrate the model under both dry- and wet-weather conditions, ensuring reliable simulation of flows and system performance. Calibration will include verification of d/D ratios, peak factors, and infiltration/inflow (I&I) assumptions in accordance with the MMCD Design Guidelines.

Model performance will be validated by comparing simulated flows to observed data from lift stations and flow monitoring points. Based on projected population growth and anticipated development identified through the Town's Official Community Plan, future wastewater loading will be calculated and allocated across catchments according to base sanitary flow contributions, ensuring the model accurately represents both current and 20-year future conditions for the Town.

Based on I&I measurements (previously completed by others) and observed flow data, further analysis will quantify I&I contributions, identify likely sources, and recommend targeted reduction measures to improve system sustainability and cost-effectiveness.

TRUE will also develop future scenario models based on forecasted wastewater loading associated with potential development and growth areas, providing the Town with a flexible tool for evaluating infrastructure capacity under multiple future conditions.

Sanitary System Capacity Assessment and Recommendations

TRUE will assess the Town's existing sanitary system using PCSWMM, with results documented and presented for Town review and consideration. The assessment will include analysis of both existing and future conditions, supported by GIS-integrated mapping with capacity identifiers, including:

- d/D ratios for gravity sewers (depth-to-diameter ratio).
- System performance indicators for pump stations and forcemains (e.g., available capacity and head).

A summary table will be prepared identifying all deficient and near-deficient components within the sanitary system, including:

- Gravity mains with d/D > 0.5 (near deficient) and d/D > 0.8 (deficient).
- Pump stations or forcemains operating near or above capacity.

Recommended upgrades will be highlighted to address identified deficiencies and optimize system performance. It is noted that specific recommended upgrades to address highlighted deficiencies will not be included as a project deliverable. Typically, those types of recommended

upgrades and accompanying Class D cost estimates are better included in master planning documents. Recommendations will include:

- Conduit upgrades: Replacement or upsizing of gravity mains and forcemains where capacity issues are identified. It is important o note that theoretical sewer capacity assumes the pipe diameter is available as a fully open area to pass flow. The theoretical capacity could be impacted by defects in the pipe condition (structural or maintenance issues). Sewer pipe condition is not proposed to be assessed as part of the project scope.
- Pump station upgrades: Improvements to pumps to address capacity concerns.
- System optimization measures: Strategies to improve efficiency, reliability, and resiliency of the overall collection system network.

The Final Report will be submitted to the Town in draft format for review. The plan will be finalized based on any comments received and then submitted to the Town in both paper and digital form. All digital support files will also be submitted including mapping, GIS, CAD, photos and updated hydraulic model (PCSWMM format).

Please note that this scope of work will include modelling existing and projected flows from the Ts'uubaa-asatx First Nation's (TFN) Indian Reserve #1 and future additions to reserve (i.e. District Lot 27 and Nenkis). Upgrades to the Town's sanitary sewer system triggered in part or wholly by future development by the TFN will be summarized in final reporting.

Fee Estimate and Closing

TRUE Consulting tracks time and invoices not solely based on a standard rate 'per employee' but instead based on the 'role' filled at various stages of the project. Some employees will fill a single role for the duration of the project; however, it is possible that certain employees will fill more than one role depending on the project stage. Fees are proposed to be based on the charge out rates included in the attached task-fee schedule:

The overall fee estimate, as determined in the attached task-fee schedule, of $74,600 has been based on data collection Option C (LiDAR and Pipe Slope Assumptions), as described in the above section. Feedback from Town staff related to the other noted data collection options would be welcome. The following impacts to the projected project budget based on the Town picking another data collection option are anticipated to be as follows:

- Data Collection Option A is anticipated to result in an increase to the project budget of about $50,300 (not including GST)
- Data Collection Option B is anticipated to result in an increase to the project budget of about $29.700 (not including GST).

This fee estimate is inclusive of all costs, including professional fees and disbursements as outlined in the proposal. Applicable taxes (GST) are not included in this fee estimate.

TRUE will only invoice for hours worked and will not exceed the value of our fee estimate without prior authorization. Our invoices will be prepared on a monthly basis, including a description of

works completed (in relation to the tasks identified in this proposal) and a monthly breakdown of hours spent by each staff member.

Yours truly,

TRUE CONSULTING

Sean Curry, P. Eng.

SAC/NA

Enclosure: Engineering Services Task-Fee Schedule & DRAFT Professional Services Agreement

Town of Lake Cowichan - Sewer Model Preparation
Engineering Services Task-Fee Schedule

		TRUE Consulting									
TASK	TEAM MEMBER / Hourly Rate	Engineer of Record $219	Project Engineer (EIT) $168	GIS Lead $169	Project Technologist $160	GPS Survey $221	Administration $96	TRUE Hours	TRUE Fees	TRUE Disb.	TOTAL Fees & Disb.
Option A: Topographic Survey											
A 1.0	Desktop review and site meeting with Town Staff and Operators.	15	10				5	30	$5,445	$1,500	$6,945
A 2.0	Review existing lift station flow and pump run hours (provided by others).	2	25				15	42	$6,078		$6,078
A 3.0	Calculate existing flows for model validation.	2	15				3	20	$3,246		$3,246
A 4.0	Data collection: Topographic survey.			25	40	200	10	275	$55,785	$15,000	$70,785
A 5.0	Prepare sanitary sewer model and identify collection system constraints.	5	80	10	30			125	$21,025		$21,025
A 6.0	Prepare project reporting.	25	35	15	15		5	95	$16,770		$16,770
									Total Option A (Rounded):		**$124,800**
Option B: Lidar and Pipe Invert Measurements											
B 1.0	Desktop review and site meeting with Town Staff and Operators.	15	10				5	30	$5,445	$1,500	$6,945
B 2.0	Review existing lift station flow and pump run hours (provided by others).	2	25				15	42	$6,078		$6,078
B 3.0	Calculate existing flows for model validation.	2	15				3	20	$3,246		$3,246
B 4.0	Data collection: LiDAR and field measurement pipe inverts *assumes field measurements provided by Client.	5	10	20	200			235	$38,155	$12,000	$50,155
B 5.0	Prepare sanitary sewer model and identify collection system constraints.	5	80	10	30			125	$21,025		$21,025
B 6.0	Prepare project reporting.	25	35	15	15		5	95	$16,770		$16,770
									Total Option B (Rounded):		**$104,200**
Option C: Lidar and Pipe Slope Assumptions											
C 1.0	Desktop review and site meeting with Town Staff and Operators.	15	10				5	30	$5,445	$1,500	**$6,945**
C 2.0	Review existing lift station flow and pump run hours (provided by others).	2	25				15	42	$6,078		**$6,078**
C 3.0	Calculate existing flows for model validation.	2	15				3	20	$3,246		**$3,246**
C 4.0	Data collection: LiDAR and pipe slope assumptions based on topography.	5	10	40	60	4	5	124	$20,499		**$20,499**
C 5.0	Prepare sanitary sewer model and identify collection system constraints.	5	80	10	30			125	$21,025		**$21,025**
C 6.0	Prepare project reporting.	25	35	15	15		5	95	$16,770		**$16,770**
									Total Option C (Rounded):		**$74,600**

Prepared By: Sean Curry, P.Eng.
Reviewed By: Natalie Alteen, P.Eng.
Date: March 16, 2026