

Environmental Assessment Registration Document

Route 70 Water and Sewer

Route 70 Water and Sewer
Victoria, NL

EA Registration Document - Version 0A

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eNGLOBE

Town of Victoria

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Registration Form

PURSUANT TO SECTION 49 (1) OF
THE ENVIRONMENTAL ASSESSMENT REGULATIONS 54/03
ENVIRONMENTAL PROTECTION ACT

1 The Proponent

Name of Proponent: The Town of Victoria

Principal Contact Person for purposes of Environmental Impact Assessment

Name: Shelly Butt

Official Title: Town Clerk Manager

Telephone: 709-596-3783

Email: shelly@townofvictoria.ca

Property Ownership

This project is located on Route 70, from route 70/74 intersection to Bottom Loop Road in the municipality of Victoria, on the Northeast Avalon Peninsula of Newfoundland and Labrador.

2 The Undertaking

2.1 Name of the Undertaking

Route 70 Water & Sewer - The Town of Victoria.

2.2 Project Overview

The proposed undertaking involves the replacement and upgrading of municipal water distribution and sanitary sewer infrastructure along Route 70 in the Town of Victoria, Newfoundland and Labrador, extending from the Route 70/74 intersection to Bottom Loop Road Road. The project includes the replacement of approximately 825 metres of water mains and 720 metres of sanitary sewer mains, the installation of 14 sanitary manholes, and associated road reconstruction and surface reinstatement within the existing roadway corridor.

The work will be carried out primarily within the existing Route 70 right-of-way and will include excavation, installation of new underground services, connection to existing municipal infrastructure, pressure testing, commissioning, and final restoration of disturbed areas. Temporary traffic control measures will be implemented during construction to maintain safe access for residents, businesses, and through traffic.

Construction activities are anticipated to occur during a single construction season and will be undertaken in accordance with applicable provincial and municipal standards, including the Municipal Infrastructure Division's Water, Sewer, and Roads Master Construction Specifications. The project will also incorporate climate resilience considerations consistent with the Newfoundland and Labrador Climate Change Lens requirements.

The following work will be undertaken by the Proponent for the new underground infrastructure:

- removal and replacement of existing watermains and sanitary sewers;
- installation of new PVC water and sewer mains, replacement of approximately 14 sanitary manholes, reconnection of existing water and sewer services to the property line, and replacement of select culverts.
- Installation of a new fused HDPE watermain to cross beneath the Salmon Cove River, while maintaining existing bridge structures.

Construction will be completed primarily by open-cut trenching within the roadway, followed by roadway rehabilitation including asphalt resurfacing and restoration of disturbed areas to pre-construction conditions.

2.3 Purpose / Rationale / Need for the Undertaking

The purpose of the undertaking is to restore and improve the reliability of the Town of Victoria's primary water supply and sanitary sewer infrastructure along Route 70. Existing water and sewer systems in this corridor are aging and have experienced frequent leaks, breaks, pressure loss, and operational deficiencies, which pose risks to public health, service continuity, and environmental protection.

The need for the project arose after it was determined that the existing infrastructure along Route 70 required priority replacement to ensure the continued delivery of safe, potable drinking water and adequate wastewater collection and disposal for the majority of the community. Without replacement, the likelihood of further system failures, service interruptions, emergency repairs, and potential environmental impacts would continue to increase.

The undertaking will address these issues by replacing deteriorated infrastructure with modern systems designed to meet current standards, improve system performance, reduce water loss, and enhance long-term service reliability. The project also supports sustainable community development by extending the service life of critical municipal infrastructure and reducing the need for ongoing reactive maintenance and emergency response.

2.4 Project Location

The proposed undertaking is located in the Town of Victoria, Newfoundland and Labrador, along Route 70, extending from the Route 70/74 intersection to Bottom Loop Road. The project corridor lies within an established municipal roadway right-of-way and includes multiple intersections with local roads and existing watercourse crossings.

A key feature of the project location is the crossing of the Salmon Cove River, a known salmon-bearing watercourse, as well as Clarkes Brook, both of which flow beneath Route 70 through existing bridge and culvert infrastructure. The proposed water main alignment crosses these watercourses within the existing roadway corridor, in proximity to the existing bridge structure.

All works associated with the river and brook crossings will occur within previously disturbed areas associated with the roadway and existing municipal infrastructure. No new permanent access roads or right-of-way expansions are proposed beyond the existing limits of Route 70.

2.4.1 General Site Considerations

The project will be constructed within an active municipal roadway corridor characterized by paved road surfaces, roadside ditches, culverts, overhead utilities, and adjacent residential and commercial development. Construction activities will occur in close proximity to existing traffic, private properties, and municipal services, requiring staged construction, traffic control measures, and ongoing coordination with the Town of Victoria.

The project will be constructed in accordance with applicable Municipal Infrastructure Division standards, occupational health and safety requirements, and approved permits. Climate resilience considerations will be integrated into the design to address future precipitation patterns and infrastructure durability, consistent with the Newfoundland and Labrador Climate Change Lens requirements.

2.4.2 Watercourse and Fish Habitat Considerations

The project includes a water main crossing of the Salmon Cove River, a salmon-bearing watercourse, and Clarkes Brook, both of which are considered environmentally sensitive features. The crossing will be completed by installing a continuous fused section of HDPE water main beneath the riverbed, as shown on the Issued for Approval drawings.

This installation method has been selected to:

- Avoid in-stream obstructions or permanent structures within the active channel
- Minimize long-term impacts to fish passage and aquatic habitat

- Reduce the risk of future exposure or damage to the water main during high-flow events or ice movement.

Construction in the vicinity of the watercourses will require careful management to prevent sedimentation, erosion, or accidental release of deleterious substances to surface waters. All in-water or near-water works will be completed in accordance with applicable provincial and federal regulatory requirements, including any timing restrictions to protect fish and fish habitat. The project will be undertaken within an active municipal roadway environment and will require careful consideration of traffic, public safety, and existing infrastructure. Construction activities will occur in proximity to residential and commercial properties, requiring ongoing coordination to maintain access and minimize disruption.

Stormwater management and erosion control will be important considerations during construction, particularly during excavation and trenching activities. Appropriate erosion and sediment control measures will be implemented to prevent the migration of sediment to adjacent lands or drainage features.

2.4.3 Other Location Considered

Alternative locations and installation methods for the water main crossing of the Salmon Cove River were considered during the design phase. In particular, the use of the existing bridge structure to support or suspend the water main was evaluated. This option was determined to be infeasible due to structural limitations, clearance constraints, and constructability concerns associated with the existing bridge, as well as the potential for increased long-term maintenance and risk of damage during high-flow or ice conditions. Realignment of the water main to avoid the river crossing was also considered but was not practical due to roadway geometry, property constraints, and the need to maintain service continuity within the Route 70 corridor. As a result, the selected location follows the existing roadway alignment and crosses the river by installing a continuous fused HDPE water main beneath the riverbed, which minimizes disturbance to the watercourse and avoids permanent in-stream infrastructure.

2.4.4 Zoning

The project corridor is located within an established municipal roadway right-of-way and is in proximity to several surface water features, most notably the Salmon Cove River, a salmon-bearing watercourse, and Clarkes Brook, which both cross beneath Route 70 within the project limits. In addition, roadside ditches and low-lying areas adjacent to the roadway may function as minor drainage features and localized wetland habitat. The proposed water and sewer works will occur primarily within previously disturbed areas; however, construction activities near these watercourses will require careful management to prevent erosion, sedimentation, and potential effects on aquatic habitat. The water main crossing of the Salmon Cove River will be completed using a continuous fused HDPE pipe installed beneath the riverbed, thereby avoiding permanent in-stream structures and minimizing disturbance to the active channel and adjacent riparian areas.

2.4.5 Proximity to Wetlands and Watercourses

The project corridor is in proximity to several surface water features, most notably the Salmon Cove River, a salmon-bearing watercourse, and Clarkes Brook, both of which cross beneath Route 70 within the project limits. These watercourses are located within defined channels associated with riparian vegetation and localized aquatic habitat. In addition, roadside ditches and low-lying areas adjacent to the roadway convey surface drainage and may provide limited wetland or wetland-like functions.

Geotechnical conditions near the watercourse crossings indicate variable subsurface materials, including granular alluvium, glacial till, and shallow refusal layers, which may influence excavation methods and groundwater management during construction. The water main crossing of the Salmon Cove River will be installed beneath the riverbed using a continuous fused HDPE pipe, thereby avoiding permanent in-stream structures and minimizing disturbance to the active channel and adjacent riparian areas.

2.5 Physical Components and Dimensions of the Project

2.5.1 Land Requirements

The proposed works will be completed entirely within the existing Route 70 roadway right-of-way and previously disturbed municipal lands in the Town of Victoria. No permanent land acquisition or new property access is required for the project. Temporary use of land within the road right-of-way may be required during construction for equipment access, material storage, and trench excavation; however, all disturbed areas will be restored to pre-construction conditions following completion of the work. No changes to existing land ownership, land use designation, or long-term land availability are anticipated as a result of the project.

2.6 Construction Details

The preliminary schedule for the project is shown below, it shall be noted that the schedule below is dependent on environmental constraints that are yet to be confirmed. It is our recommendation that this project be tendered in Spring 2026 with a planned construction of Summer 2026.

The following preliminary schedule has been developed for the project. The exact timing of each component will be refined as the project progresses depending on the actual time taken to complete the preceding task(s).

Table 1: Preliminary Schedule

Task	Task Milestone Date
Topographic Survey	COMPLETE
33% Package	COMPLETE
66% Package	COMPLETE
99% Package	March 27, 2026
IFT Package	April 3, 2026
Tender Date	April 8, 2026
Tender Close	April 22, 2026
Contract Award	April 24, 2026

Task	Task Milestone Date
Construction Start	May 11, 2026
Substantial Performance	October 26, 2026
Construction End	November 9, 2026
10 Month Warranty Inspection	September 9, 2027
Project Completion	November 9, 2027

The estimated hours of construction will be from Monday to Friday between 7:00 A.M. and 5:00 P.M..

The following equipment is anticipated to be used for the construction procedures:

- Earthworks: Excavators, backhoes, loaders, dump trucks, compaction equipment.
- Pipe Installation: Excavators, drilling equipment as required, pipe fusion equipment

Potential sources of pollutants during the construction period are anticipated to include:

- Exhaust and other emissions from construction equipment.
- Noise from construction equipment.
- Water during drilling. The run-off water from the drilling operation will be controlled by the installation of erosion control structures. Typical installation for a drilling site includes utilizing site-specific measures to manage and direct the flow of water, installation of erosion control structures (silt fencing and/or hay bales), and utilization of the existing vegetated land where possible to minimize the effect on nearby streams. If necessary, a small sedimentation pond and ditch may be constructed to improve the control drill cuttings and run-off water.
- Silt from disturbed surface areas. This will be minimized by requiring the contractor to install silt fences and other erosion protection devices prior to ground disturbance and to reinstate disturbed areas as soon as is practical.
- Petroleum hydrocarbons from possible leaks, spills, or accidents from construction equipment and vehicles. This will be minimized by requiring the Contractor to have spill kits on-site and to conduct daily inspections of his equipment. No refueling or maintenance of vehicles will occur within 30 m of watercourses.

As a result of previous land use and current construction activities, it is not anticipated that significant site work (gravel, grading, etc.) will be required to provide access for the drilling equipment. Minimal site work may be required to properly direct drilling water, to be confirmed during a pre-drilling meeting on-site with the Contractor.

2.7 Operation and Maintenance Details

Once construction is complete, the water and sewer infrastructure will form part of the Town of Victoria’s municipal servicing system and will be operated and maintained in accordance with standard municipal practices. Routine operation will be passive and will not involve any interaction with adjacent watercourses or wetlands. Ongoing maintenance activities may include periodic inspection, valve operation, flushing, and emergency repair if required, all of which would typically occur within the roadway right-of-way. The buried HDPE water main crossing beneath the Salmon Cove River is

designed to minimize long-term maintenance requirements and reduce the risk of exposure or damage during high-flow or ice conditions. No operational discharges, emissions, or alterations to the river channel or riparian areas are anticipated during the operational life of the infrastructure.

2.8 Future Modification, Extensions, or Abandonment

No future modifications or extensions to the proposed water and sewer infrastructure are anticipated beyond routine maintenance and repair activities typical of municipal servicing systems. Should future upgrades, extensions, or alterations be required as part of separate projects, they would be subject to applicable municipal, provincial, and federal approvals at that time. In the event that any portion of the infrastructure is decommissioned or abandoned in the future, abandonment would be completed in accordance with accepted municipal and regulatory practices, with infrastructure either removed or safely abandoned in place to prevent environmental effects.

2.9 Occupations

This project will be carried out to promote equity and fairness and, where possible, establish a workplace that is free of barriers.

The various types of occupations anticipated for this project include:

Occupations	National Occupation Classification (NOC) Code	Number of Proposed Workers
Civil Engineers	21300	2
Structural Engineers	21300	1
Engineering Technicians	22300	2
Road Surveyors	21203	1
Heavy Equipment Operators	73400	4
Drillers and Blasters	73402	2
Carpenters	72310	2
Heavy Equipment Mechanics	72401	1
Labourers	75110	1
Truck Drivers	73300	1
Concrete Finishers / Technicians	72014	2
Material Technicians and Engineers	22300	1
Steel Erectors	72010	4

Occupations	National Occupation Classification (NOC) Code	Number of Proposed Workers
Senior Environmental Professional	21110	1

2.10 Project-Related Documents

The following project-related documents are referenced throughout this document:

- Englobe Corp. (2025). Geotechnical Investigation Report. Route 70 Water & Sewer Extension & Road Upgrading

3 Description of the Existing Environment

3.1 Physical and Natural Features

The project is located within the existing Route 70 roadway corridor in the Town of Victoria and traverses a broad, shallow river valley associated with the Salmon Cove River, which is crossed approximately midway along the alignment. Topography along the corridor descends approximately 10 m toward the river crossing and rises similarly beyond it, corresponding to an average roadway grade of approximately 1.8 percent on either side of the river. The roadway also crosses Clarkes Brook near the northern extent of the project via an existing concrete arch culvert.

Subsurface conditions within the project limits consist primarily of previously disturbed roadway materials, including asphalt pavement underlain by crushed granular aggregate and compact fill. Beneath the fill, native soils generally consist of silty sand and glacial till, with refusal encountered at relatively shallow depths, interpreted to be dense cobble- and boulder-rich material and/or shallow bedrock. Groundwater was not encountered during the geotechnical investigation; however, groundwater levels are expected to fluctuate seasonally and during periods of heavy precipitation, particularly near watercourse crossings. Natural features within the project area are largely confined to the defined channels and riparian zones of the Salmon Cove River and Clarkes Brook, with the remainder of the corridor characterized by maintained roadside vegetation and disturbed soils associated with long-standing roadway and municipal infrastructure.

3.2 Site Topography and General Surface Drainage Regime

The Route 70 roadway follows existing grades that reflect the natural valley associated with the Salmon Cove River. Based on geotechnical and topographic information, the roadway descends approximately 10 m over a distance of roughly 550 meters toward the river crossing and rises similarly beyond it. Surface drainage within the project limits is controlled by the roadway crown, shallow roadside ditches, and existing culverts at watercourse crossings and driveway entrances. These features convey runoff toward nearby watercourses, including the Salmon Cove River and Clarkes Brook.

The geotechnical investigation did not observe groundwater seepage during subsurface exploration; however, site soils are moisture sensitive and drainage conditions may vary seasonally. Surface runoff and localized groundwater infiltration are expected to increase during periods of heavy precipitation and snowmelt. Construction and restoration activities will be undertaken within this established drainage framework and will be designed to maintain existing surface drainage patterns following completion of the works.

3.2.1 Significant Natural and Managed Areas

Significant natural features within and adjacent to the project area include the Salmon Cove River, a salmon-bearing watercourse crossed approximately midway along the Route 70 corridor, and Clarkes Brook, which is crossed near the northern extent of the project via an existing concrete arch culvert. These watercourses are associated with defined channels, riparian vegetation, and localized aquatic habitat and represent the primary environmentally sensitive features within the study area. The surrounding terrain forms a broad, shallow river valley at the Salmon Cove River crossing, with natural drainage patterns influenced by local topography and glacial soils.

Managed areas within the project limits include the paved Route 70 roadway, gravel shoulders, roadside ditches, culverts, utility corridors, and adjacent disturbed lands associated with residential driveways and municipal infrastructure. Based on the geotechnical investigation, subsurface conditions within the managed corridor consist largely of previously placed roadway fill, compact glacial till, and localized sand deposits, with shallow refusal encountered in some areas. Vegetation within the managed areas is primarily maintained grass, roadside vegetation, and landscaped residential frontages. The majority of construction activities will occur within these managed and previously disturbed areas, with natural features largely confined to the defined watercourse corridors and areas beyond routine roadway maintenance limits.

3.3 Cultural Features

A review of available provincial and municipal heritage and archaeology information indicates that no known registered archaeological sites, heritage structures, or cultural features are located within the Route 70 project corridor or within the immediate limits of construction.

3.4 Existing and Historic Land Uses

Existing land use within the project limits consists primarily of a two-lane paved roadway with gravel shoulders, roadside ditches, culverts, and associated municipal water and sewer infrastructure. Adjacent lands are predominantly residential, consisting of single-family homes on large lots, with occasional small businesses and community services fronting the roadway.

4 Summary of Environmental Impacts

The proposed Route 70 Water and Sewer project is located within an existing municipal roadway corridor and involves the replacement and upgrading of buried water and sanitary sewer infrastructure. Environmental impacts associated with the project are expected to be temporary, localized, and manageable through the application of standard construction practices and mitigation measures. Short-term impacts during construction may include soil disturbance, generation of sediment, temporary changes to surface drainage, construction noise, and localized traffic disruption. These effects will be confined primarily to previously disturbed areas within the roadway right-of-way.

The most environmentally sensitive feature in proximity to the project is the Salmon Cove River, a salmon-bearing watercourse, as well as Clarkes Brook. Potential impacts to these watercourses include sedimentation or accidental release of deleterious substances during construction. These risks are minimized through the selection of a buried continuous fused HDPE water main installed beneath the riverbed, which avoids permanent in-stream structures and reduces disturbance to the active channel and riparian areas. No long-term adverse effects to fish habitat, wetlands, or surface water quality are anticipated.

Subsurface conditions identified through the geotechnical investigation indicate previously disturbed fill, glacial till, and shallow refusal, which may influence construction methods but do not present unique environmental constraints. Groundwater was not encountered during investigation, and no operational discharges, emissions, or ongoing interactions with natural features are expected once construction is complete.

Overall, the project represents an upgrade to existing municipal infrastructure within a long-established transportation and utility corridor. With appropriate construction controls in place, the project is not expected to result in significant adverse environmental effects during construction or operation.

5 Summary of Proposed Mitigation

The proposed Route 70 Water and Sewer project will be completed within an existing municipal roadway corridor and previously disturbed lands. Potential environmental effects associated with construction are expected to be temporary and localized. The following mitigation measures will be implemented to minimize potential impacts to the surrounding environment during construction and operation

- Planned road grades will match existing as closely as possible, respecting navigation and water level constraints. Englobe will review alignment and gradients once all constraints have been met.
- Disturbed areas will be reinstated as soon as is practical, silt fences and other erosion protection measures will also be used until disturbed vegetation is fully re-grown.

- The Contractors will be responsible to provide machinery in good working condition.
- Machinery will be operated on existing access roads, where possible, to prevent unnecessary disturbance of vegetation, tree root zones and soils.

5.1 Air Quality and Noise

Dust: Activities during the project have a small potential for short term reduction in air quality due to dust generated during activities and an increase in emissions from the use of heavy machinery (drilling equipment, trucks, etc.).

Mitigation: The generation of dust during activities is unlikely, however if dust is generated during project activities dust suppression by the application of water will be employed when required. The exact locations where water is to be applied, the amount of water to be applied, and the times at which it shall be applied will be determined on-site based on conditions. Waste oil will not to be used for dust control under any circumstances.

Odours: Activities could generate some short-term odours (i.e. diesel exhaust).

Mitigation: There are no residential properties located in close proximity to the proposed construction location but any odours from the drill rig or other equipment exhaust, etc., will be limited to within working hours.

Noise Levels: Project activities will result in noise caused by the use of machinery.

Mitigation: Noise events will be of short duration, and project activities will be scheduled to be done during daytime hours where possible. All machinery should be well muffled. Contractors should avoid any sharp or loud noises where feasible.

5.2 Biology and Ecology

Wetland habitat: Construction activities near roadside ditches, low-lying areas, and watercourse margins may result in temporary disturbance to riparian vegetation and wetland-like drainage features. Soil disturbance and altered drainage patterns could increase the risk of sediment transport to adjacent watercourses.

Mitigation: Construction will be confined to the existing roadway right-of-way and previously disturbed areas. Erosion and sediment control measures will be installed prior to ground disturbance and maintained throughout construction. Disturbed areas will be stabilized and restored promptly following construction to prevent long-term alteration of drainage patterns or wetland function.

Machinery will be checked for leakage of lubricants and fuel prior to beginning work each day. Basic petroleum spill clean-up equipment will be kept on site. All spills or leaks will be promptly contained, cleaned up, and reported to the 24-Hour Environmental Emergencies Report System (1-800-565-1633).

Hazardous materials (e.g., fuels, lubricants, hydraulic oil) and wastes (e.g., waste oil) will be managed so as to minimize the risk of chronic and/or accidental releases. A designated storage area for hazardous materials will be identified and located away from any watercourse habitats. Refueling will occur in a manor to minimize potential impacts to the surrounding environment and spill kits will be kept onsite.

Spawning, feeding and breeding sites: In-water or near-water construction during sensitive life stages could disrupt salmon spawning, egg incubation, juvenile development, and migration within the Salmon Cove River and Clarkes Brook

Mitigation: No in-water construction is proposed. The water main crossing of the Salmon Cove River will be installed beneath the riverbed using a continuous fused HDPE pipe. All work in proximity to the watercourse will comply with DFO timing windows for Newfoundland and Labrador, which restrict in-water work in tributaries and headwaters of scheduled salmon rivers during spawning, incubation, and hatching periods.

Populations/communities of aquatic species (including flora, fish, birds, marine mammals, etc.):

Sediment release, accidental spills, or changes to water quality during construction could adversely affect local fish and aquatic invertebrate populations that support the aquatic food web.

Mitigation: Potential pollutant sources will be managed through controlled excavation, equipment maintenance, spill prevention measures, and sediment controls. Excavated materials will be isolated from flowing water, and any groundwater or surface runoff encountered will be managed to prevent sediment transport. With these measures in place, no long-term effects on aquatic species populations are anticipated.

Cultural fisheries: Temporary degradation of water quality could affect recreational salmon fishing or culturally important fisheries within the Salmon Cove River.

Mitigation: Construction activities will avoid direct disturbance to the river channel and will adhere to DFO freshwater habitat protection guidelines. The selected sub-river installation method eliminates permanent in-stream structures and reduces the potential for long-term effects on fish passage and fishery use. Any temporary effects are expected to be localized and short-term.

Vegetative cover: Clearing or disturbance of vegetation along the roadway corridor may result in temporary loss of ground cover and increased erosion risk.

Mitigation: Vegetation removal will be limited to the minimum area required for construction. Existing roadside vegetation will be retained where practicable, and disturbed areas will be reinstated with topsoil and appropriate stabilization measures following construction to restore vegetative cover and prevent erosion.

Migratory Birds: Vegetation clearing during the breeding season could disturb nesting migratory birds protected under the Migratory Birds Convention Act.

Mitigation: Vegetation clearing will be minimized and, where practicable, scheduled outside the migratory bird nesting period. If clearing must occur during the breeding season, visual checks for active nests will be conducted, and appropriate buffers will be maintained around any nests identified, in accordance with applicable federal guidance.

5.3 Groundwater

Groundwater Quality: Although groundwater was not encountered during the geotechnical investigation, groundwater levels may fluctuate seasonally or during periods of heavy precipitation, particularly near the Salmon Cove River and Clarkes Brook. Although unlikely, excavation for utility installation could locally intercept perched or shallow groundwater, potentially resulting in wet trench conditions, increased sediment transport, or uncontrolled discharge to surface waters.

Mitigation: Excavations will be kept as small and short-term as practicable. If groundwater is encountered, dewatering will be conducted in a controlled manner using appropriate methods to prevent erosion and sedimentation. Pumped water will be directed to stable, vegetated areas or sediment control measures prior to discharge, and will not be released directly to watercourses.

All construction equipment will be properly maintained and refueled in designated areas away from watercourses and excavations where practicable. Spill prevention and response measures will be implemented, and spill kits will be available on site. Excavated materials will be managed to minimize contact with groundwater, and contaminated materials, if encountered, will be handled in accordance with applicable regulations.

5.4 Other Considerations

All work will follow the Terms and Conditions of any Newfoundland and Labrador Department of Environment, Conservation and Climate Change (ECCC) Water Resources Management, TRC letters and any other provincial or federal letters of advice.

6 Public and First Nations Involvement Process

The typical steps to involve the Public and First Nations are outlined below. Confirmation from the ECCC will be required to ensure that the following steps are required for this specific project (or if additional steps are necessary).

The minimum public and First Nations consultation requirements of the Provincial EA registration guide will be followed (ECCC, 2022). A public notice containing the information specified in the registration guide will be delivered to the above noted stakeholders, in addition to the local Member of the House of Assembly (MHA), and the local service district prior to concluding the EA process. No First Nation communities are located within the immediate study area.

Following the completion of the consultation process, a summary report on the public and First Nation involvement will be prepared and submitted to ECCC in accordance with the EA process requirements.

7 Approval of Undertaking

The following technical approvals are anticipated as being required for this project:

- Permit to Alter a Body of Water
- Environmental permits
- Water Resources Management

8 Funding

The development is being funded by a combination of the Town of Victoria and Government of Newfoundland and Labrador.

9 Signature



Shelly Butt
Town Clerk Manager
Town of Victoria

March 20, 2026

Date

Appendix A General Site Plan








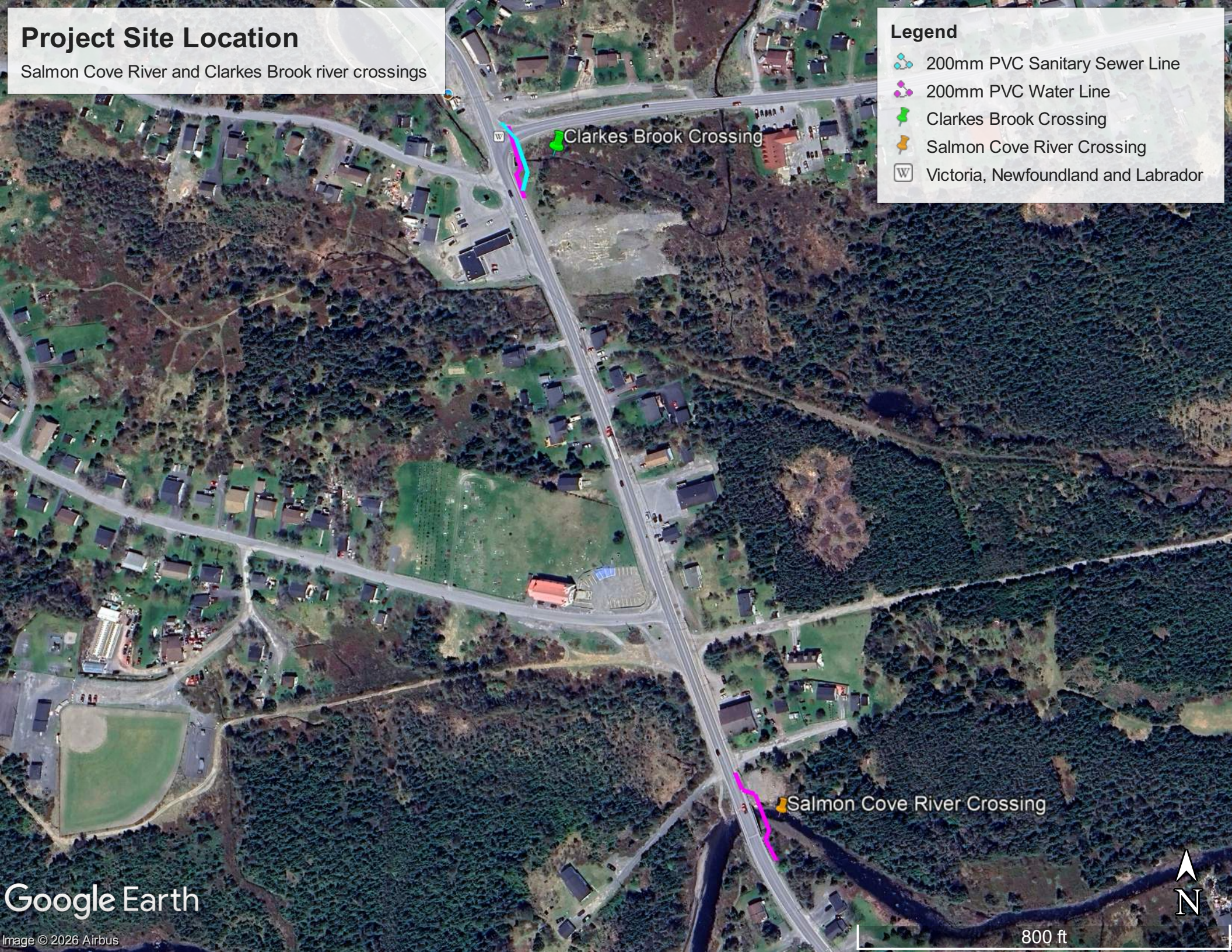
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Project Site Location

Salmon Cove River and Clarkes Brook river crossings

Legend

-  200mm PVC Sanitary Sewer Line
-  200mm PVC Water Line
-  Clarkes Brook Crossing
-  Salmon Cove River Crossing
-  Victoria, Newfoundland and Labrador



Clarkes Brook Crossing





Salmon Cove River Crossing



Clarkes Brook Crossing

Victoria, NL

Legend

-  200mm PVC Sanitary Sewer Line
-  200mm PVC Water Line
-  Clarkes Brook Crossing
-  Victoria, Newfoundland and Labrador





Clarkes Brook Crossing



Salmon Cove River Crossing

Victoria, NL

Legend

-  200mm PVC Water Line
-  Salmon Cove River Crossing



 Salmon Cove River Crossing

Appendix B Geotechnical Investigation Report



eNGLOBE

Route 70 Water & Sewer Extension & Road Upgrading

Geotechnical Investigation

Town of Victoria
Final Report

August 5, 2025
2412152



eNGLOBE

Town of Victoria

Geotechnical Investigation - Route 70 Water & Sewer Extension & Road Upgrading

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1 Introduction

At the request of the Town of Victoria (the Town), Englobe Corp. has conducted a geotechnical investigation for the Route 70 Water & Sewer Extension & Road Upgrading project (the Project). The purpose of the geotechnical investigation was to evaluate the subsurface conditions of the existing roadway to support design and construction tendering.

The Town issued a request for proposals (Solicitation no. 17-GI-23-00072, dated November 22, 2024) for Consulting Services for Route 70 Water and Sewer. Englobe was awarded the contract on January 20, 2025. This geotechnical investigation was completed as part of the overall contract.

2 Site and Project Description

2.1 Site Description

The geotechnical investigation was carried out along an approximately 1,100 m section of Route 70 in the Town of Victoria. The alignment extends from the intersection of Route 70 and Route 74 to Antles Road, crossing the Salmon Cove River Bridge approximately halfway along its length. The alignment features a slight southeast bend at the bridge but is otherwise predominantly straight. Based on publicly available topographic mapping, the roadway descends approximately 10 m over a 550 m run toward the river and rises similarly beyond it. This corresponds to an approximate 1.8% grade on either side of the crossing, indicative of a broad, shallow river valley. Near the northern end of the alignment, the roadway also crosses Clarks Brook via a concrete arch culvert.

The surrounding area is characterized by semi-rural residential development, with a mix of single-family homes, private driveways, and occasional small businesses. Residences are generally situated on large lots with grassed frontages and mature trees.

The roadway is a two-lane asphalt-paved surface with gravel shoulders. The asphalt surface exhibited localized cracking, edge deterioration, and patching in several locations. Road shoulders were narrow and moderately eroded in spots, especially near driveway tie-ins and culvert outlets. Surface drainage is managed by shallow roadside ditches and culverts near property entrances. Utility poles with overhead power lines are present along both sides of the road, and field markings indicate the presence of underground water and sewer infrastructure. Vegetation along the roadway corridor includes well-maintained lawns in residential areas, patches of dandelions and low-lying weeds along the roadway's shoulder zones, and isolated areas of unmanaged grass and brush in less developed segments along the roadway shoulders.

2.2 Project Description

The project consists of the replacement of approximately 1,100 m of water services and 990 m of sanitary sewer services, including the replacement of 17 manholes. Following utility installation, the roadway along the same alignment will be fully reinstated with new asphalt pavement and corresponding granular base courses.

No modifications to the existing Salmon Cove River bridge are anticipated for these infrastructure upgrades; however, the proposed utilities will cross the watercourse. The crossing methodology has not yet been defined and was not assessed as part of this report. Also, there may be a need to replace the concrete arch culvert at Clarks Brook, which is not assessed in the report.

3 Subsurface Exploration Program

Six boreholes, designated BH1 through BH6, were advanced as part of the geotechnical subsurface investigation program. Englobe personnel supervised the drilling activities, maintained detailed records of subsurface conditions, and oversaw the execution of the investigation program.

Borehole locations were selected by Englobe in consultation with the design team, considering the proposed development layout, access constraints, traffic control requirements, and potential conflicts with existing buried and overhead utilities. The boreholes were advanced at strategic locations along the alignment, including one at the proposed culvert replacement (BH1), and four boreholes (BH2 to BH5) were completed in the existing roadway for the proposed utilities.

Geotechnical exploration spacings (test pits, boreholes, etc.) for linear infrastructure are selected based on expected subsurface variability, project sensitivity, and type of infrastructure. While the Canadian Foundation Engineering Manual (CFEM, 2023) does not prescribe specific spacing values for works of this nature, it emphasizes that the investigation density should reflect geotechnical risk, complexity, and the nature of the works. Industry practice typically applies spacing of 50 to 150 m in urban areas and 150 to 300 m in rural areas, such as for this Project, unless site-specific conditions warrant greater detail, such as culvert crossings, stream channels, areas of shallow refusal, or for other site-specific reasons. For this project, the borehole spacing ranged from 160 to about 280 m. The approximate borehole locations are shown on the Exploration Location Plan in Appendix A.

The boreholes were advanced to depths ranging from approximately 2.0 to 3.7 m below existing grade using a Geoprobe 7822DT drill rig supplied by Eric Taylor Ltd. of Conception Bay South, NL, on May 29, 2025. A target investigation depth of 4.0 m was established to support utility and culvert design requirements, and refusal conditions limited drilling depth at several locations as noted herein.

Although direct push methods are effective across a wide range of soil conditions, they do not reliably distinguish between refusal on bedrock and refusal on dense glacial till or embedded boulders. No complementary methods (i.e. rotary coring, seismic refraction, or test pitting) were employed to verify the nature of refusal. Based on drilling resistance and the regional geological context, refusal is interpreted to result from either dense boulder-rich till or shallow bedrock; however, the exact cause could not be confirmed within the scope of this investigation.

The boreholes were advanced using a percussion-driven dual-tube sampler, with field sampling and testing performed in the temporary casing. Standard Penetration Tests (SPT) were performed near continuously in the boreholes to obtain blow counts (i.e. N-values) using a 50 mm outside-diameter split-barrel sampler in general accordance with ASTM International (ASTM) standard D1586 *Standard Test Method for Standard Penetration Test (SPT)*. Soil samples obtained were logged and transported to our laboratory for further classification.

4 Subsurface Conditions

The following section describes and summarizes the subsurface conditions encountered. The Symbols and Terms used on Borehole and Test Pit Records in Appendix B provide a brief explanation of the terminology and graphics used.

The subsurface conditions generally consisted of granular fill with occasional cobbles, underlain locally by sand, and refusal encountered in possible bedrock or cobbles/ boulders at relatively shallow depths. A summary of the encountered geologic conditions is described in the sections below and included in Table 1 as well as on the Boreholes Records included in Appendix B.

Table 1: Summary of Subsurface Conditions

Borehole	Borehole Depth (m)	Grasstop Thickness (m)	Crushed Granular Aggregate Thickness (m)	Fill Thickness (m)	Sand Thickness (m)	Refusal Depth (m)
BH1	2.41	0.08	NE	2.40	NE	2.41
BH2	1.96	NE	0.2	1.80	NE	1.96
BH3	3.27	NE	0.2	1.90	1.2	NE
BH4	2.20	NE	0.2	2.00	NE	2.20
BH5	3.65	NE	0.2	3.45	NE	3.65
BH6	2.10	NE	0.2	1.90	NE	2.10

NE: Not Encountered

>: Greater than

Field and laboratory soil classification was performed in general accordance with the system recommended in the Canadian Foundation Engineering Manual, 4th edition (CFEM).

Note that the stratigraphic boundaries detailed in this section typically represent a transition of one soil or bedrock type to another and do not necessarily indicate an exact plane of geologic change. Subsurface conditions may vary between and beyond the testing and sampling locations. The information presented is accurate only at the specific locations where exploration was completed and reflects conditions observed at the time of investigation. Due to the discrete nature of subsurface exploration, local variability may not be fully captured even at the test locations themselves. If tests were performed, the results apply only to the specific samples tested and should be interpreted in conjunction with the accompanying discussion in this report. Inference regarding subsurface conditions beyond the tested points remains the responsibility of the user of the information.

4.1 Pavement

A layer of crushed granular aggregate was encountered at the surface of boreholes BH2, BH3, BH4, BH5, and BH6 with a thickness of approximately 200 mm.

4.2 Fill

Fill was encountered below the crushed aggregate layer at all borehole locations. The fill generally consisted of loose to compact, brown to brownish grey, well-graded gravel with silt and sand (GW-GM)

to sand with trace to some gravel (SM), containing occasional cobbles and was typically damp to moist.

Two fill samples were tested to determine the moisture content in accordance with ASTM D2216 *Standard Test Method for Laboratory Determination of Water Content of Soil and Rock by Mass*. The results are presented in the Borehole Records in Appendix B and on the Laboratory Test Results in Appendix C.

The results indicate that the tested soils contained approximately 18% to 33% gravel, 46% to 50% sand, and 21% to 32% fines (material passing the 75 µm sieve). Both samples exhibited broadly graded profiles consistent with silty sand (SM) with gravel classifications under the Unified Soil Classification System. The gradation characteristics suggest a sand-dominant matrix with moderate to high fines content, and limited gravel. The higher fines content observed in one of the samples (over 12%) may influence permeability, frost susceptibility, and trench stability in localized areas. These findings are consistent with field observations of compact to very dense silty sand and gravelly till, and support the general subsurface characterization provided in this report.

4.3 Sand

A deposit of sand was encountered beneath the fill in borehole BH3. The sand consisted of very loose to compact, brownish grey to grey silty sand with trace to some gravel (SM), which was moist to wet. The sand extended from a depth of approximately 2.20 to 3.27 m to the borehole termination.

4.4 Borehole Refusal Conditions

Refusal was encountered in the boreholes at depths ranging from approximately 1.96 to 3.65 m below ground surface. Advancement was terminated and inferred to be a result of very dense soil interpreted to consist of cobbles, boulders, and/or possible bedrock. The drilling method employed did not permit confirmation of the refusal type. Differentiation between coarse obstructions and true bedrock was not possible without rock core recovery or other bedrock-confirmation techniques, which were not included in the scope of work for this project. Additional investigation using methods such as rotary coring would be required to confirm the presence and depth of any bedrock surface along the proposed alignment.

4.5 Groundwater

Groundwater seepage was not apparent during the exploration program. Groundwater levels observed during the exploration program should be considered a short duration may not be representative of the actual site conditions.

Groundwater levels can be expected to fluctuate during periods of heavy precipitation associated with seasonal weather trends, tide cycles, a particular event, site use, adjacent site use, and construction activity.

5 Geotechnical Discussion and Recommendations

5.1 General Discussion

The project consists of the replacement of approximately 1100 m of water services and 990 m of sewer services, including 17 manholes and the upgrading of the main highway Route 70 and 74 intersection to Antles Road. The following comments on specific construction aspects of the project are provided for the guidance of the design team.

Subsurface conditions in the area of the proposed project included asphalt or gravel pavement, fill of various origins, glacial till, sand and possible bedrock. The soil conditions at this site are considered to be suitable for the proposed development due to the presence of compact fill, competent sand, and possible bedrock or cobble/boulder-rich horizons at a relatively shallow depth. Where encountered, the very loose sand deposit should be compacted and proofrolled under the supervision by geotechnical personnel. Bedrock may be encountered depending on the installation depth of the proposed buried infrastructure, and was anticipated to be relative strong and may require removal by an excavator equipped with a hydraulic or pneumatic impact hammer or possibly even blasting.

Other geotechnical design issues for the proposed development include:

1. The surficial soils will be susceptible to frost if they are given access to free water or groundwater within the zone of seasonal frost (estimated to an average depth of 1.2 m). In general, the depth to the local water table for much of the site is relatively deep and beyond the potential depth of frost, so the potential for ice lensing will be limited.
2. Englobe does not accept the warranty for the performance of any existing fill materials left in place for construction (e.g. due to possible settlement). However, based on observations made in the boreholes completed in this investigation, the fill material should be suitable for the bearing of the new road/roadway structure with appropriate site preparation and proof rolling of the surface as described herein. The existing fill will provide a moderate level of subgrade support for pavement areas. Subgrade conditions may be adversely impacted by wet weather. The use of a geotextile as a separation barrier between the pavement section subbase layer and the fine-grained subgrade is suggested to minimize the migration of fines into the design pavement section.
3. Service trenches at the site will likely be excavated into and backfilled with imported fill, the existing fill, the natural silty sand deposits, or the refusal layer. To minimize potential trench settlement, trenches must be backfilled and compacted in thin lifts. The existing fill and sand are anticipated to be near the optimum moisture content above the groundwater table; however, they will be saturated below this depth. The existing fill will not dry readily outside of warmer summer months, and if proposed for use as trench backfill, they may need to be moisture conditioned in order to achieve the specified levels of compaction.
4. Trenchless methods may be technically feasible for the proposed Salmon Cove River crossing, but these installation methods are not common in Newfoundland and possible constraints would need to be evaluated further if proposed (i.e. entry and exit pads, pipe bending radius, etc.). An isolated trenched crossing is generally preferred. An isolated trenched crossing uses high-volume pumps, dams, culverts or other methods to temporarily divert stream flow around the trench excavation and pipe installation.

The contractor undertaking the work should make their interpretation of the factual information provided in this report, as it affects their construction procedures and scheduling.

5.2 Site Preparation

5.2.1 Stripping

In general, site preparation will require the removal of unsuitable materials, inspection of subgrades, and placement and compaction of structural fill soils. Unsuitable materials include any materials containing construction debris, organic soils, environmental contamination (if in excess of appropriate guidelines), existing loose fill materials, frozen, saturated, softened or disturbed soils, and unfavourable bedrock surfaces inclined steeper than 3.0 horizontal to 1.0 vertical (e.g. 3.0H:1.0V), bedrock pinnacles, and oversize particles.

Unsuitable materials are to be removed to a competent base (e.g., compact soil, bedrock, or compacted structural fill), inspected, and approved by a qualified professional before proceeding with structural fill placement or foundation construction. Roots or other intrusions over 50 mm in diameter should be removed to a depth of 1 m below the original ground surface.

Excavated rootmat/topsoil materials may be stockpiled at an approved location for future landscaping use if they are deemed by way of inspection to be suitable for this type of re-use for this project. Organic materials should not be mixed with other mineral soils.

5.2.2 Existing Fill Materials

Fill materials were encountered during this investigation. Compaction records were not provided to Englobe to indicate if the encountered fill was placed and compacted under engineering supervision. The existing backfill soils at the site should be considered unsuitable if it were to remain in place in roadway areas without additional site preparation as recommended herein. Englobe does not accept the warranty for the performance of any existing fill materials left in place for construction (e.g. due to possible settlement).

5.3 Excavations

5.3.1 Regulations under the OHS Act for Temporary Excavations and Slopes

Safe excavation slopes are the responsibility of the earthwork's contractor. As a minimum, temporary excavations must be sloped in accordance with the regulations of the Occupational Health and Safety (OHS) Act and the Regulations therein of the province of Newfoundland and Labrador. Per the OHS Regulations, an "excavation" means a cut, cavity, trench, or depression in the earth's surface resulting from rock or soil removal. Workers shall not enter an excavation over 1.2 m deep unless the sides are sloped to a safe angle or have been secured using sheet piling, shoring and bracing, a trench box or workers are protected by other effective means.

The guidelines and regulations for trenching and excavation safety in the workplace place the importance of identifying utility lines, protecting workers from falling into trenches, ensuring proper equipment use, and controlling risks related to soil stability and excavation depth.

The guidelines and regulations describe the need for safety measures such as guardrails, ladders, excavation shoring, and procedures for preventing hazards like water accumulation, shifting materials, and improper concrete handling during trench work. Workers and their supervisors are also responsible for adhering to the OHS Regulation's safety practices, obtaining worker and supervisor training, using personal protective equipment, and reporting hazards.

5.3.2 General Requirements for Temporary Excavations and Slopes

The use of temporary excavation support, such as trench boxes, should be carried out in accordance with the manufacturer's recommendations and all applicable provincial Occupational Health and Safety regulations.

Where trench boxes or other engineered shoring systems are not used, temporary sloping in soil equivalent to 1.5 Horizontal to 1.0 Vertical (i.e., 1.5H: 1.0V) or shallower, depending on soil conditions, should be provided for excavation within unstable soil or fill layers of any height and for excavations deeper than 1.2 m in competent natural soil. Shallower sloping would be required where the groundwater table is intercepted within the excavation limit.

If space does not permit the slopes to be cut back, some form of temporary shoring must be installed to protect workers in the trench. Stockpiles of materials and excavated soil should be kept back from the crest by a distance equal to at least the depth of excavation. Greater setbacks are recommended for excavations which remain open for extended periods of time (greater than four weeks), dependent on stability analyses. All vehicles delivering materials to the site should be kept back from excavated faces at least 1.0 m or 1.5 times the excavation depth, whichever is greater. Monitoring and maintenance of the cut-slopes should be carried out on a regular basis.

It is necessary to prevent surcharge loading near the excavation edge. Surcharge loading can result from excavated soil and construction material stockpiles, heavy machinery and any other instances that could affect the temporary slope stability of excavations. As a preliminary measure, the surcharge load should be excluded by a horizontal excavation crest set-back distance of at least or greater than 1.5 times the adjacent vertical excavation depth.

5.4 Structural Fill

Any imported materials and re-use of existing on-site till soil intended for use as structural fill should be assessed by geotechnical personnel as earthworks and site preparation operations are carried out.

Imported structural fill should consist of a predominately processed, angular, clean, well-graded rockfill material derived from a rock quarry source (e.g. 100 mm rockfill) or engineered crushed stone materials such as granular aggregate base and base material (e.g. NL-DTI Class A & B aggregates, etc.) to level and build back design grades. The fines content should not exceed 8% above the groundwater table and not exceed 2% below the groundwater table.

Re-use of excavated native till or common fill materials may be permitted under a construction quality control program to confirm that the material is suitable for placement and can be compacted to meet performance requirements. The re-use of silt- and sand-rich soils is discouraged in moisture-sensitive areas, as these materials are prone to softening during handling and after placement if exposed to water.

The structural fill lift thickness should be compatible with both the fill type and compaction equipment used:

- For granular or engineered fill materials, lift thickness should not exceed 300-400 mm when compacted using a 10-12 tonne smooth-drum roller, or 200-300 mm when compacted with a reversible diesel plate compactor.
- Refer to Section 5.6 - Culvert Installations and Section 5.7 - Underground Utilities for structure-specific bedding backfill material and compaction requirements.
- All lifts should be placed in horizontal, uniform layers and compacted to achieve the specified density requirements.

Due to the particle size distribution of over-sized, coarse fill materials (e.g., rockfill, rocky till used as common fill, etc.), verification of the field density by visual inspection during proof rolling by

geotechnical personnel will be required for each lift of material placed. Coarse fill is defined as a material containing particles greater than 30% passing the 19 mm sieve (3/4-inch) and where verification of the field density by nuclear methods is not recommended according to the ASTM D698 testing standard.

5.5 General Structural Fill and Compaction Requirements

Compaction of material should conform to NL-Master Spec Book Division 31, Section 31 05 10 - Corrected Maximum Dry Density and Section 31 23 33.01 - Excavating, Trenching and Backfilling. In general, all structural fill material types should be placed in even and horizontal lifts and compacted to the minimum standard Proctor maximum dry density (ASTM D698), depending on the construction application, as identified below:

Table 2: Compaction Requirements

Structural Fill Application	Percent of Standard Proctor Compaction (ASTM D698)
Foundations of Any Type, Precast Concrete Elements	100
Asphalt & Concrete Pavement Structures, Exterior Concrete Sidewalks & Curbing	100
Precast Culvert Bedding and Base (including cushion and reinstated subgrade materials)	100
General Backfill, Pipe Bedding	95

Fill placement and compaction during the winter months is challenging due to the difficulty in moisture conditioning fill soils and obtaining high compaction levels. Materials and methodology should be reviewed prior to construction if cold weather compaction of clay fills is proposed. High compaction levels can only be achieved using unfrozen fill material, provided the compaction area is heated and hoarded to prevent freezing during placement and compaction. Frozen material is considered unsuitable and should not be placed as backfill.

5.6 Culvert Installations

Culverts should be installed in accordance with the requirements outlined in the Municipal Water, Sewer and Roads Master Construction Specifications (2024), e.g. NL Master Spec Book, published by the Government of Newfoundland and Labrador. These specifications provide the standard for trenching, bedding, backfill, and placement procedures applicable to culvert installations in municipal and provincial infrastructure projects.

Culverts should be designed to resist earth pressures for the proposed height of the embankment. The minimum and maximum cover over the culvert is dependent on the product, wall thickness, diameter, span, and rise. The manufacturer should be consulted regarding culvert installation details, and any manufacturer requirements which are stricter than the recommendations given below should be followed.

At BH1 near the Clark’s Brook culvert, a refusal condition was encountered beneath fill at about 2.4 m below grade. Culverts should be sufficiently sized and installed such that scouring of the inlet and

outlet streambed does not occur as a result of increased water velocities due to the culvert. Slopes of the watercourse that are trimmed back should be protected with riprap protection at slopes no steeper than 2H:1V and backed by an appropriate soil filter and/or a non-woven geotextile filter fabric.

Proper compaction of the backfill material is necessary to reduce the voids, which can cause "piping effect". The material compaction around the culvert should achieve 95% standard Proctor density or better. Concrete headwalls and wingwalls can be used to impede seepage around the exterior walls of the culvert and are typically the first step in controlling piping or seepage problems, prior to considering more extensive measures. Further protection may be provided by anti-seep headwalls, wingwalls, cut-off collars placed at intervals along the culvert barrel.

5.6.1 Culvert Subgrades

Foundation subgrades for the replacement culvert are expected to consist of compact glacial till on possible shallow bedrock or cobble/boulder-rich horizon. These types of subgrades are expected to be relatively stable with respect to foundation support to the culvert provided dewatering and grading of the trench area is maintained throughout construction to minimize softening. Any signs of excessive softening or zones which might promote preferential pathways for groundwater flow or springs should be sub-cut down to intact and competent foundation materials. In sites where soft foundation conditions are present, the unsuitable material should be removed and replaced by clean granular soil to prevent the culvert from sagging.

Culvert subgrades are anticipated to consist of native glacial till, typically ranging from firm to very stiff. If fill materials are encountered at the design subgrade elevation, or if the exposed native subgrade is found to be soft, loose, or otherwise unsuitable, additional sub-excavation should be carried out to expose competent native glacial till or bedrock. The over-excavated zone should then be reinstated with engineered fill, such as 100 mm minus crushed rock, where culvert footings are designed to be soil-supported.

For precast structure installations, it is recommended that a finer granular cushion layer (e.g., 19 mm crushed gravel) be placed over the coarser rockfill to provide a level, stable, and uniform bedding surface. This cushion layer facilitates proper seating and alignment of the structure and should be compacted to the project-specified density prior to placement of precast units.

Once the design subgrade level is reached, the subgrade should be inspected to identify any localized weak zones requiring further remediation. Where bedrock is encountered, any loose or fractured rock should be removed from the base of the excavation to provide a uniform and competent bearing surface. Bedrock removal methods are discussed in a subsequent section of this report.

5.7 Underground Utilities

Earthworks for underground utilities installation should be carried out in accordance with the site-specific recommendations provided herein and the applicable Newfoundland and Labrador Government guidelines and specifications provided in the *Newfoundland and Labrador Government's Municipal Water, Sewer and Road Specifications (2020)*, e.g. Master Spec Book.

5.7.1 Frost Protection for Underground Utilities

Based on Englobe's experience in the region, it is recommended that a minimum nominal soil cover of 1.5 m or equivalent be provided for lines (i.e., water) susceptible to freezing.

5.7.2 Underground Utilities Trenches

In open-cut areas, the anticipated subgrades for service catch basins, manholes, and piping are expected to consist of native glacial till ranging from compact to very dense, or sand ranging from very loose to loose. While a bedrock profile was not confirmed during the investigation, its presence should be anticipated at some locations depending on the depth of embedment.

Once the underground utility trench design subgrade elevation is reached, the exposed surface should be inspected to identify any loose, soft, or otherwise unsuitable zones. Where sub-excavation is required, unsuitable material should be removed and replaced with approved imported engineered fill, such as 100 mm minus crushed rock, to establish a stable and uniform base. All areas, including those remediated, must be inspected and approved prior to placement of bedding material.

Dewatering of all subgrades is required throughout excavation, pipe installation, and backfill reinstatement to ensure stable working conditions and proper material placement and compaction. In the event of significant groundwater seepage or wet base conditions, additional mitigation of groundwater and modification of materials may be required. Typically, these measures include placement of a working mat of free-draining gravel and filter cloth after lowering the water table and removal of disturbed or unstable soils.

Where pipe or drainage structure subgrades are located within bedrock, any loose or fractured rock at the base of the excavation should be removed to provide a uniform and competent bearing surface.

5.7.3 Pipe Bedding Materials and Compaction

Pipe bedding requirements depend on the pipe class, trench configuration, and site-specific geotechnical conditions. All pipe bedding and backfill materials shall conform to the requirements of the Master Spec Book, as applicable. The excavated materials and soils from the trench are not suitable for use as a bedding material.

A minimum 300 mm annular clearance, or as specified in the project's civil specifications, should be provided around the pipe to allow for proper bedding placement and compaction. This clearance ensures that bedding material can be uniformly placed and compacted around the pipe to provide adequate structural support and limit differential movement.

Bedding material should be placed in lifts not exceeding 150 mm (loose thickness), or as specified in the afore-referenced guidelines, and compacted to a minimum of 95% of Standard Proctor Maximum Dry Density (SPMDD) in accordance with ASTM D698. Compaction should be performed using equipment and methods suitable for the pipe type and installation conditions.

Hand-operated or small walk-behind plate compactors may be used to compact bedding material within 300 mm of the pipe, provided the equipment is appropriate for confined trench conditions and does not pose a risk of pipe damage. For flexible pipe systems (e.g., HDPE, PVC), care should be taken to avoid excessive deflection or misalignment during compaction.

The use of larger compaction equipment or vibratory compactors should only be permitted after sufficient cover has been placed above the pipe to distribute compactive forces safely. The minimum cover depth required prior to using such equipment should conform to the pipe manufacturer's recommendations and the project's civil specifications. This approach reduces the risk of pipe deformation and helps maintain the structural integrity of the installed utility.

5.7.4 Salmon Cove River Crossing

A geotechnical assessment of the Salmon Cove River crossing was not included in the current scope of work for this investigation. However, general observations from nearby boreholes and regional geology suggest that subsurface conditions may include granular alluvium underlain by glacial till and potential cobble- or boulder-rich layers. Any future crossing design at this location should consider the

potential for variable soil conditions, shallow refusal, groundwater interaction, and environmental permitting requirements. Should a more detailed assessment be required, it is recommended that additional subsurface exploration and hydraulic assessment be completed, specific to the crossing alignment.

5.8 Flexible Asphalt Pavements

5.8.1 Subgrade Preparation

Following the removal of any materials deemed unsuitable, exposed subgrades should be graded to promote drainage off the surface, statically compacted with a minimum 10-tonne roller and proof-rolled with several passes of a loaded tandem axle truck under observation by qualified geotechnical personnel. Proof-rolling should be performed to identify any additional unsuitable subsurface conditions, such as wet and loose/soft soil zones, before placement of structural fill soils. Due to the fines content of the soil (both natural soil and existing fill materials) at this site, proof-rolling should not be performed under wet/freezing weather conditions. Alternatively, the earthworks contractor can over-excavate the subgrade by a nominal amount to be determined by the geotechnical engineer and immediately place and compact a layer of protective rockfill to the design subgrade elevation.

Site soils are anticipated to be moisture sensitive, and wherever possible, exposed subgrades should remain dry by ditching and/or pumping. If construction is planned for seasonally wet months (i.e. spring or fall), consideration should be given to minimizing construction traffic on exposed subgrades. In addition, minimizing exposed subgrades in lieu of mass excavation will limit subgrade disturbance from precipitation.

5.8.2 Pavement Structure

The Department of Transportation and Infrastructure details for the rural urban-collector standard (RCU 80) are proposed for the pavement reinstatement.

Table 3: Flexible Pavement Design

Pavement Section	RCU 80
Surface Asphalt	50 mm
Base Asphalt	60 mm
Granular "A"	100 mm
Granular "B"	200 mm

[*https://www.gov.nl.ca/ti/files/1122-March-2024.pdf](https://www.gov.nl.ca/ti/files/1122-March-2024.pdf)

Material types and placement specifications conforming to the NL Master Spec Book (2024) or equivalent will be suitable for this application.

5.9 Materials Testing and Inspection

During construction of the proposed development, we recommend that a geotechnical engineering firm be retained by the owner and/or the contractor to provide ongoing consultation, confirm that the recommendations herein are followed, and ensure that the materials used during construction meet specifications.

6 Closure

The geotechnical investigation undertaken has involved random sampling of site conditions. Should any conditions be encountered during construction that are contrary to those reported herein, we request immediate notification so that reassessment can be undertaken.

Please note that the current investigation has not involved any environmental assessment or sampling of the site soil or groundwater conditions. For purposes of this report, we have assumed that the site soils/groundwater have not been adversely affected by environmental impacts.