Appendix D

Surface Water Management Plan (Updated)

October 4, 2022

137 Chain Lake Drive
Suite 100
Halifax, Nova Scotia
Canada
B3S 1B3
Telephone
902.450.4000
Fax
902.450.2008

Envirosoil Limited
927 Rocky Lake Drive
Bedford, NS
B4A 3Z2
jscott@dexter.ca

Attention: Jerry Scott, M.Eng., P.Eng.
General Manager

Surface Water Management Plan (Revised), Proposed Waste Oil Recycling and Water Treatment Facility, 750 Pleasant Street, Dartmouth, Nova Scotia

Dillon Consulting Limited (Dillon) is pleased to present Envirosoil Limited (Envirosoil) with the following revised Surface Water Management Plan (SWMP) for the proposed Waste Oil Recycling and Water Treatment Facility, located in Dartmouth, Nova Scotia. The revisions to the SWMP and the additional information provided aim to meet both the information provided in Nova Scotia Environment and Climate Change's Request for Additional Information to the Environmental Assessment Registration Document (EARD) Addendum (dated February 18, 2022), as well as individual comments provided by regulatory agencies during the review of the EARD Addendum, as well as through subsequent discussions between Envirosoil and representatives from regulatory agencies.

Project Background

Envirosoil proposes to construct and operate a Waste Oil Recycling and Water Treatment Facility at 750 Pleasant Street in Dartmouth, NS. The proposed undertaking is on a previously disturbed industrial site, where the majority of the property is currently being used as an operating liquid asphalt receiving, storage and transfer facility. The waste oil recycling and water treatment components of this project will be sited on Parcel Identification Number (PID) 00260703. Access to the main facility from the Pleasant Street entrance will cross General Liquids Canada property (PID 41464280), as well as PID 00643238 which is owned by Canadian National Railway and serves as an active railway corridor.

The project will consist of installation of six (6) multi-use tanks, to be located near the northeast boundary of the property, as well as associated water treatment equipment located within the existing building on site.

Background Data Collection and Review

Available background information was reviewed to support the documents attached to this report. These data included previous reports and regulatory submissions, topographic and geographic information, climate and meteorological data including potential future climate change projections, geological information, and a review of applicable municipal, provincial, and federal regulations.

It is important to note that the Surface Water Management Plan (dated September 2020) for the site at 750 Pleasant Street included the impervious area associated with the new proposed installation of the six (6) multi-use tanks and associated containment area, and there are no changes expected to the drainage volumes or patterns on site related to this proposed development, or the addition of a 2nd asphalt storage tank being constructed in 2022. In 2020, prior to development of the site for the use as a liquid asphalt storage and transfer facility, to quantify and mitigate potential increases in site runoff, an assessment of runoff conditions was completed for both pre- and post-development conditions at the site. This assessment report, including modelling results, is in Appendix D.

Request for Additional Information Items

Stormwater Management System Features

The area of the site is approximately 1.2 ha. Stormwater on the existing site is managed with site grading, perimeter berms, and a stone-filled infiltration trench system (French drain), collecting at a First-Defense® stormwater separator prior to being released to the Halifax Harbour. Site stormwater management system features are summarized in Table 1, with additional details on the orientation and sizing of the existing surface water management system, and the associated discharge point which are included in Appendix A.

Table 1: Stormwater Management System Features Summary

Feature	Design Capacity	Connection(s)	Discharge Point
Petroleum-Resistant Secondary Containment Dyke	110% volume of largest tank or 100% of largest tank +10% of aggregate capacity of all other tanks (whichever is greater)	OWS Piping	Oil Water Separator (OWS)
Double-Walled FRP Oil Water Separator (OWS)	15,000 L	40 PVC OWS Drain Pipe	Stormwater Sewer (Halifax Water)

Feature	Design Capacity	Connection(s)	Discharge Point
Earthen Perimeter Berm (existing)	Approx. 0.15m high	French Drain (existing)	French Drain (existing)
French Drain (existing)	166 m^3 of volumetric runoff storage	Perforated Piping (existing)	First-Defence® FD-6HC (existing)
First-Defence® FD-6HC stormwater separator (existing)	Peak Flow: 906 L/s Min. Sediment Storage: 1.2 m^3 Oil Storage Capacity: 1878 L	Outlet (existing)	Halifax Harbour

Stormwater Collection and Management

The footprint of the six (6) multi-use tanks and associated containment area was considered in the Surface Water Management Plan for the original 2020 development of the site. Therefore, installation of this new external infrastructure is not expected to alter existing drainage patterns on the property.

Design of the new tank system is such that water collected within its containment dyke will be directed to a 15,000L oil-water separator prior to release to the Halifax Water municipal stormwater sewer. The OWS is a standard commercial product design that is commonly used in the HRM to treat precipitation collected in containment structures, prior to discharge to the storm sewer system. As such, post-development runoff and snowmelt conditions are not expected to change compared to existing conditions.

Post-development site runoff and snowmelt is not expected to have an impact on the receiving body (Halifax Harbour) nor cause adverse stormwater effects to adjacent properties. Runoff is contained on-site, including all loading and unloading areas, by an existing earthen perimeter berm and ditching. Site grading and ditching directs runoff and snowmelt from all areas towards the French drain (consisting of a stone-filled infiltration trench and perforated pipe) to promote infiltration and intercept and remove suspended solids (TSS) from runoff. A First-Defense® FD-6HC stormwater separator is installed downstream of the perforated pipe to allow for separation of oils and hydrocarbons, coarse particles, fine particles, and trash and floatables prior to discharge, if required. The loading and unloading area is graded such that a catchbasin directs runoff and snowmelt to a catchbasin that drains to the French Drain and subsequent First-Defense® FD-6HC stormwater separator.

Surface Water Management and Monitoring

Surface water collected at the project site is to be monitored for both quality and quantity. Operational surface water sampling consisting of metered readings for temperature, pH, turbidity and conductivity and water sampling for Total Suspended Solids (TSS) is undertaken on a monthly basis. If at any time a hydrocarbon sheen is observed, samples will be collected for Total Petroleum Hydrocarbon/Benzene, Toluene, Ethylene, Xylene (TPH/BTEX). The monitoring plan is consistent with recommendations provided in the main EARD submission and is attached in Appendix B.

As noted in Appendix A, inspection and maintenance of the oil-water separator, First-Defense® FD-6HC stormwater separator, and outfall shall be performed quarterly by Envirosoil to confirm performance. Inspection frequency is to be re-assessed at the time of the annual reporting period.

During each sampling event, rainfall occurring within the previous 24 hours and within the previous three days will be documented based on Environment and Climate Change Canada's nearest meteorological station (Shearwater RCS 8205092).

Extents of Armour Stone

As shown on Figure 1, armour stone has been placed along the extent of the property boundary at the harbour above the surveyed ordinary high water mark. Scour and erosion related to the discharge of stormwater runoff from site is not considered a concern.

Figure 1: Armour stone installation at the project site, with discharge pipe (photo dated September 2021)

Annual Report Surface Water Analytical Results

The completed 2021 Annual Report surface water analytical data for the site required to meet provincial Industrial Approval (IA) requirements, are summarized below. For additional detail please refer to the IA No. 2020-2723541-00 General Liquids Canada Annual Report, as submitted to NSECC 8 February 2021.

General Chemistry

The surface water location at the Site exceeded applicable site-specific guidelines for pH during the 2021 sampling events.

Field pH, as measured at the time of sampling, is considered to be the more accurate measurement of pH, as laboratory pH is measured beyond this parameter's hold time. Field pH was recorded to be slightly higher than lab pH throughout the year, but lab pH was still above the applicable guideline ranges. Throughout 2021, field and lab pH at the surface water station ranged from 10.13 to 9.13 with a gradual declining trend over the year.

Total Suspended Solids were below the IA criteria of 25 mg/L throughout the 2021 monitoring period.

Petroleum Hydrocarbons

Petroleum hydrocarbon concentrations were generally below laboratory detection limits and were below the IA criteria in the 2021 monitoring period.

Closing

We trust this letter and associated appendices meet your requirements. We are available for further discussion at your convenience.

Sincerely,

DILLON CONSULTING LIMITED

Paul Koke, M.A., CISEC
Project Manager

PK:lmk
Attachments
Our file: 19-1742-2000

Appendix A

Hydrologic and Hydraulic Assessment

SURFACE WATER MANAGEMENT PLAN

Hydrologic and Hydraulic Assessment

The proposed development consists of the construction and operation of a Waste Oil Recycling and Water Treatment Facility, located at 750 Pleasant Street, Dartmouth. The site has an area of approximately 12,039 m^2. The runoff from the study site discharges into the Halifax Harbour.

Description of Stormwater Infrastructure Associated With Flows from the Site

No changes to site runoff are expected post -development. Existing runoff from the site is currently directed to a stone-filled trench along the southern boundary of the property, which is shown in Figure A-1. A perforated 200 mm pipe (i.e., French drain) is installed in the trench, which connects to a manhole and First-Defense® stormwater separator that discharges through a 200 mm pipe to the Halifax Harbour. An earthen berm with a crest elevation of 8.59 m exists on the southern side of the site to direct runoff into the trench.

Recommended Plans for Monitoring, Maintenance, and Upgrading of Stormwater Infrastructure

It is recommended that stormwater associated with the area of the six (6) proposed multi-use tanks and associated containment area be managed on-site with a petroleum-resistance secondary containment dyke and an oil-water separator prior to release to the municipal stormwater sewer (Halifax Water).

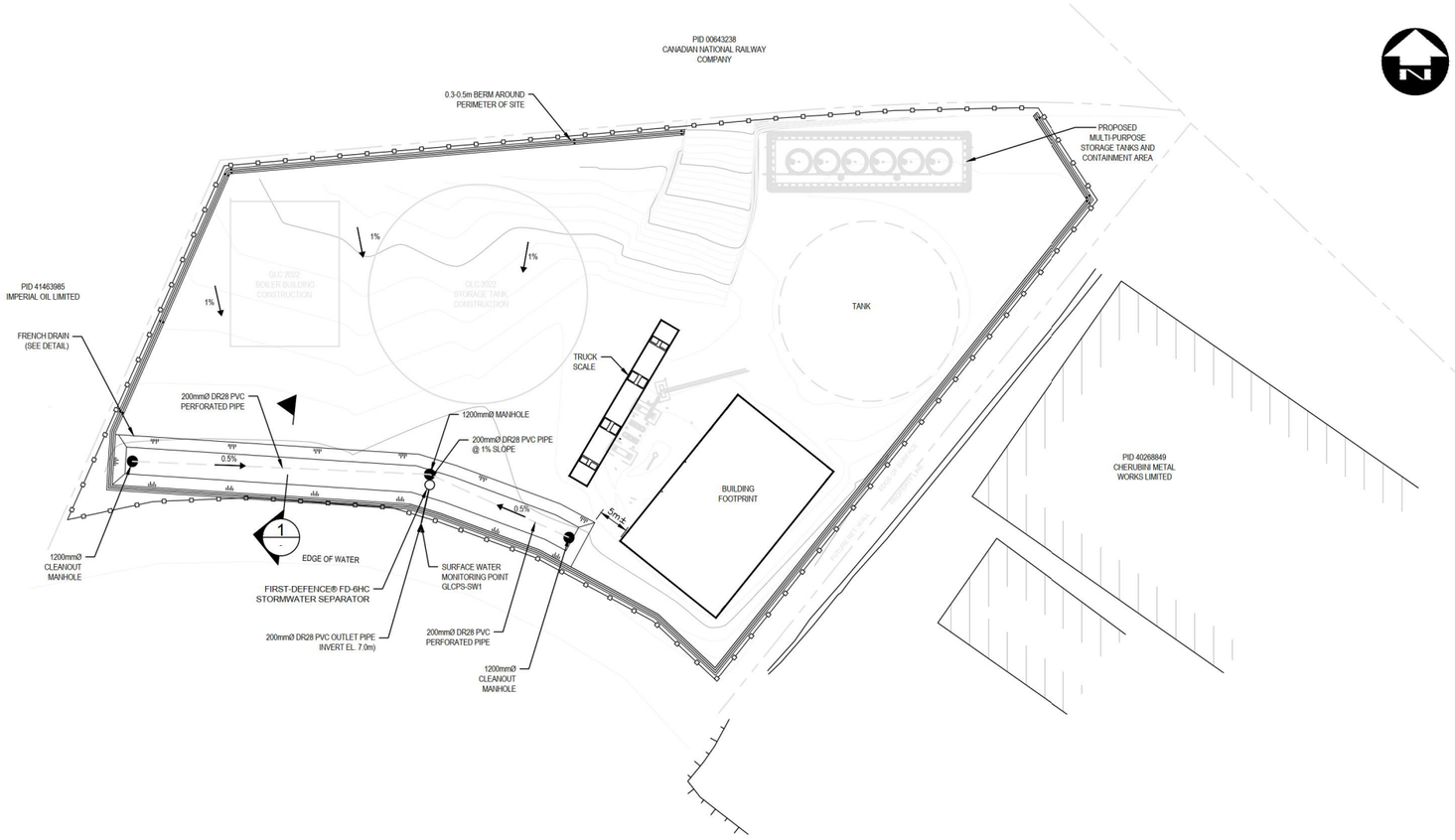
The existing site is generally graded at approximately 1% towards the Harbour. Runoff that flows towards the edge of the property is intercepted by the perimeter berm, which is approximately 0.15 m high and is intended to keep runoff on-site. Maintaining runoff on-site is intended to mitigate total suspended solids (TSS) migration into the harbour. The elevation of the berm has been built to limit excessive ponding on site to mitigate flooding of adjacent site facilities.

Snow management on site shall be conducted such that contact between potentially contaminated snow and fresh snow is minimized, and snow surplus will be stored such that associated meltwater will be treated by the oil-water separator or the French drain and First-Defense® FD-6HC stormwater separator.

The French drain on site promotes infiltration of stormwater and removal of suspended solids. During operations, a 200-mm perforated pipe collects stormwater and promotes infiltration into the stone layer surrounding the pipe. The French drain then leads to a First-Defense® FD-6HC stormwater separator that outlets to the Harbour in overflow conditions.

Details of the design, orientation and sizing of the secondary containment dyke and the 15,000 L oil-water separator, and identification of the associated discharge point, including maintenance recommendations, are included in Figure A-1.

275 CHARLOTTE STREET, B1P 1C6



SITE PLAN
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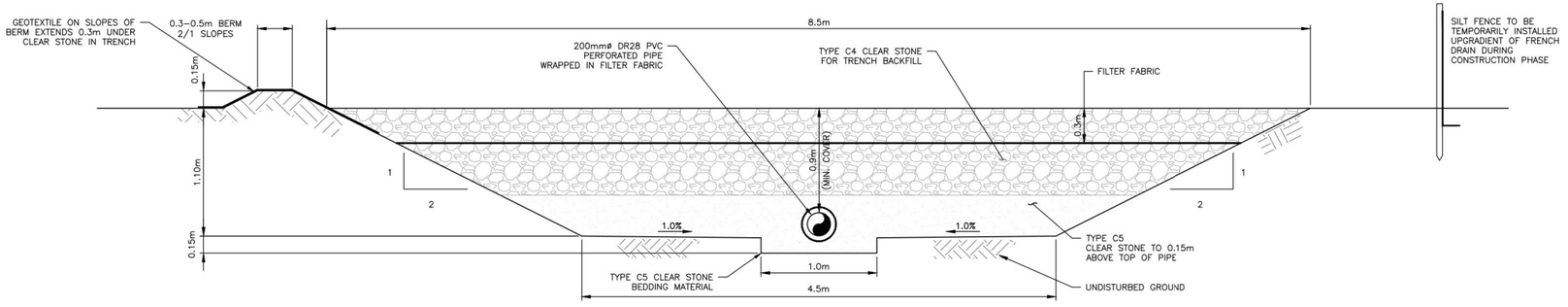

1 FRENCH DRAIN WITH PIPE TRENCH DETAIL
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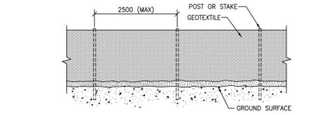

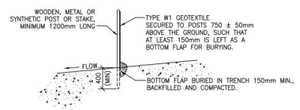

SEDIMENT CONTROL FENCE
NTS

NOTE:
THE CONTRACTOR SHALL PROVIDE ADEQUATE SILTATION AND EROSION PROTECTION OF ALL DRAINAGE COURSES AS ESTABLISHED BY THE EROSION AND SEDIMENTATION CONTROL HANDBOOK FOR CONSTRUCTION SITES AS PREPARED BY NOVA SCOTIA ENVIRONMENT.

GENERAL NOTES

1. ALL DIMENSIONS ARE IN METRES UNLESS SPECIFIED OTHERWISE.
2. REGULAR MONITORING AND MAINTENANCE OF STORMWATER INFRASTRUCTURE TO BE PERFORMED AS REQUIRED. SEDIMENT REMOVAL SHALL BE PERFORMED SO AS TO CAUSE MINIMAL DISTURBANCE TO THE GROUND OR ANY PART OF THE FRENCH DRAIN OR STORMWATER SEPARATOR.
3. INSPECTION AND MAINTENANCE OF THE STORMWATER SEPARATOR AND OUTFALL SHALL BE PERFORMED QUARTERLY TO CONFIRM PERFORMANCE. INSPECTION FREQUENCY TO BE RE-ASSESSED AT THE ANNUAL REPORTING PERIOD.
4. BACKFILL AND COMPACTION METHODOLOGY AND MATERIALS TO BE CONFIRMED AND APPROVED IN THE FIELD BY GEO-TECHNICAL ENGINEER, IF REQUIRED.
5. CONTRACTOR RESPONSIBLE FOR COORDINATING FIELD LOCATES AND CLEARANCE CERTIFICATES FROM APPROPRIATE UTILITIES PRIOR TO COMMENCING CONSTRUCTION.
6. ALL WORK TO BE PERFORMED IN ACCORDANCE WITH EXISTING NSE APPROVALS.
7. EARTHWORKS, MANHOLES AND PIPEWORK TO BE IN ACCORDANCE WITH THE STANDARD SPECIFICATION FOR MUNICIPAL SERVICES, LATEST EDITION.

WATER QUALITY MONITORING NOTES

1. ALL MONITORING TO BE COMPLETED IN ACCORDANCE WITH THE MORE STRINGENT OF: PROJECT SPECIFIC ENVIRONMENTAL PERMIT, OR APPLICABLE PROVINCIAL/FEDERAL GUIDELINES.
2. GLCPS-SW2 TO BE SAMPLED FROM A REPRESENTATIVE BACKGROUND LOCATION OFF-SITE.
3. IF SAMPLING OF THE ON-SITE SURFACE WATER INDICATES NON-COMPLIANCE WITH APPLICABLE PROVINCIAL AND FEDERAL GUIDELINES THIS MAY REQUIRE THE IMPLEMENTATION OF SUPPLEMENTAL CHEMICAL/MECHANICAL TREATMENT AND PUMPING (E.G. FLOC TANK).

SEDIMENT CONTROL PLAN NOTES

1. REGULAR MONITORING AND MAINTENANCE OF EROSION CONTROL WORKS TO BE PERFORMED AS REQUIRED. SEDIMENT REMOVAL SHALL BE PERFORMED SO AS TO CAUSE MINIMAL DISTURBANCE TO THE GROUND OR ANY PART OF THE EROSION CONTROL STRUCTURE.
2. GEOTEXTILE FENCING SHOULD BE POSITIONED TO KEEP SEDIMENT ON-SITE.
3. ANY EXPOSED SOILS TO REMAIN UNTOUCHED FOR GREATER THAN 14 DAYS MUST BE VEGETATED OR COVERED AS SOON AS POSSIBLE.
4. CONTRACTOR TO TAKE ALL REASONABLE PRECAUTIONS ON SITE TO LIMIT MIGRATION OF SEDIMENTS. THIS WILL INCLUDE MINIMIZING AREA OF DISTURBANCE AT ANY GIVEN TIME, COVERING DISTURBED SOILS, AND PROTECTION OF EXISTING STORM DRAIN INLETS.
5. SITE TO BE GRADED TOWARDS FRENCH DRAIN LEADING TO FIRST DEFENDER FD-6HC.

LEGEND

PROPOSED	EXISTING
PROPERTY BOUNDARY	
FENCING	
BERM	
PERIMETER DITCH	
SLOPE	
PERFORATED PIPE	
NON-PERFORATED PIPE	
MANHOLE	
STORMWATER SEPARATOR	

DILLON CONSULTING

No.	ISSUED FOR	DATE	BY
3	RE-ISSUED FOR REVIEW	10/05/22	HML
2	RE-ISSUED FOR REVIEW	11/17/20	JAM
1	ISSUED FOR REVIEW	09/25/20	JAM
0	ISSUED FOR REVIEW	08/20/20	JAM

DESIGN: JAM | REVIEWED BY: KRM
DRAWN: HEB | CHECKED BY: HML
DATE: JUNE 2021
SCALE: AS NOTED

SURFACE WATER MANAGEMENT
PLEASANT STREET, DARTMOUTH, NS

SURFACE WATER MANAGEMENT PLAN AND DETAILS

PROJECT NO. 19-1742

SHEET NO. **A-1**

Appendix B

Surface Water Monitoring Program

SURFACE WATER MANAGEMENT PLAN

Surface Water Monitoring Program

To satisfy regulatory requirements, the following provides a surface water quality and quantity monitoring plan including proposed monitoring locations, monitoring parameters, and monitoring frequency.

Surface water context: There is no effluent discharge proposed directly to surface water. Surface water at the property related to runoff from precipitation and as part of site design is directed to a drainage feature to the east and south east of the property (see Appendix A). The drainage feature discharges above Ordinary High Water (OHW) to the Halifax Harbour. Current site operations include a French Drain, which limits the volume and frequency of discharge, and a First-Defense® FD-6HC stormwater separator to treat runoff prior to discharge. Discharge from the outfall is expected only during storm events of moderate intensity and duration.

The proposed surface water monitoring program consists of construction and operational phase monitoring. Construction monitoring will occur during periods of earthworks associated with the new external multi-use storage tanks and associated containment area. The operational surface water monitoring program proposed reflects an initial year of confirmatory monitoring and a reduction in sampling frequency in subsequent years if conditions are as predicted.

Surface Water Sampling

One primary downstream sampling location is proposed due to the configuration of the site. The proposed primary surface water sampling location (GLCPS-SW1) is located at the First Defender system, and the sample is proposed to be collected immediately prior to the discharge point to the Halifax Harbour, shown in Figure B-1. The topography of the property limits the potential for an upgradient sampling location. The majority of the surface water runoff anticipated at the property is from precipitation falling on the property. Surface water in samplable volume is not anticipated to enter the property from adjacent properties, based on observations of existing conditions at the site.

275 CHARLOTTE STREET, B1P 1C6

GENERAL NOTES

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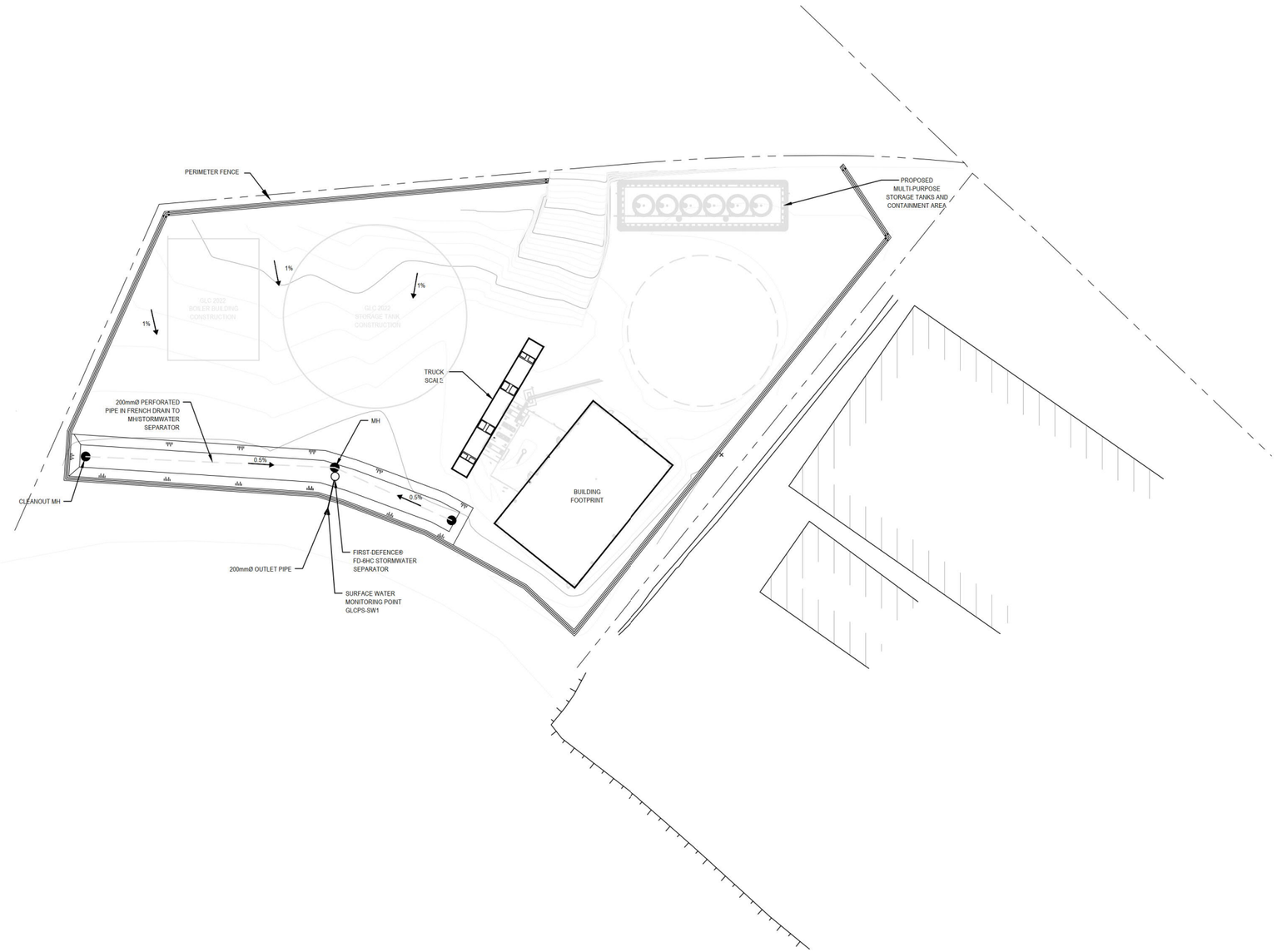
3. GLCPS-SW2 TO BE SAMPLED FROM A REPRESENTATIVE BACKGROUND LOCATION OFF-SITE.
4. IF SAMPLING OF THE ON-SITE SURFACE WATER INDICATES NON-COMPLIANCE WITH APPLICABLE PROVINCIAL AND FEDERAL GUIDELINES THIS MAY REQUIRE THE IMPLEMENTATION OF SUPPLEMENTAL CHEMICAL/MECHANICAL TREATMENT AND PUMPING (E.G. FLOC TANK).



SITE PLAN
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Conditions of Use

Verify elevations and/or dimensions on drawing prior to use. Report any discrepancies to Dillon Consulting Limited.

Do not scale dimensions from drawing.

Do not modify drawing, re-use it, or use it for purposes other than those intended at the time of its preparation without prior written permission from Dillon Consulting Limited.

DILLON CONSULTING

No.	ISSUED FOR	DATE	BY
3	RE-ISSUED FOR REVIEW	10/05/22	HML
2	RE-ISSUED FOR REVIEW	11/17/20	JAM
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DESIGN: JAM | REVIEWED BY: KRM
DRAWN: HEB | CHECKED BY: HML
DATE: JUNE 2021
SCALE: AS NOTED

SURFACE WATER MANAGEMENT
PLEASANT STREET, DARTMOUTH, NS

PROJECT NO. 19-1742

SURFACE WATER MONITORING PLAN

SHEET NO. B-1

Sampling Methodology and Quality Assurance/Quality Control (QA/QC)

All surface water sampling will be conducted by personnel trained in environmental sampling, with appropriate qualifications, and following industry standard protocols. Samples to be submitted for laboratory analysis will be collected as grabs in laboratory-supplied bottles. Laboratory analysis will be performed at a facility accredited for the analysis undertaken (e.g., Canadian Association for Laboratory Accreditation (CALA) or Standards Council of Canada (SCC)). Some water quality parameters will be assessed using field instruments. Calibration of meters will be undertaken as per appropriate manufacturer's recommendations prior to the sampling event and field instrument use will be documented. Control (QA/QC) activities will include duplicate samples for laboratory analysis at a minimum of 10% of total samples.

Operational Surface Water Monitoring Program

Operational surface water sampling within property runoff will be folded into the existing Surface Water Management Program pending NSECC approval of the sampling program and once operations have been initiated. Surface water sampling consisting of metered readings for temperature, pH, turbidity and conductivity and water sampling for Total Suspended Solids (TSS) will be undertaken on a monthly basis. If at any time a hydrocarbon sheen is observed, samples will be collected for Total Petroleum Hydrocarbon/Benzene, Toluene, Ethylene, Xylene (TPH/BTEX).

As noted in Appendix A, inspection and maintenance of the oil-water separator, First-Defense® FD-6HC stormwater separator, and outfall shall be performed quarterly by Envirosoil to confirm performance. Inspection frequency is to be re-assessed at the time of the annual reporting period.

During each sampling event, rainfall occurring within the previous 24 hours and within the previous three days will be documented based on Environment and Climate Change Canada's nearest meteorological station (Shearwater RCS 8205092).

Daily Area Inspections

During daily site visual site inspection checklist activities, tank containment berms and the loading/unloading areas are checked for the presence of standing water. Should standing water be present in the containment berms it is released to subsequent downstream treatment (oil-water separator or First-Defense® FD-6HC stormwater separator, depending on the location). Regular inspection and release will ensure full containment capacity is maintained.

Regulatory Guidelines

Assessment of conditions will reflect NSECC Industrial Approval conditions and Canadian Council of the Ministers of the Environment (CCME) Fresh Water Aquatic Life (FWAL) guidance and observed background/upgradient conditions (i.e.,

existing/natural conditions may not meet CCME guidelines). Guidelines will include comparison of results with total suspended solids (TSS) guideline of:

- Clear flow - Maximum increase of 25 mg/L from background levels for any short-term exposure (e.g., 24-h period). Maximum average increase of 5 mg/L from background levels for longer term exposures (e.g., inputs lasting between 24 h and 30 d).
- High flow - Maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L. Should not increase more than 10% of background levels when background is ≥ 250 mg/L.

For turbidity measurement, results will be compared to the turbidity guideline of:

- Clear flow - Maximum increase of 8 NTUs from background levels for a short-term exposure (e.g., 24-h period).
- High flow or turbid waters - Maximum increase of 8 NTUs from background levels at any one time when background levels are between 8 and 80 NTUs. Should not increase more than 10% of background levels when background is > 80 NTUs.

Where approval requirements are not met, a description of action taken will be provided to NSECC within one week of the finding.

Reporting

For operational monitoring, an annual report is produced in conjunction with a groundwater monitoring report within one month of the last sampling event of the year. If Approval requirements are not met during any sampling events this will be reported to Nova Scotia Environment and Climate Change Inspection Compliance and Enforcement Division (Bedford Office) within 48 hours.

Appendix C

Erosion and Sedimentation Control Plan

SURFACE WATER MANAGEMENT PLAN

Erosion and Sedimentation Control Plan

As reported in the Environmental Assessment Registration Document, site activities will include overburden excavation and placement of clean fill materials to support installation of the six (6) new multi-purpose tanks and secondary containment dyke, and installation of the 15,000 L oil-water separator. Wastewater treatment equipment and associated piping and appurtenances is generally not expected to require ground disturbance.

As reported in a 2018 Phase II Environmental Site Assessment completed for the subject property, soils at the site are indicated as a mixture of silty sand and clay horizons to 8 m below grade with no bedrock. These soils may be considered erodible, however, infiltration was not measured and hydraulic conductivity is not known. This Erosion and Sedimentation Control Plan proposes to manage sediment related to construction activity in the form of total suspended solids (TSS) only. Other contaminants of concern (e.g. hydrocarbons) are to be monitored and managed under a separate surface water monitoring plan (see the Surface Water Monitoring Program in Appendix B).

Pleasant Street (to the North of the site) is serviced by storm sewers that are expected to intercept offsite runoff before it reaches the site. For this reason, run-on from upgradient surfaces is not anticipated and measures to intercept and divert this water have not been included in these recommendations.

The objectives of this Erosion and Sediment Control Plan are to provide measures and best management practices to minimize erosion and manage sedimentation to protect the marine receiving water environment. The erosion and sediment control features must be compliant to the Nova Scotia Environment Erosion and Sediment Control Handbook for Construction Sites[1]. The TSS concentration in stormwater leaving the site will be monitored by the contractor to ensure compliance with the applicable environmental permitting. This limit is understood to be based on the Canadian Council for Ministers of the Environment (CCME) requirement that no activity shall increase TSS greater than 25 mg/L above background.

Temporary and Permanent Erosion and Sedimentation Control Measures

Dillon recommends an adaptive Erosion and Sedimentation Control Plan incorporating a monitoring program, erosion prevention at the source, and construction of the permanent runoff controls prior to the commencement of other site activities. The plan features are provided in Figure C-1. During construction, the plan should reflect ongoing changes on-site, and should be updated as conditions change due to grading or storm events, and as site activities change. These updates

[1]Nova Scotia Environment. (1988). Erosion and Sedimentation Control Handbook for Construction Sites.

and modifications are expected to be completed by the owner (Envirosoil Limited) and the site contractor.

Prior to the commencement of construction activities, sediment fencing in the form of geotextile filter fabric staked into the ground, or geotextile-wrapped hay bales laid along the ground, should be installed around excavation perimeter.

During any grading activities, surfaces should be stabilized as soon as possible if they are to be exposed for 14 days or longer. This erosion control applies to disturbed soils on-site as well as to stockpiled material. Stabilization should be undertaken as soon as practical, and may consist of hydroseeding, mulching, or laying out hay matting on exposed surfaces.

Any stockpiled material on site should be in compliance with NSECC requirements such as minimizing side slopes, vegetating or covering slopes as soon as possible to prevent erosion, and being physically separated from stormwater controls.

Stormwater will be managed by the existing runoff management features on site (French drain, berm, and stormwater separator; see Figure C-1). This system has been designed to provide adequate storage and conveyance during the 100-year, 24-hour rainfall event. This system will be more than adequate to provide interim runoff and ESC control during the construction phases of the project.

Monitoring Program

It is recommended that a routine monitoring program be implemented. The surface water monitoring program is presented in Appendix B of this report and includes sampling prior to outfall. In addition, visual inspection of the sediment/erosion control measures should be undertaken daily and deposition within the system should be checked weekly at a minimum during construction. If the accumulation of sediment at check dams, geotextile fencing, or the French drain interferes with their function, that ESC feature should be replaced or excavated to restore function. This monitoring and maintenance will be coordinated by the owner and completed by the site contractor. Results of the monitoring program will help to inform the design and type of current and future mitigation measures, allowing for the plan to be adapted to site conditions and to take advantage of natural site drainage conditions where possible.

Additional Measures

If routine and event-based monitoring indicate that the erosion prevention and sedimentation control measures outlined above are not sufficient, more intensive infrastructure measures should be considered. Such measures may include the placement of additional erosion control structures, or other technologies to capture suspended sediments prior to discharge from the site.

275 CHARLOTTE STREET, B1P 1C6

GENERAL NOTES

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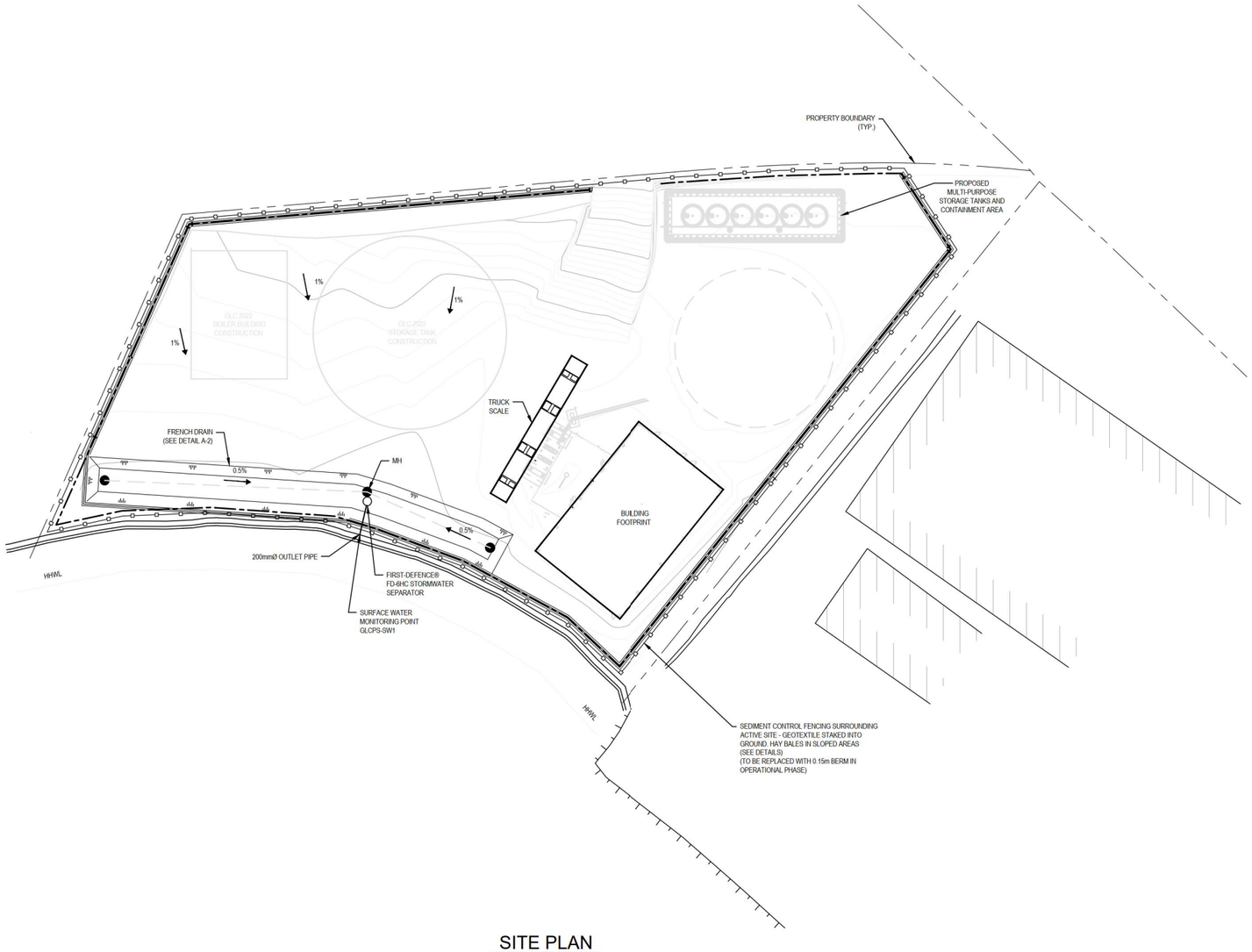
2. REGULAR MONITORING AND MAINTENANCE OF EROSION CONTROL WORKS TO BE PERFORMED AS REQUIRED. SEDIMENT REMOVAL SHALL BE PERFORMED SO AS TO CAUSE MINIMAL DISTURBANCE TO THE GROUND OR ANY PART OF THE EROSION CONTROL STRUCTURE.
3. GEOTEXTILE FENCING SHOULD SURROUND THE SITE TO KEEP SEDIMENT ON-SITE.
4. ANY EXPOSED SOILS TO REMAIN UNTOUCHED FOR GREATER THAN 14 DAYS MUST BE VEGETATED OR COVERED AS SOON AS POSSIBLE.
5. CONTRACTOR TO TAKE ALL REASONABLE PRECAUTIONS ON SITE TO LIMIT MIGRATION OF SEDIMENTS. THIS WILL INCLUDE MINIMIZING AREA OF DISTURBANCE AT ANY GIVEN TIME, COVERING DISTURBED SOILS, AND PROTECTION OF EXISTING STORM DRAIN INLETS.
6. SITE TO BE GRADED TOWARDS FRENCH DRAIN LEADING TO FIRST DEFENDER FD-6HC.



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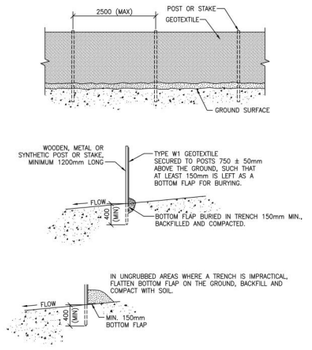

SEDIMENT CONTROL FENCE
NTS

NOTE: EROSION CONTROL DETAILS ADOPTED FROM THE STANDARD SPECIFICATIONS, DEPARTMENT OF TRANSPORTATION AND INFRASTRUCTURE, NB

DILLON CONSULTING

No.	ISSUED FOR	DATE	BY
2	RE-ISSUED FOR REVIEW	10/05/22	HML
1	ISSUED FOR REVIEW	09/25/20	JAM
0	ISSUED FOR REVIEW	08/20/20	JAM

DESIGN: JAM	REVIEWED BY: KRM
DRAWN: HEB	CHECKED BY: HML
DATE: JUNE 2021	
SCALE: AS NOTED	

SURFACE WATER MANAGEMENT
PLEASANT STREET, DARTMOUTH, NS

PROJECT NO. 19-1742

EROSION AND SEDIMENTATION CONTROL PLAN

SHEET NO. C-1

Appendix D

2020 Pre- and Post-Development Site Analysis – 750 Pleasant Street

SURFACE WATER MANAGEMENT PLAN

Hydrologic and Hydraulic Analysis

The proposed development consists of the construction of a Liquid Asphalt Storage Facility, located at 750 Pleasant Street, Dartmouth and has an area of approximately 12,039 m^2. The runoff from the study site discharges into the Halifax Harbour.

To quantify and mitigate potential increases in site runoff, an assessment of runoff conditions has been undertaken for both pre- and post-development conditions at the site. The following sections present the findings of this assessment. The existing and proposed site layout conditions used to support this study are provided in the grading plan provided by General Liquids Canada.

Modelling Approach

A review of existing and proposed future site drainage conditions has been undertaken to complete stormwater calculations for the site; see Figure A-1 for the site location. The 100-year return period event was modelled using the 24-hour Chicago design storm developed using the intensity-duration-frequency (IDF) data at Shearwater RCP (ID 8205092).

Figure A-1: Liquid Asphalt Storage Project Area Subcatchments

The Environment and Climate Change Canada Climate Station at the Shearwater Airport (Station ID SHEARWATER RCS 8205092) is less than 1 km from the project site and has a data record of 61 years between 1955 and 2017. The historical data indicates that a 1:2 year return period storm event with 24-hour duration is a 67.49 mm rainfall event. Under a moderate climate change scenario (RCP 4.5)[1] future modelled data indicates a 1:2 year return period storm event with a 24-hour duration is a 71.73 mm rainfall event.

The pre- and post-development conditions were simulated using the latest version of Computational Hydraulics International's PCSWMM software package. The pre-development runoff parameters are provided in Table A-1. The existing forested land was assigned a SCS curve number (CN) of 72 and the impervious tank was assigned a CN of 98.

Table A-1: Pre-Development Runoff Parameters

Subwatershed	Area (ha)	Imperviousness (%)	SCS Curve Number (Pervious)
S1	0.58	12.0	72.00
S2	0.62	0.0	72.00

The post-development condition runoff parameters are provided in Table A-2.

Table A-2: Post-Development Runoff Parameters

Subwatershed	Area (ha)	Imperviousness (%)	SCS Curve Number (Pervious)
S1	0.58	24.0	89
S2	0.62	0.0	89

Item 1: Pre and Post Stormwater Management Conditions Assessment

The results of the pre- and post-development peak flow calculations for the 100-year 24-hour rainfall design event without attenuation of runoff is presented in Table A-3. It can be seen in Table A-3 that the overall discharge from the site is expected to increase.

[1]Schardong, Gaur, Simonovic, Sandink. (2018) Computerized Tool for the Development of Intensity- Duration- Frequency Curves Under a Changing Climate Technical Manual v.3. University of Western Ontario.

Table A-3: Simulation Results for Peak Flow without Mitigation Measures

Rainfall Return Period (years)	Pre-Development Total Peak Flow (L/s)	Post-Development Total Peak Flow (L/s)	Deviation (L/s)
100	110.0	280.0	+170.0

Existing runoff from the site is currently distributed overland (i.e., sheet flow), however under proposed conditions this runoff will be directed to a stone-filled trench along the southern boundary of the property, which is shown in Figure A-2. A perforated 200 mm pipe (i.e., French drain) will be installed in the trench, which will connect to a manhole and oil-water separator that will discharge through a 200 mm pipe to the Halifax Harbour. A 0.15 m high berm with a crest elevation not to exceed the finished floor elevation of the operations building will additionally be constructed on the southern side of the site to direct runoff into the trench.

The increase in runoff peak flow is offset by the storage provided in the stone-filled trench, which includes a 200 mm perforated pipe. The proposed trapezoidal trench provides a cross-sectional area of 5.5 m^2 with a total length of 75 m. The trench will be filled with clear stone having a void space of 0.35, thus providing 166 m^3 of volumetric runoff storage. The simulated storage, French drain, and 200 m pipe attenuates the peak runoff to 114 L/s (Table A-4), representing a minor increase (3.6%) in runoff peak flow.

Table A-4: Simulation Results for Peak Flow with Mitigation Measures

Rainfall Return Period (years)	Pre-Development Total Peak Flow (L/s)	Mitigated Post-Development Total Peak Flow (L/s)	Deviation (L/s)
100	110.0	114.0	4.0

The 4 L/s increase in the peak discharge rate is not expected to have an impact on the receiving body (Halifax Harbour) nor cause adverse stormwater effects to adjacent properties.

To address possible increases in runoff due to climate change, the representative concentration pathway (RCP) 4.5 was used to assess future precipitation conditions. Using the IDF CC (https://www.idf-cc-uwo.ca/) created at the University of Western Ontario. The IDF curve for the Shearwater RCS climate station was projected to 2100 and the resulting IDF data were used to build an updated 100-year, 24-hour Chicago distribution storm with a peak flow of 340 L/s. The additional storage required to

contain the projected future climate change runoff on-site is 15 m^3. Based on the dimensions of the surface area of the trench (75 m x 8.5 m = 637.5 m^2), this results in approximately 2.5 cm of ponding over the trench, which will be contained by the proposed 0.15 m berm.

Item 2: Recommended Plans for Monitoring, Maintenance, and Upgrading of Stormwater Infrastructure

It is recommended that stormwater be managed on-site with site grading, perimeter berms, and an infiltration trench system with a cleanout sump and a Stormceptor® (or equivalent). The site will generally be graded at approximately 1% towards the Harbour. Runoff that flows towards the edge of the property will be intercepted by the perimeter berm, which is intended to keep runoff on-site. The maximum height of the berm should not exceed the finished floor elevation of the operations building to avoid potential water ingress. Maintaining runoff on-site is intended to mitigate total suspended solids (TSS) migration into the harbour. The proposed maximum elevation of the berm has been set to limit excessive ponding on site to mitigate flooding of an adjacent site facilities.

As discussed above, a French drain will be installed to promote infiltration of stormwater. During operations, a 200-mm French drain will collect stormwater and promote infiltration into the stone layer surrounding the pipe. The French drain will lead to a Stormceptor® EFO6 (or equivalent) that will outlet to the Harbour in overflow conditions.

An Imbrium Systems Stormceptor® product is recommended at this site to protect the receiving environment from suspended sediment, floatables and other pollutants. It is expected that the French drain system will be highly effective at removing TSS prior to discharge. The grit-separation capabilities of the Stormceptor® is not a specific requirement given the efficacy of the upstream French drain to capture sediments. Other approved products achieving similar results may also be considered.

For reference the PCSWMM for Stormceptor® online tool was used to determine the adequate Stormceptor size for a 'first flush' equivalent 2-year, 1-hour rainfall event which corresponds to approximately 20mm of rainfall within a 1-hour period . This calculation suggested that the sediment and pollutant mitigation system should be equivalent to or greater than the Stormceptor EFO6 system. Other products meeting or exceeding the EFO6 performance may also be considered. Inspection and maintenance of the unit and outfall shall be performed quarterly to confirm performance. Inspection frequency of the drainage systems shall be re-assessed at the annual reporting period.

Details of the design, orientation, sizing of the infiltration trench system, Stormceptor®, and identification of the associated discharge point, including maintenance recommendations, are included in Figure A-2.

Appendix E

Wastewater Management Plan (Updated)

DILLON CONSULTING

ENVIROSOIL LIMITED

Waste Oil Recycling and Water Treatment Facility Wastewater Management Plan

750 Pleasant Street, Dartmouth, Nova Scotia

October 2022 – 19-1742

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Appendices

Acronyms, Abbreviations and Definitions

Some of the regularly used and important technical abbreviations in this report are summarized below for convenience:

Table 1-1: Acronyms and Abbreviations

Abbreviation	Term	Definition
BOD_5	5 Day Biochemical Oxygen Demand	The amount of dissolved oxygen required over a 5-day period by microorganisms to oxidize or decompose organic matter found in wastewater.
$cBOD_5$	Carbonaceous Biochemical Oxygen Demand	The amount of dissolved oxygen required over a 5-day period by carbonaceous sources only.
COD	Chemical Oxygen Demand	The amount of oxygen required to chemically oxidize organic matter in water.
FOG	Fats, Oils & Greases	Animal, vegetable any synthetic substances found in fatty substances.
Kg	Kilogram	Unit of weight, equivalent to 2.20 pounds
m^3	Cubic Metre	Unit of volume, equivalent to 1,000 litres
ft^2	Square Feet	Unit of area, equivalent to 0.093 square metres
TKN	Total Kjeldahl Nitrogen	The sum of ammonia-nitrogen and organically-bound nitrogen.
TSS	Total Suspended Solids	The amount of particulate matter that remains suspended in water, related to turbidity or the “cloudiness” of water.
WWTP/WWTF	Wastewater Treatment Plant/Facility	A facility that receives domestic and industrial wastewater and through biological, chemical and/or physical processes produces clean effluent.

Executive Summary

Dillon Consulting Limited (Dillon) has prepared this Wastewater Management Plan (the 'Plan') related to the proposed wastewater treatment plant in Dartmouth, Nova Scotia. The proposed plant is a waste oil recycling and water treatment facility that will treat liquid waste in accordance with environmental best practices, regulatory requirements and proposed environmental discharge criteria for treated effluent from the facility that considers the specific Halifax Harbour receiving environment. A Receiving Water Study (RWS), presented under separate cover (EA Addendum - Appendix F), has been undertaken to support this Plan.

The following document outlines the scope of the project, the proposed facility design, applicable by-law and regulations, management practices and any emergency measures associated with facility operations.

The proposed facility will treat wastewater and waste oil that are common, non-sanitary waste products from the domestic, industrial and commercial markets. Envirosoil Limited is proposing to install a modern, industry standard waste oil recycling and water treatment system within the existing primary building. The treatment unit will employ a multi-stage system that provides enhanced treatment and includes processes that can be adjusted and optimized to effectively treat the anticipated forms of waste oil and wastewater that will be received. The system will treat, recover and recycle waste oil using a two-stage process of gravity separation and demulsification, followed by filtration.

The wastewater treatment system is comprised of a flexible treatment train that can be tailored to treat specific contaminants and/or to achieve lower discharge requirements. Similar to other existing Envirosoil operations, the waste generator will provide a Waste Profile Sheet for review by Envirosoil to determine acceptance.

At the request of Halifax Water, treated effluent is proposed to be discharged to the Halifax Harbour via an existing and operating site discharge system, and the new facility will be required to meet regulatory agency approved discharge criteria. Surface runoff from an onsite tank farm will be collected and sent to an oil/water separator prior to discharge into the municipal sewer, similar to other sites with industry-standard oil/water separator systems.

The facility will be equipped with a state of the art laboratory facility maintained by trained operators, where incoming wastewater and outgoing discharges of treated effluent will be analyzed to ensure compliance with permit limits. Facility operators will follow the operation and maintenance protocols, which include monitoring, process control and reporting. Additionally, preventative maintenance and inspections will be done to keep the effluent quality within the required regulatory agency approved limits. Prior to the plant start up, wet commissioning will be conducted prior to the introduction of wastewater to identify and repair any possible vulnerabilities in the system. Waste management best

practices pertaining to the handling of liquid waste and solid waste will be carefully followed by operators. Emergency response measures for accidents, malfunctions and unplanned events are addressed and cover the accidental release of waste materials, the accidental release of untreated wastewater, and the accidental release of excessive quantities of wastewater along with mitigation actions.

1.0 Introduction

Envirosoil Limited (Envirosoil) is proposing to install and operate a waste oil recycling and water treatment facility ("the project" or "the facility") on a longstanding and currently active industrial site, located at 750 Pleasant Street in Dartmouth, Nova Scotia ("the site"). The project will be located entirely within a property currently owned and operated by General Liquids Canada. The facility will be used for receiving, treating and recycling waste oil and liquid wastewaters. Liquid wastes will be treated to meet the required regulatory criteria and discharged to the Halifax Harbour via a new 150mm (6") discharge line, to be located immediately adjacent the existing and currently operating site discharge system (First-Defense® stormwater separator), which also employs a 200 mm (8") discharge line. Waste oils recovered/collected as part of the facility's recycling process will be sent to licensed and approved facilities for beneficial reuse, adhering to Nova Scotia's Used Oil Regulations under the *Environment Act*.

The Proponent will develop a list/approach based on their current forecasted waste streams, but this will evolve as the facility enters operation and new waste sources are identified. Regardless of the waste accepted, the discharged effluent will be treated to regulatory agency approved discharge limits. The Proponent also intends to have a digital toxicology simulator ("Microtox") as part of their lab.

The design and operation of the facility will be based on proven technology and methods used by similar operations across Canada. As described in Section 3.0, the construction/installation phase of the project will generally consist of installation of the required facilities, including the wastewater treatment system, multi-purpose storage tanks and associated upgrades to the electrical and piping connections at the existing facility. Storage and transfer of products to be received at the facility is by appointment only and carried out through the use of tanks, pipes and pumps which does not allow for uncontrolled emission of gas, vapours, liquids, or objectionable odour.

2.0 Scope

This Wastewater Management Plan is intended to address any potential wastewater discharge from the proposed facility and outline the mitigation measures implemented in order to avoid any potential adverse effect on the receiving environment (Halifax Harbour). Dillon has worked closely with Envirosoil to prepare a Wastewater Management Plan outlining:

1. Discharge volumes, frequencies, sampling and analysis programs, and applicable criteria to be met prior to discharge, taking into consideration effluent quality, and quantities;
2. How wastewater discharges will be managed during pressure testing and equipment maintenance/cleaning processes; and
3. Emergency protocols in the event of a system upset and release of untreated water to the marine environment.

3.0 Proposed Facility

This facility is proposing to accept an average of 16,000 m^3 per year of incoming waste oil and wastewater, with a maximum of 20,000 m^3 per year of treatment capacity. Wastewater and waste oil are common waste products from the domestic, industrial and commercial markets. Marine shipping in particular drives a requirement for effective treatment of wastewater and waste oil, as it is a common effluent from bilges and fuel transfer. Given Halifax's status as a world class-shipping hub, there is significant demand for effective treatment of this effluent and this demand is best met by a local service provider.

The proposed location for this undertaking is close to marine shipping and other industrial activities, which would minimize the environmental and safety risks associated with secondary trucking of wastewater and waste oil over considerable distances through environmentally sensitive areas (as the nearest two similar facilities are located in Goffs and Debert, NS). Currently, for example, most bilge water is trucked to Cape Breton for disposal, incurring large transporting costs and significant GHG emissions.

Envirosoil is proposing to install a modern, industry standard waste oil recycling and water treatment system within the existing primary building at the site. The treatment unit will employ a multi-stage system that will be optimized to effectively treat the anticipated forms of waste oil and wastewater that will be received.

3.1 Facility Overview

Wastewater and waste oil will enter the facility by truck via the existing Pleasant Street entrance to Envirosoil's facility. Truck arrivals on site will be by appointment only and a Waste Profile Sheet will be provided to Envirosoil prior to receipt of wastewater. These trucks will connect to a new external loading connection at the treatment facility, and product will be pumped into unheated raw wastewater/waste oil storage tanks. This loading will be metered and volumes will be recorded. It is noted that all piping will be separate from the existing asphalt operations at the site, and therefore no potential exists for crossover during movement of liquids.

The existing building has a set of boilers that use a food grade (non-toxic) oil to transfer heat to the asphalt concrete tanks and enhance its ability to transport. These boilers have sufficient and excess capacity to provide a heat source for the proposed waste oil treatment system. The following sections outline the specific processes proposed to treat wastewater and waste oil at the facility.

3.1.1 Waste Sources

When classifying the wastewater types that the facility will accept and treat, Envirosoil relied on information provided in the US EPA Centralized Waste Treatment (CWT) Effluent Guidelines and Standards. This document covers facilities that treat or recover metal-bearing, oily, and organic wastewater received from off-site sources. This document was not used in its entirety or verbatim, but as a general guideline for the development of various aspects of the facility operations. It is important to note that the facility is planning to only accept wastewaters that are currently being sent for treatment and/or disposal in one of Nova Scotia's existing, privately operated, wastewater treatment facilities. Most of the wastewaters to be accepted at the facility are therefore currently being treated within Nova Scotia and are being actively discharged to either the environment, municipal sewer and/or storm sewer.

Since Nova Scotia is a growing province that is actively trying to attract new industry and business to the province, the types and sources of wastewaters requiring treatment over the next decade may change and/or expand. If a "new" waste stream is developed/generated in Nova Scotia (i.e., a new commercial or industrial facility moves into the region, modifications to existing commercial/industrial facilities, etc.), a full treatability program will be developed and implemented prior to accepting the water for treatment. This treatability program will include both laboratory testing and/or bench-scale treatability testing to determine if the treatment process can effectively remove the contaminants to the appropriate criteria.

3.1.2 Pre-Acceptance Procedure

As per the general procedures outlined in the US EPA Centralized Waste Treatment Effluent Guidelines and Standards guidance document, before the facility accepts wastewater for treatment, it will perform a pre-approval review. This pre-approval process may include screening the wastewater for compliance to its acceptance criteria, treatability and compatibility with both other wastewaters being treated, and the capability of the treatment system to effectively treat the wastewater.

The facility will generally contact the waste generator and/or the industrial services contractor to obtain information concerning the type and concentrations of contaminants in the wastewater and have the generator complete a Waste Profile Sheet (WPS; refer to EA Addendum, Appendix C-3 for details). In order to complete the WPS the generator will rely on any/all of the following:

1. Analytical data on the waste composition obtained by laboratory testing (if available);
2. Information on the properties of waste constituents, SDS sheets, etc.;
3. Process knowledge, whereby detailed information on the wastes is obtained from existing published or documented waste analysis data or studies conducted on wastes generated by processes similar to that which generated the waste;
4. Generator knowledge of the waste and the process that generate the waste; and
5. Current treatment/disposal practices (i.e., current treatment/disposal facility within NS).

Ideally all wastewater would be sampled and fully analyzed prior to acceptance. However, in many cases this may not be feasible or practical and/or the data from a full chemical analysis is not always relevant. For example, it would not be feasible/useful to conduct a full chemical analysis of wastewater from a HRM catch basin or manhole water prior to performing maintenance or cleaning. The isolation of a manhole/catch basin and the collection and analysis of samples would require that the manhole/catch basin be removed from service for 2 – 7 days while awaiting analytical data. This is neither financially feasible nor practical when one considers the low potential for various contaminants within the manhole/catch basin. A similar rational would apply to a car wash oil/water separator. In both these cases the wastewater would be classified based on items 3 to 5 above.

In the case of commercial and/or industrial types of wastewaters, reliance on analytical data that was collected on an established frequency would be more appropriate. The frequency and type of analysis required would depend on the types of potential contaminants, process generating the wastewater, volumes to be disposed of, frequency of shipments, variability in the wastewater generation process, etc. The current treatment/disposal practices and requirements (i.e., current treatment/disposal facility used) will also influence the requirement for additional laboratory testing. Based on all of the relevant data, the generator may be required to re-evaluate and/or re-sample and analyze wastewater once per shipment, once per month, once per year, etc.

Once the facility receives all of the relevant information from the generator, a decision will be made as to whether or not the wastewater is suitable for acceptance and treatment.

3.1.3 Acceptance Procedure:

Once a wastewater stream is approved for acceptance, delivery to the facility will be scheduled. The facility will not accept unscheduled deliveries of wastewaters even if the waste stream has been approved for acceptance.

Prior to scheduling delivery of a particular waste stream, the facility will establish a schedule for acceptance testing/screening – referred to as fingerprint analysis. Two key objectives of the waste acceptance sampling and analysis are to:

1. Ensure that the parameters being tested meet permit/approval requirements and fall within acceptable limits for effective treatment and management; and
2. Verify that the incoming shipment matches the Waste Profile Sheet (refer to EA Addendum, Appendix C-3 for details) and is the same waste that was approved during pre-acceptance.

The testing/acceptance screening requirements will be based on the following parameters:

1. Types of contaminants in the wastewater;
2. Total volume to be received;
3. Frequency of shipments; and
4. Volume per shipment.

Fingerprint analysis parameters used to verify that the waste arriving at the facility is the actual waste expected are often quick screening tests or observations since the detailed chemical and physical properties of the waste are usually obtained under pre-acceptance sampling and analysis.

Fingerprint analysis of the incoming wastewaters can include laboratory instrumental analysis, testing with field test kits and screening instruments, or by making qualitative observations such as visual identification of color, number of liquid phases, etc.

Visual identification of color and number of liquid phases are examples of fingerprint analysis that can be used to help verify that the wastewater meets the acceptance criteria and matches the expected characteristics for that waste. Other examples of this type of screening may include specific gravity, flash point, Btu/lb, pH, halogen content, chlorine spot test, reactive cyanide spot test, oxidizer screen test, select metals, percent water, BOD/COD, percent solids, etc. The specific fingerprint analysis selected will depend on the initial physical and chemical characteristics outlined in the Waste Profile Sheet.

For each project[1], the fingerprint sampling and analysis will be based on the following:

1. Collection of a sample from every shipment/load;
2. Visual inspection of 100% of shipments/loads;
3. In-house analysis of the first shipment/of water from the project;
4. In-house analysis of 10% of all shipments/loads after the first shipment/load;
5. Collection of daily composite sample to be archived until the wastewater has been treated and discharged. The purpose of the sample is to allow for further analysis of raw water should there be any issues during treatment. If there are issues, a more complete analysis of the archived sample can be conducted to see if it matches the anticipated waste characteristics; and
6. Shipments/loads selected for fingerprint analysis will not be offloaded until the in-house analysis is completed.

Once the required fingerprint analysis data has been completed, the data will be compared with information provided on the Waste Profile Sheet to ensure that it is consistent with the initially approved wastewater stream. In order for a waste stream to be compliant with the Waste Profile Sheet the results of the fingerprint analysis must indicate that the appropriate parameters have an average Relative Percent Difference (RPD)[2] <35%. If the RPD is <35% the sample will be deemed similar, and the shipment of wastewater is accepted for treatment. If the sample is dissimilar, the facility will re-evaluate acceptance. This re-evaluation may include discussion with the generator, obtaining additional data, performance of additional testing, etc. Once the re-evaluation is completed, the generator is contacted to discuss the discrepancy and reach a resolution. Figure 3-1 presents a schematic of the waste acceptance procedure.

[1]A project is defined as a particular wastewater stream that is generated from a particular customer by the same process.
[2]Based on the US EPA Centralized Waste Treatment Effluent Guidelines and Standards.

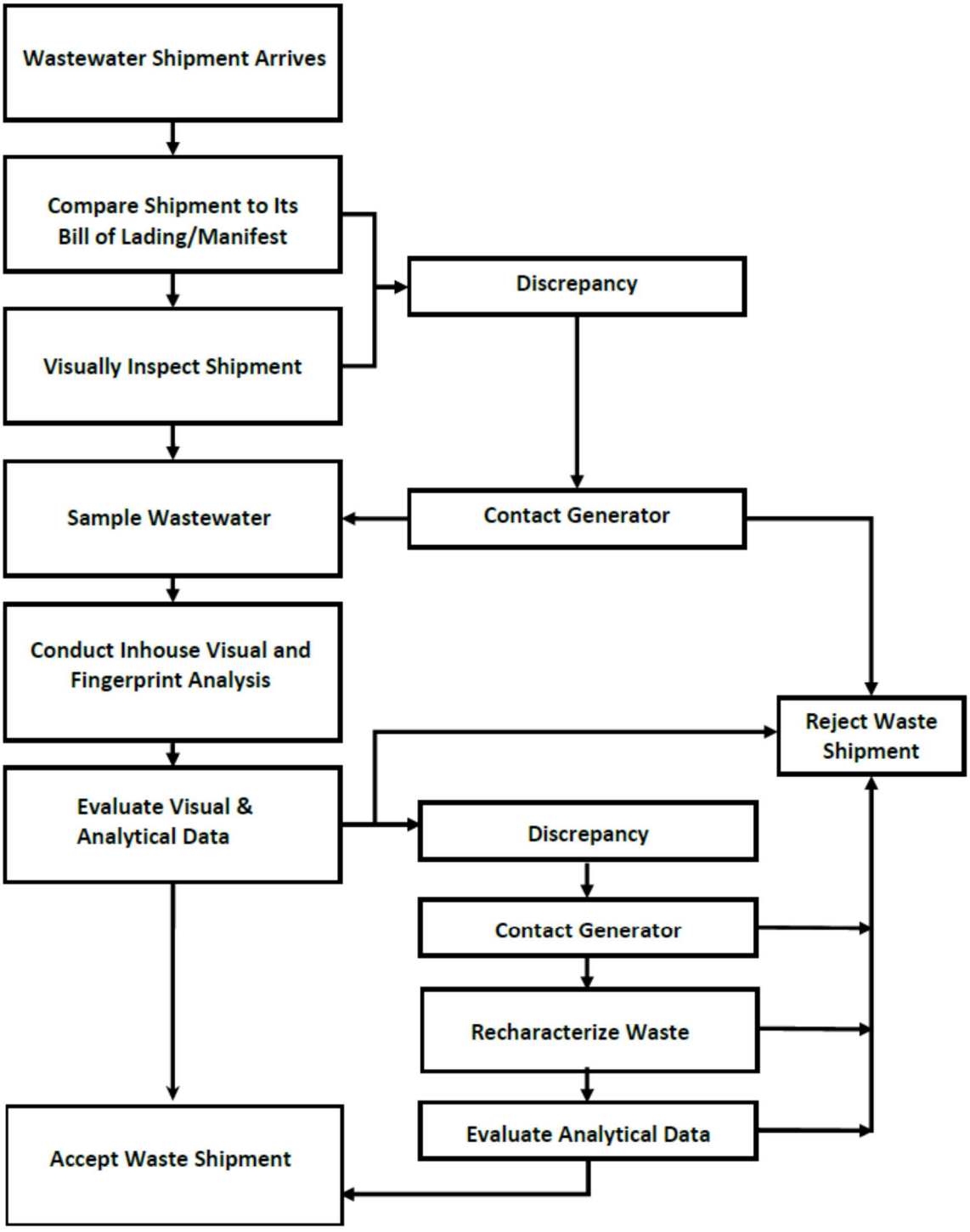


Figure 3-1: Waste Acceptance Procedure

3.2 Waste Oil Treatment Process

The overall process flow for the treatment process is displayed within Figure 3-2 for reference; the complete drawing package is provided in Appendix A of this WWMP. The waste oil recycling system will be able to accept and treat all waste oils as defined by the Nova Scotia Used Oil Regulations. The system can treat, recover and recycle waste oil using a two-stage process:

1. Gravity Separation; and
2. Demulsification.

In the gravity separation treatment process, waste oil is placed in a dedicated raw waste storage tank and any free water is allowed to naturally separate via gravity. After the gravity separation process, the separated water is drawn off and sent to the wastewater treatment system. The remaining waste oil is then sampled and analyzed for basic sediment and water (BS&W). If the BS&W exceeds 3% then the waste oil contains too much emulsified water to be recycled as fuel. The oil is then sent to the secondary treatment process (demulsification) for further refinement. If the BS&W content is below 3% then the oil is deemed "good quality" and trucked off-site for use at an approved facility for beneficial reuse, following criteria outlined in Nova Scotia's Used Oil Regulations.

In the demulsification treatment stage, the waste oil is heated via a closed loop heat exchanger from the on-site boilers and a demulsification chemical is added (if needed) in order to break the oil/water emulsion. Once the emulsion is broken, free water separates via gravity as a separate phase and is removed and treated via the wastewater treatment process described in the next section.

The demulsification process begins by transferring the waste oil into a 'Treater Tank', which is a vertical tank with a heating coil at the bottom. Once the Treater Tank is filled with waste oil, heating fluid (from the existing hot oil heaters) is passed through the coils and the waste oil is heated to 50 – 85°C (depending on the type of hydrocarbon present). If needed, a chemical demulsifier is added to the waste oil to aid in the demulsification process. The demulsifier will both be biodegradable and safe for use and discharge to the marine environment, or the demulsifying agent will be comprised of an acid and a hydrocarbon. In this case, the hydrocarbon will partition into the waste oil and any impacts to pH will be mitigated by the downstream pH adjustment system.

The application of heat and/or demulsifier effectively breaks the emulsion and allows the remaining water to separate from the oil. The separated water is drawn off and sent to the wastewater treatment system while the remaining waste oil is then sampled and analyzed for BS&W. If the BS&W exceeds 3% then the treatment process is repeated. If the BS&W is <3% then the waste oil is transferred to an appropriate tank and shipped off-site for beneficial reuse, following criteria outlined in the provincial Used Oil Regulations.

3.3 Wastewater Treatment Process

Envirosoil's proposed wastewater treatment facility will accept and treat a variety of non-sanitary commercial and industrial wastewaters containing contaminants from only three general chemical groups:

- Organics (including Polycyclic Aromatic Hydrocarbons);
- Metals; and
- Petroleum Hydrocarbons.

The system will employ physical and chemical separation processes that will be capable of removal of organics and inorganics to the applicable discharge limits.

The plant is designed such that the treatment train can be started and stopped as needed. This will allow the plant flexibility regarding discharge options. The plant is also capable of holding treated effluent for up to 48 hours if discharge needs to be temporarily suspended. With the exception of BOD5 (which is a five (5) day test and would require 3rd party laboratory analysis), the other parameters can be analyzed within 48 hours.

If a situation occurred where effluent was tested and found to not be in compliance, the acceptance of new loads would pause. It is impractical/non-standard to test each batch of effluent for every possible contaminant, and therefore primary Chain of Custody's and surrogate analysis is proposed. The Chain of Custody documentation records the chronological traceability of custody (by authorized person(s) or upon storage) and the actions performed on the sample and any aliquot of the sample taken for analytical testing.

Envirosoil will mobilize all of the necessary equipment to allow for the effective installation and operation of the water treatment facility. The following components are expected to be required as part of the Treatment train (the actual components included will be based on detailed engineering requirements):

- Laboratory and Testing Equipment;
- Duplex Solids Filtration Unit (Coarse Rigid Duplex Basket Strainer);
- Dual Bag Solids Filtration Unit;
- Multi-bag Solids Filtration Unit;
- Oil/Water Separator;
- Electrocoagulation;
- Pipe flocculator for chemical reactions;
- Multi-disk screw press;
- Organo-Clay Adsorption Unit;
- Activated Carbon Adsorption Filters;
- Zeolite/media Adsorption Filters;

- Fine Filtration Unit;
- Automatic pH Adjustment systems and Online TPH, TSS Analyzers;
- Online BOD/COD Analyzer;
- Pumps, piping & instrumentation; and
- Integrated programmable logic (PLC) control system and data logger.

3.3.1 Process Description

Wastewater enters the facility from truck unloading or piped connection to the untreated water storage tanks. Wastewater can also enter the system from the waste oil treatment process. A Wastewater and Waste Oil Offloading Procedure has been developed for the facility, based on the Canadian Fuels Association's Professional Petroleum Driver's Manual (refer to EA Addendum, Appendix C-3 for details).

From the untreated water storage tanks, wastewater is pumped through a staged 6-unit bag filter consisting of decreasing pore sizes to remove solids. The bag filters are staged in series through the treatment train with pore sizes ranging from 50 microns to 1 micron and can be changed to optimize treatment. The solids separated from the process are sampled, tested, and trucked to an approved facilities for further processing, depending on solids sampling results. The used bag filters are sent to an approved facility for disposal.

Water that passes through the multi staged bag filter is then passed through the oil-water separator. Oil drains by gravity from the top of the separator and is stored in an oil day tank to be pumped back to the waste oil treatment system.

Non-oily wastewater passes through a pH adjustment system, utilizing inline sensors and chemical feed pumps to adjust the pH within acceptable range for electrocoagulation. In this unit an electrical current is passed through water containing anodes and cathodes, destabilizing colloidal particles and allowing them to form flocs. This enables the removal of TSS, BOD/COD (contained in TSS), metals, organics and other contaminants following the next step.

Wastewater then passes through a mechanical screw press, separating solids out of the water. The final polishing stage includes a six unit bag filter, followed by three separate media filtration steps: organo-clay (removal of oil and grease, soluble organic compounds), activated carbon (removal of soluble organics, hydrocarbons and other contaminants) and zeolite metals (removal of heavy metals, ammonia, etc.). Treated effluent then flows through another pH adjustment system and finally passes through inline TSS, TPH and BOD analyzers. Water that passes the treatment criteria for all three online analyzers is sent to the clean water storage tank via the inline auto-sampler. Water that fails either of the online analyzers is automatically directed back to the dirty water storage tank. Water sent to the clean water tanks is analyzed and discharged to the Halifax Harbour if regulatory agency approved discharge criteria is met.

Two options are proposed for wastewater sampling depending upon the wastewater stream:

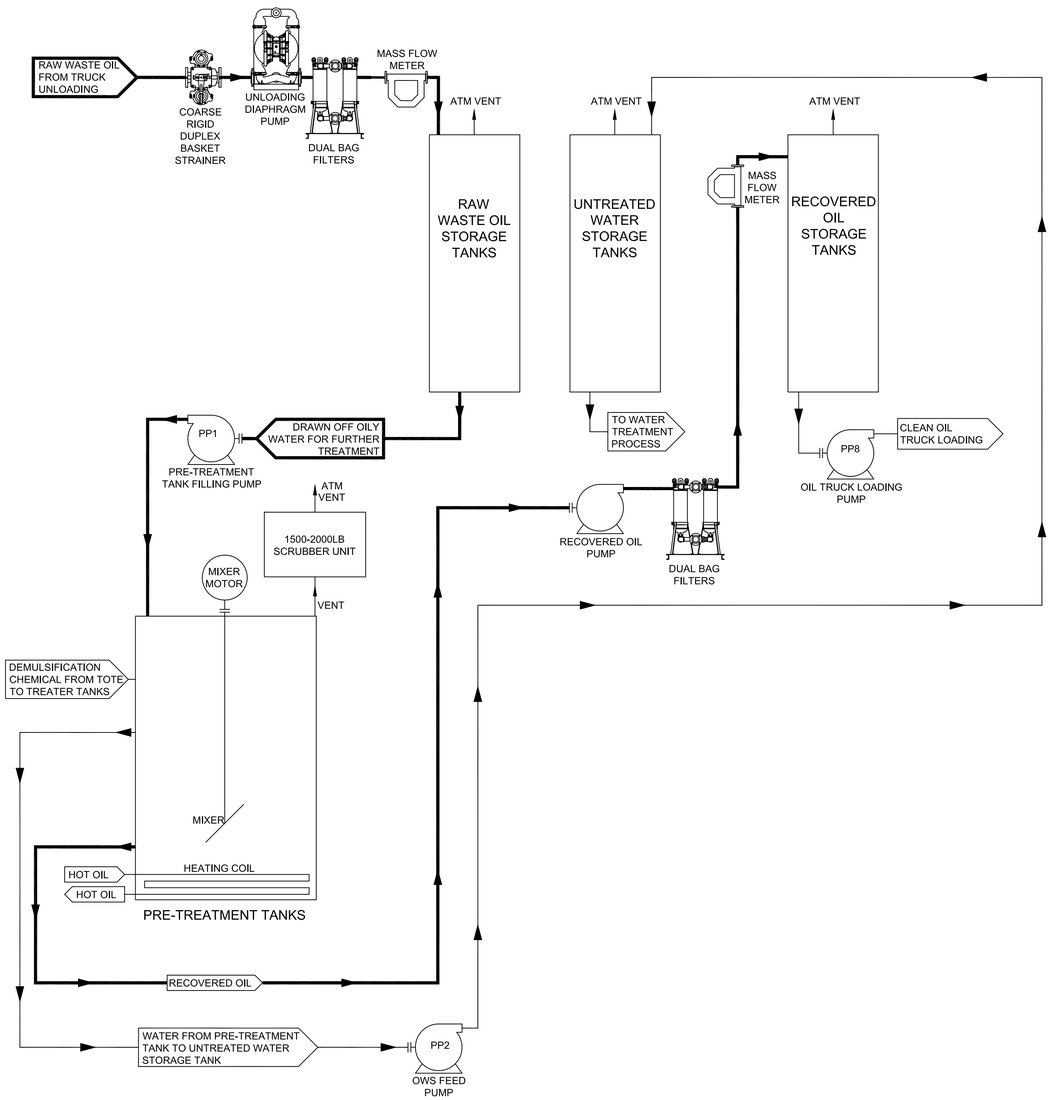
1. Continuous discharge with in-house lab testing on a regular basis (i.e., one sample per shift) with 10% confirmatory to accredited lab; or
2. Batch process (defined as maximum of 100 m3) until in-house lab data is received. 5% of confirmatory samples are sent to an accredited lab.

Effluent that does not meet the discharge requirements will be diverted to the start of the process for additional treatment. All effluent is metered and recorded prior to discharge. In the event that TSS, TPH, pH, or BOD readings exceed programmed criteria, online sensors, automatic valves and pumps will divert the effluent back to the start of the treatment process.

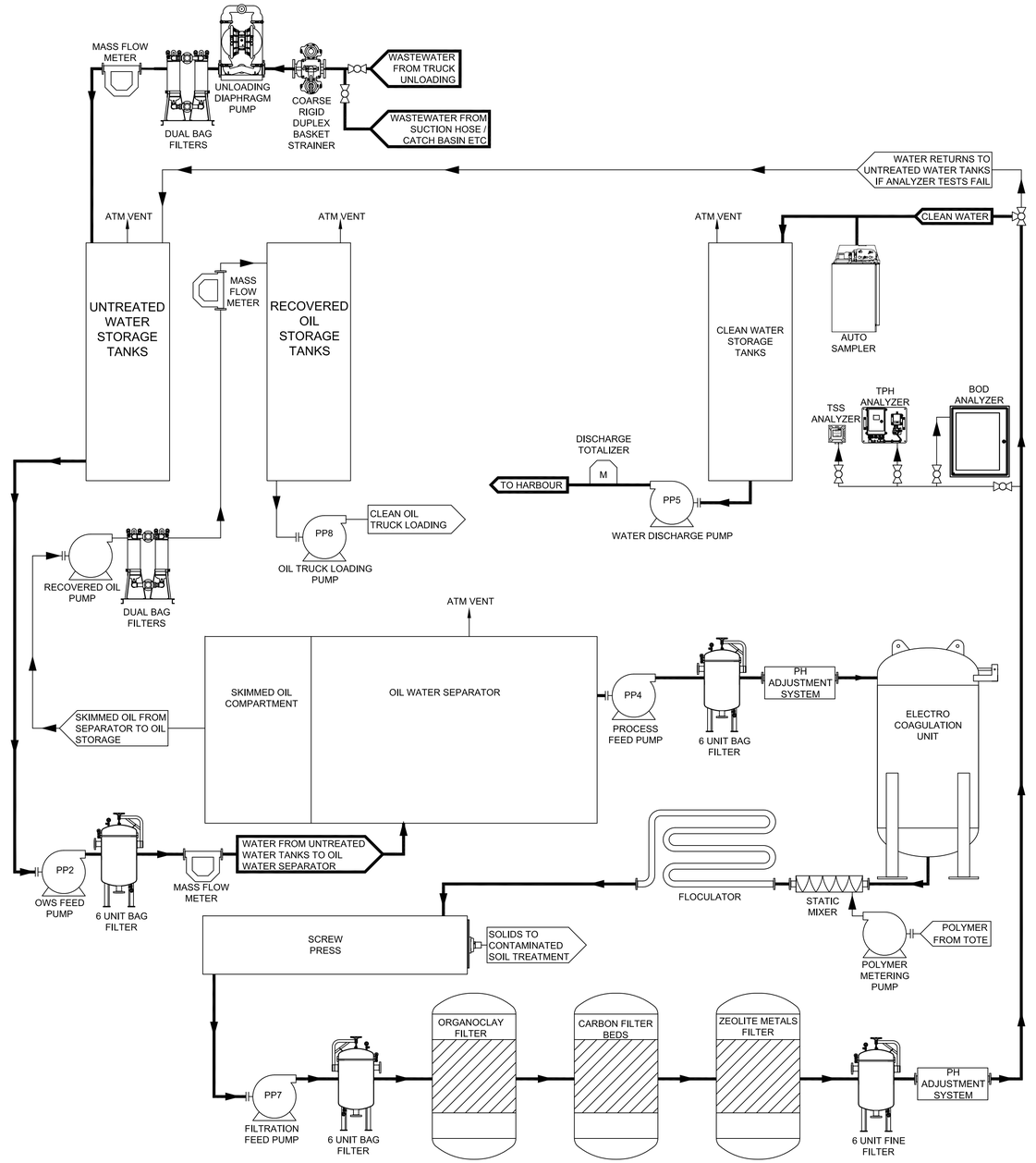
The solid effluent from the screw press will be trucked offsite to Envirosoil or other appropriate and licensed treatment facility.

Refer to Figure 3-2 for the Wastewater Treatment Process, and refer to EA Addendum, Appendix C-2 for detailed information regarding key treatment process technologies.

Although Envirosoil anticipates that the facility will primarily handle hydrocarbon and metals contaminated wastewaters, the system will be capable of treating a variety of miscellaneous contaminants (suspended solids; metals (i.e., lead, copper, zinc, etc.), ammonia, nitrite/nitrates; and BOD and COD.



WASTE OIL TREATMENT PROCESS FLOW DIAGRAM



WASTE WATER TREATMENT PROCESS FLOW DIAGRAM

ISSUE

FOR	BY	DATE
■ – FOR REVIEW ONLY	TJG	OCT 2022
□ – FOR APPROVAL		
□ – FOR TENDER		
□ – FOR CONSTRUCTION		
□ – FOR AS BUILT		

NOTES:

- INSTALLER TO VERIFY LOCATION OF BUILDING AND PROPERTY LINES BEFORE BEGINNING WORK
- INSTALLER TO CHECK SITE FOR EXISTING SITE SERVICES SUCH AS: WATER AND SEWER LINES, ELECTRICAL LINES, ETC... PRIOR TO ANY EXCAVATION.
- ALL EQUIPMENT TO BE INSTALLED AND TESTED AS PER MANUFACTURES RECOMMENDATIONS
- INSTALLATION WORK TO BE COMPLETED IN ACCORDANCE WITH ALL APPLICABLE CODES.
- THIS PETROLEUM STORAGE SYSTEM CONFORMS TO ALL APPLICABLE ULC REQUIREMENTS AND STANDARDS INCLUDING ULC–S601, "SHOP FABRICATED STEEL ABOVEGROUND VERTICAL TANKS FOR PETROLEUM PRODUCTS," AND API 650 "WELDED STEEL TANKS FOR OIL STORAGE", LATEST EDITION.
- THIS DESIGN HAS ADDRESSED THE ISSUE OF POSSIBLE COLLECTION OF FLAMMABLE VAPOUR AND/OR LIQUID IN UNDERGROUND SUMPS.
- ALL WORK TO BE COMPLETED BY A PETROLEUM INSTALLER LICENSED BY THE PROVINCE OF NOVA SCOTIA.
- CONTRACTOR SHALL VERIFY ALL DIMENSIONS PRIOR TO COMMENCING WORK.
- ALL TANKS TO BE INSTALLED LEVEL

CONCRETE SPEC:

32MPa
5%–8% AIR
400MPa REBAR YIELD STRENGTH
80mm SLUMP

No.	DESCRIPTION	BY	DATE

REVISIONS

Logo: envirosoil ISO 14001 • ISO 9001

Client: ENVIROSOIL

Address: PLEASANT STREET DARTMOUTH, NS

Project: NEW WASTE OIL RECYCLING & WASTE WATER TREATMENT FACILITY

Title: SIMPLIFIED PROCESS FLOW DIAGRAM

GALLAGHER TECHNICAL SERVICES LIMITED
22 DOUGLAS DRIVE
QUISPAMSIS, NB
E2G 1Y3
PHONE: 506 849 4116
FAX: 506 847 1070

Stamp:

DESIGN:
DRAWN:
CHECKED:
DATE: OCT 2022
SCALE: 1/2" = 1'–0"
REV.: A

PROJECT NUMBER: GTS–1645

FIGURE 3–2

Table 3-1 below summarizes the treatment process equipment's risks and mitigation options.

Table 3-1: Wastewater Treatment Design Parameters

Equipment	Risk	Mitigation
Laboratory and Testing Equipment	Improper use of testing equipment; miscalibration	Properly trained operators; Enforced reporting practices; and Samples sent to lab external accredited lab for confirmation.
Flow meter	Incorrect flow measurement.	Properly calibrate the flow meter at the manufactures specified frequency. If warranted, the use of a portable flow meter can be considered.
Online TPH, TSS, COD/BOD, pH Analyzers	Incorrect readings.	Properly calibrate the analyzers at the manufacturer's specified frequency; compare to lab analysis results.
Pumps, Piping & Instrumentation	Leaks; Pump shutdowns; and Instrument failure/malfunctions.	Complete pressure tests and wet commissioning prior to start-up; Regular walk down the system to inspect for leaks; pressure monitoring; and Include redundancies in case of emergency pump/instrumentation failure.
PLC control system and data logger	Loss of data; and Miscommunication from the systems instrumentation.	Regularly back up data or use cloud storage; and Regularly check the calibration of the instrumentation.
pH Adjustment Systems	Chemical leak; pump failure; calibration issues.	Suitable containment skids, cleanup kits, eye washes/emergency showers, manual pH checks, monitoring chemical usage and effluent quality.
Duplex Solids Filtration Unit	Clogging of the baskets leading to poor performance.	Regular maintenance to keep the basket strainer clean and functional; and Automated PLC process that alerts operator of increase in differential pressure across filter which

Equipment	Risk	Mitigation
		indicates the filter is getting plugged. Manufacturers typically recommend a 15 – 30 psi pressure drop, alarm will sound if exceeded.
Dual Bag Solids Filtration Unit	Clogging or damage of the bag leading to poor performance.	Regular maintenance to keep the bag filters clean and functional; and Automated PLC alarm process that alerts operator of increase in differential pressure across filter which indicates the filter is getting plugged.
Multi-bag Solids Filtration Unit	Clogging or damage of the bag leading to poor performance.	Regular maintenance to keep the bag filters clean and functional; and Automated PLC alarm process that alerts operator of increase in differential pressure across filter which indicates the filter is getting plugged.
Fine Filtration Unit	Clogging or damage of the filter leading to poor performance.	Regular maintenance to keep the filter clean and functional; and Automated PLC alarm process that alerts operator of increase in differential pressure across filter which indicates the filter is getting plugged.
Oil/Water Separator Unit	Poor oil separation leading to oil in the effluent; buildup of sludge or debris; and Leaks at the connections and/or tank.	Maintenance/testing; and Water discharge from OWS is sampled on daily basis. If TPH is increasing over time, then the system is shut down for cleaning. The OWS has a coalescing pack which helps in oil separation but may need to be cleaned every year or two.
Electrocoagulation Unit	Compromising effluent quality due to lack of cleaning/maintenance; and System failure/shutdown.	Monitoring of current through EC “electrodes”. PLC alarms and shutdowns if out of spec; Regular and preventative maintenance to keep the

Equipment	Risk	Mitigation
		electrocoagulation unit clean and functional; Monitoring treated effluent quality and sludge generation; or PLC alarm can shut down unit is electrical current through electrodes is out of spec.
Flocculator Unit	Compromising effluent quality due to lack of cleaning/maintenance; pressure buildup due to accumulation; and System failure/shutdown.	Regular and preventative maintenance to keep the flocculator unit clean and functional.
Organo-Clay Filter Unit	Buildup within the unit.	The discharge is monitored for breakthrough and the material changed when this occurs. The spent material is sent for reuse in the Envirosoil operations, or disposal to an approved facility.
Carbon Filter bed	Buildup within the unit.	The discharge is monitored for breakthrough and the material changed when this occurs. The spent material is sent for reuse in the Envirosoil operations, or disposal to an approved facility.
Zeolite/Metals Filter	Buildup within the unit.	The discharge is monitored for breakthrough and the material changed when this occurs. The spent material is sent for reuse in the Envirosoil operations, or disposal to an approved facility.
Screw/Filter Press Unit	System failure/shutdown.	Regular and preventative maintenance to keep the screw press unit clean and functional.

3.3.2 Influent Quality and Quantity

The wastewater treatment system is designed based on the following general process parameters:

Table 3-2: Wastewater Treatment Design Parameters

Parameter	Average Concentration	Maximum Concentration
Discharge Volume (m^3/year)	16,000	20,000
Free Liquid Hydrocarbons	100,000	500,000
Dissolved Hydrocarbons	3,000	10,000
Emulsified Hydrocarbons	600	3,000
Total Suspended Solids	10,000	50,000
COD (mg/L)	3,000	20,000
BOD (mg/L)	1000	65,000
TKN (mg/L)	500	1500
pH (mg/L)	4-9	2-11

Table 3-2 presents the expected normal and maximum inlet contaminant concentrations at the specified flow rates under normal anticipated operational parameters. These inlet concentrations do not represent the maximum or upper limit that the system is capable of treating. The system can effectively treat higher levels of inlet contaminant concentrations by decreasing the flow rate and/or modifying individual treatment component process parameters, such as chemical dosage rates, and therefore the values presented in Table 3-2 are not a limiting influent criteria for the treatment system.

Incoming wastewater to the plant will be treated to meet or exceed the Effluent Discharge Objectives (EDOs) that were developed as part of the Receiving Water Study for the Project (EA Addendum, Appendix F). Discharge volume will range from 16,000 to 20,000 m^3/year. It is anticipated that a maximum daily volume of 100m^3 will be treated per day, with estimated average daily volumes anticipated to be less. For sampling program details, refer to 3.0. For discharge limits, refer to the Receiving Water Study.

Regarding other inorganic parameters in the incoming wastewater:

- A non-negligible source of any halides (e.g., chlorides, bromides) in the influent will be from ocean water, rather than industrial sources. This will be confirmed in the pre-acceptance stage where the generator provides details regarding contaminants and/or analytical data (refer to Section 3.1.2); and
- Online analyzers will include monitoring for pH, however, there are no major net changes to pH expected as a result of treatment operations.

3.4 Analytical and Testing Equipment and Process

Water treatment technologies have been designed to remove or greatly reduce the majority of potential petroleum hydrocarbons (PHCs), polycyclic aromatic hydrocarbons (PAHs and organics; particularly those in colloidal or sediment form) and low solubility metals (particularly those in colloidal or sediment form). As such the final effluent will be high in clarity, low in organic content, low in sediment content

and, as a result, will be low in PHCs, PAHs and nutrients with only measurable amounts of soluble metals and salts remaining as the dominant chemical parameters still in solution. The finished water would, therefore, be ideally suited for operational monitoring with Microtox technology, the Hach DR600 unit, and a gas chromatography (GC) 8610C model unit (or equivalent) equipped with multi-detector analysis, as planned for the facility. Refer to EA Addendum, Appendix C-1 for detailed information and specifications on monitoring equipment.

Microtox testing is particularly sensitive to many parameters, especially to fines/particulates and inorganic contaminants. The Microtox sensitivity is non-specific, but highly sensitive meaning that, although it is not particular to any individual metals (or suspended particulates composed primarily of metals), or individual PAH (or sediments composed of or with PAHs bound to), or particular type of PHC. The presence of any of these parameters (and even the presence of parameters not being explicitly tested for) will be effectively screened using Microtox testing. This method has been selected as it has advantages compared to simply testing for any one parameter or even specific groups of parameters.

The GC multi-detector analyzer will be set up with a Photo Ionization Detector (PID), Flame Ionization Detector (FID), Dry Electrolytic Conductivity Detector (DELCD) and Aromatic Selective Detector (ASD). A Hach DR6000 spectrophotometer with UV and visible spectrum capabilities will also be set up. These types of analyzers are widely used in local, national and international wastewater treatment facilities, including in Halifax for drinking water and municipal water treatment. Detailed product specification documents are presented in Appendix C-1 of the main Addendum document. These detectors are capable of analyzing PHCs, PAHs and VOCs to the parts per million (ppm) and parts per billion (ppb) levels (i.e., ppb for BTEX and PCE/TCE, ppm for PAHs, and tens of ppb for other chlorinated VOCs), as well as metals and general water quality parameters. The completion of these analyses in house will be used to confirm operational effectiveness of the treatment train for removal of metals, PHCs, PAHs, VOCs, and other general parameters. This will provide confirmation of acceptability prior to treated effluent discharge as each treatment batch is completed with real time turnaround (also referred to as live on site monitoring; this not instantaneous but rather same day and a quicker turnaround time than multi-day or week long delays typical of off-site laboratory confirmation).

During the commissioning phase, including initial start-up and system optimization, the effectiveness of the treatment and testing program will be confirmed. Once confirmed, the operational monitoring would use the Microtox, GC multi-detector analyzer, and Hach DR6000 spectrophotometer for analysis of various parameters and surrogates. Details of the proposed commissioning and standard testing and analytical regime for both the commissioning and operational phases are presented below.

3.4.1 Facility Commissioning Phase Testing and Analytical Regime

During the commissioning phase of the project, which includes initial start-up, pilot testing and system optimization, water quality and effectiveness of operational monitoring will be confirmed through sampling and analysis at an external accredited laboratory. The Canadian Environmental Protection Act,

1999 (CEPA) maintains and actively updates the list of Toxic Substances (Schedule 1), and this list will generally inform the list of substances to be analyzed for during the commissioning phase (see Figure 3-3 below).

Figure 3-3: Substances for Commissioning Phase Confirmation Lab Analysis

Metals		
As	Cu	Se
Cd	Pb	V
Cr	Hg	Zn
Co	Ni	

PAHs			
Naph	Anth	Phen	Cry
MeNapth	Flu	Pyr	
Ace	Flt	B(a)P	

General Chem.		
NH_3	NO^-_3	Na
$cBOD_5$	NO^-_2	SO^{-2}_4
Cl	TP	TSS
F	pH	TDS

VOCs			
PCE	TCE	VC	Glycols
Phenol			

PHCs	
BTEX	m. TPH

[3] Abbreviations: Naph (Naphthalene), Anth (Anthracene), Phen (Phenanthrene), Cry (Chrysene, MeNapth (Methylnaphthalene), Flu (Fluorene), Pyr (Pyrene), Ace (Acenaphthene), Flt (Fluoranthene), B(a)P (Benzo[a]pyrene), PCE (Tetrachloroethylene), TCE (Trichloroethylene), VC (Vinyl Chloride), BTEX (Benzene, Toluene, Ethylbenzene, Xylene, m.TPH (Modified Total Petroleum Hydrocarbons)

3.4.2 Daily Operational Standard Monitoring, Testing and Analytical Regime

From CEPA's Toxic Substances list, and upon completion of the commissioning phase which will confirm operational effectiveness of the treatment system, the following are the substances which are proposed to be analysed during the facility's operational phase. The sub-set of the substances to be analyzed during the operational phase has been selected based on substance characteristics and commonalities, wastewater sources, treatment system design, and project feasibility considerations. This is consistent with industry standard approaches to wastewater analysis during operations. Analysis will be completed either in real time (in-house) or through external accredited laboratory confirmation monitoring (as required) with a commercial auto-sampler device:

- Metals - real time screening via the Hach DR6000 spectrophotometer and Microtox, and autosampler collection for confirmation with accredited laboratory (arsenic, cadmium, chromium, cobalt, copper, lead, mercury, nickel, zinc).
- Petroleum Hydrocarbons (PHCs) – online TPH analyzer, real time screening via Microtox, and in-house analysis with GC multi-detector unit for BTEX/TPH (1 ppb to 1 ppm), and autosampler collection for confirmation with accredited laboratory.
- Polycyclic Aromatic Hydrocarbons (PAHs) - real time screening via Microtox, analysis in house with GC multi-detector unit for Naphthalene and Benzo(a)pyrene and autosampler collection for confirmation with accredited laboratory.

- Volatile Organic Compounds (VOCs) - real time screening via Microtox, and in-house analysis with GC multi-detector unit for Tetrachloroethylene, Trichloroethylene, Vinyl Chloride (1 to 50 ppb), glycols and phenol, and autosampler collection for confirmation with accredited laboratory.

It is expected that operation testing will be primarily completed in-house, with approximately 10% of samples sent to an external accredited laboratory for confirmation and QA/QC purposes.

3.4.3 In-House Laboratory QA/QC and Audit Program

Envirosoil will establish its in-house analytical laboratory in accordance with all industry standard guidelines, standards and requirements. The setup and operations of its inhouse lab will follow the general guidelines and recommendations outlined in the *British Columbia Environmental Laboratory Manual* (BCELM), as well as other industry documents. The goal of Envirosoil's in-house laboratory is to ensure that it consistently produces accurate, precise, reliable data that is scientifically defendable and traceable. This will ensure that all decisions related to the interpretation of laboratory data can be made with the highest degree of confidence.

To ensure that the in-house laboratory is operating in strict accordance with all relevant procedures, and at the highest level of quality assurance, a series of audits will be performed within the first year of operations. These audits will be conducted by an independent, third-party consultant and the lead auditor will have significant knowledge and experience in the operation and management of commercial environmental analytical laboratories and a detailed understanding of various laboratory accreditation programs such as the *Standards Council of Canada* (SCC) and the *Canadian Association for Laboratory Accreditation (CALA).*

The emphasis of the audits will be on documentation and other evidence demonstrating that the laboratory is following all standard, recommended procedures and is producing accurate and defensible data. Auditors will examine documents to verify that all information and operational aspects of the laboratory are being performed in accordance with recognized standards and procedures. The audit will examine the full range of laboratory operations and include the following:

- Safety procedures;
- Environmental management procedures;
- Personnel training and experience;
- Facility features and equipment;
- Equipment maintenance and calibration procedures;
- Sample handling procedures;
- QA/QC procedures;
- Analytical procedures and testing methods;
- Data management procedures and document control; and
- Reporting procedures.

The QA/QC procedures will include the tracking of internal duplicates, blanks, spikes and standards, as well as external duplicates with comparisons to the same performance standards as the external laboratories (i.e., RPDs, Blank thresholds, and standards performance). Performance will be reviewed to ensure comparable performance (within the analytical performance specs for the methods/instruments) and development of staff with the identification of potential optimization methods and confirmation of manufacturer performance specifications. The procedures will follow CCME and US EPA guidance on QA/QC.

In the first year of operations, the following audits will be completed:

1. Pre-startup Audit - Completed prior to initiating operations;
2. Mid-Year Audit - Completed at the 6-month anniversary of starting operations; and
3. Year-End Audit - Completed at the 12-month anniversary of starting operations.

Any deficiencies or recommendations for improvements discovered by the audits will be immediately rectified and/or implemented.

After the initial first year of operations, both internal and external audits will be scheduled in accordance with the requirements of Envirosoil's ISO procedures. The laboratory audits will ensure that the laboratory has quality systems in place, follows good laboratory practices, and generates data of high integrity and quality.

It is noted that Envirosoil) has been an ISO 9000 and 14000 registered company since 2006 and all of its operations are conducted under the requirements of its ISO guidelines. As part of its operations at the new Pleasant Street facility, Envirosoil will ensure that its operations continue to meet the requirements of its ISO commitments.

3.5 Other Management Practices

Product receiving, storage, processing/treatment, loading, transfer and handling will be contained fully at the site. Envirosoil staff will ensure that whenever products are being transferred it is supervised by trained personnel at all times and in such a manner that the flow of products can be immediately shut off, if necessary. The operator controls the storage, receiving, and delivering process using various flow meters, level indicators and valves based on the demand of the facility. PLC connected level sensors will also sound alarms and shut the system down based on predetermined set points to avoid overflowing. All facility processes and equipment will meet the applicable standards and codes. Planned operational activities are further described in the following subsections.

3.5.1 Monitoring and Process Control

The proposed facility uses advanced sensing, monitoring, alarms and PLC control to control fluid flow tanks levels and treatment processes. These sensors and systems are managed from the control room where an operator will be stationed during all treatment operations.

To ensure that recycling and treatment processes are maintaining acceptable recovered oil and water quality standards, an on-site laboratory will be located beside the control room. In addition to this on-site laboratory, there are several in-line water quality sensors that can provide logged quality information for record keeping and process control. These include, but are not limited to:

- Flow meter with totalizer;
- In-line Total Petroleum Hydrocarbon Analyzer;
- In-line pH analyzer;
- In-line COD/BOD analyzer;
- Sampling ports; and
- In-line TSS Analyzer.

These online computerized systems combined with the on-site laboratory and testing equipment can provide Envirosoil with all the required testing and instrumentation to ensure relevant permit conditions (e.g., volumes and EDOs) are met prior to discharge. If the treated wastewater test results identify that the effluent is in exceedance of the quality requirements, the PLC will automatically divert the water to the dirty water tank, shut down the system and sound an alarm. For QA/QC purposes, as previously described, collection of 10% of samples for external accredited laboratory confirmation will be undertaken.

Specific permit conditions have not been established yet, but they will be based on the facility's provincial Approval to Operate, which will include discharge limits. Alarms can also be configured in the control system to notify operators if certain quality aspects are deteriorating, but still within permit requirements. This would provide the operator with advanced notice to perform preventative maintenance.

In addition to process monitoring, Envirosoil will undertake quarterly LC50 toxicity testing on the treated effluent to confirm quality and the protection of aquatic life.

3.5.2 Heating

An existing closed-loop hot oil system will be used to heat the treater tanks. Paratherm NF Heat Transfer Fluid will be used. It is a food grade, mineral-oil based heat transfer fluid designed for extended service in closed-loop liquid-phase systems. The fluid is circulated through the tank's hot oil distribution system and heated by the boiler. A total of 4.2 m^3 of Paratherm NF is proposed to be used in this system.

The proposed undertaking will use the existing HC and HCS bro 8-90 (HC 300-3 million BTU) boilers made by Heatec. The heaters are 3 MMBTU/hour and will increase the temperature of the heating fluid to approximately 200ºC. Natural gas for the boilers will be supplied by Heritage Gas.

3.5.3 Storage

There are four types of storage that will be required for this proposed project:

- Unheated wastewater storage (existing, 4 tanks x 55,000 L);
- Recovered oil storage tanks (existing, 2 tanks x 55,000 L, 1 tank x 3,170 L);
- Storage tanks (exterior to building, 6 tanks x 90,000 L); and
- Clean water storage tanks (in building, 2 tanks x 55,000 L).

Other tanks will be used for actively treating effluent, such as the heated treater tanks. The unheated wastewater storage tanks, recovered oil storage tanks and the clean water storage tanks are each managed by a modern, industry standard PLC system (i.e., level controls, alarms, etc.). The system uses traditional backup float switches and backup radar system (PLC) to ensure tanks are not overfilled and the process is monitored at all times.

3.5.4 Delivery

Trucks entering the site will typically be tankers that meet the provincial capacity regulations, which can range by province from 35,000 to 48,000 L. They will enter the site from Pleasant Street through a controlled security gate and drive down to a weigh-in scale. An industry standard vehicle and operator tracking system will be in place to ensure only trained drivers are allowed on-site and that the trucks are properly loaded and documented. Volume of product is controlled through the use of a flow meter, and there will be a dedicated pump and piping for this operation. Loading areas are designed to provide positive drainage and effective protection against discharge of contaminants to stormwater and underlying systems. Trucks are also required to be grounded and have the wheels chocked during any loading. All transfer processes will be equipped with emergency shut off switches.

Personnel will be required to wear appropriate PPE while at the site and during any product transfers. For personnel new to the site and its operations, a safety briefing and orientation will be required prior to starting work.

A site-specific and detailed Wastewater and Waste Oil Offloading Procedure has been developed by Envirosoil for the new facility. Refer to Appendix C-3 of the Main Addendum document for step-by-step details regarding this procedure, including components to mitigate risks to human health and the natural environment.

3.5.5 Preventative Maintenance and Inspections

The preventative maintenance program will be performed in an effort to prevent breakdowns and failures by regular adjustment, repair or replacement of equipment and parts. Equipment and systems preventative maintenance includes:

- Maintaining, calibrating and servicing online sensors for TPH, TSS, COD and BOD, and level instrumentation on all storage tanks;

- Verification of operation of all process control elements including pressure, temperature, flow rate, liquid level and emergency shutdown valves;
- Asset integrity inspections of all product transfer pipelines and storage tanks. Tank supports, and foundations are included within asset integrity inspections. Inspections will be conducted per all applicable standards and/or manufacturer recommendations;
- Operations personnel conduct multiple daily rounds of the project area; and
- Safety and Emergency Response assets are inspected regularly.

3.5.5.1 Daily Inspections

Inspections of all storage tanks, piping and associated equipment and secondary containment areas are completed by personnel on their rounds daily and documented on a checklist. The loading/unloading area will also be subject to routine daily visual inspections.

3.5.5.2 Monthly Inspections

Once per month, a more detailed inspection of facility components is performed. Completed inspection checklists are retained at the facility for a minimum of five years. Inspection standards will be developed and implemented as part of the site-wide maintenance plan that will be developed once the facility design is finalized.

Emergency response equipment is also inspected monthly for deterioration and operability and records are maintained on site.

3.5.5.3 Five-year Inspections

Every five years, tanks will be externally inspected as per API Standard 653.

3.5.5.4 Ten-year Inspections

Every ten years, tanks will be internally inspected as per API Standard 653.

3.6 Wet Commissioning

3.6.1 Pressure Testing

Prior to receiving wastewater, all pipes that will experience pressurized flow during normal operation of the wastewater treatment system shall be pressure tested with clean water or air and inspected for any damage and leaks. All leaks shall be resolved prior to the introduction of wastewater to the system.

Pressure testing will be done with either clean water or air depending on best practice. If liquids are generated they will be sent to the dirty water storage tank and treated through the system. After start up, maintenance or cleaning activities that require draining or flushing of process piping/tanks will involve all liquids being sent to the dirty water storage tank and will be treated through the system. In

the unlikely scenario that the water cannot be stored and/or treated onsite, it will be sent to an offsite treatment facility.

3.6.2 Start-up, Testing and Commissioning

Following confirmation of pressure/leak testing, the functionality if each system will be confirmed by bringing them within operating range, ensuring proper calibration, stopping/starting, adjusting set points and verifying PLC feedback or alarms. This is completed when each system has been verified to function properly, and the entire process can be commissioned.

3.7 Waste Management Practices

3.7.1 Liquid Wastes

Liquid wastes generated during installation of system components may include oils, grease and fuels from trucks delivering project components and other mobile equipment used to move and install those components, plus any inadvertent fuel spills. These wastes will be collected and disposed of in accordance with applicable local and provincial regulations. Liquid wastes from construction crews, including sewage and domestic wastewater, will also be collected and disposed of consistent with local and provincial standards. It is noted that the existing onsite washroom is already connected to the HRM sewer system.

Liquid wastes typically produced during operations and maintenance will be primarily treated effluent from the water treatment process. Treated effluent will be discharged directly to the Harbour (as described in the Receiving Water Study found in Appendix F of the Main Addendum document) based on lab testing results. Prior to facility operation, provincial Approvals to Operate will be obtained and outline performance requirements, environmental monitoring and reporting requirements. Water from the tank farm containment area (with oil-water separator system) around the proposed multi-purpose storage tanks will be discharged to the municipal sewer consistent with other sites.

Other anticipated liquid wastes include lube oil for the pumps and other mechanical equipment which will be changed regularly. This waste stream will either be incorporated into the recovered oil from the main system or, if blending is not possible, be removed from the site in barrels for delivery to an approved disposal or recycling facility.

3.7.2 Solid Wastes

Solid wastes generated during installation may include surplus fill, temporary fencing, signs, metal containers, canisters as well as welding rods, and domestic garbage. Scrap paper and other office wastes will also be generated. During regular operation a limited amount of solid wastes may be generated in addition to other solid wastes that are produced during daily operation of a typical small office environment and industrial facility. The wastewater treatment process will generate activated carbon,

spent zeolite, spent organo-clay and spent bag filters as solid waste stream items, all sent to approved facilities for disposal or reuse.

Similar to existing operations at the subject site, Envirosoil will continue to actively cooperate with municipal waste reduction and recycling programs and will encourage conservation throughout its facilities. Solid wastes will be collected and disposed of in a manner consistent with local and provincial standards. Non-hazardous wastes will be separated as recyclable and non-recyclable, with recyclable material collected and transported to a licensed recycling facility. Non-recyclable wastes will be disposed of according to Envirosoil's existing waste management procedures.

4.0 Applicable Regulations and Bylaws

The treatment facility will be located at 750 Pleasant Street in Dartmouth, Nova Scotia and discharge treated effluent to the Halifax Harbour, within relatively close proximity to an existing Halifax Water plant discharge (Eastern Passage WWTP), as well as surface water runoff from the storm sewer system on Pleasant Street. Federal guidelines are considered applicable for discharge to a marine environment, and specifically the Halifax Harbour. The applicable federal guidelines are the *CCME Water Quality Guidelines for the Protection of Marine Aquatic Life, the Canada-wide Strategy for the Management of Municipal Wastewater Effluent,* and jurisdiction specific guidelines, such as the Atlantic Risk-Based Corrective Action (RBCA). It is from these guidelines that the Generic Environmental Quality Objectives (EQOs) were generated. Site-specific EQOs are established by adjusting the generic EQOs based on the site-specific factors (i.e., ambient water quality).

A summary of Environmental Quality Objectives can be found in Appendix F (Receiving Water Study) of this EA Addendum. The Effluent Discharge Objectives (EDOs), which were developed from the EQOs and the analysis of the mixing zone of the receiving waters, represent the effluent substance concentrations that allow for the protection of the receiving environment and designated water users. They describe the effluent quality necessary to allow the EQOs to be met at the edge of the mixing zone, in conditions where a mixing zone can be applied. The EDOs established in the Receiving Water Study are presented in Appendix F of this EA Addendum.

Regulatory Authorities have final discretion regarding which effluent parameters need to be monitored regularly, based on substances of potential concern associated with the raw wastewater.

5.0 Emergency Protocols

5.1 Emergency Response and Contingency Plan

In the case of an accidental release of materials, reporting and clean-up procedures will follow provincial emergency spill regulations as required. Lubricants and other petroleum products will be stored and waste oils will be disposed of in accordance with provincial regulations. Small spills will be contained by on-site personnel using spill kits kept at the site. It is anticipated that elements of the ERCP will include:

- Purpose and scope of plan coverage;
- General facility identification information (e.g., name, owner, address, key contacts, phone number);
- Component and infrastructure locality information (e.g., maps, drawings, description, layout);
- Discovery/initial response;
- Termination and follow-up actions/prevention of recurrence;
- Notification protocols (internal, external, and agencies);
- Response management system (e.g., incident commander, safety, liaison, evacuation plan);
- Assessment/monitoring, discharge or release control;
- Containment, recovery, and decontamination;
- Logistics – medical needs, site security, communications, transportation, personnel support, equipment maintenance and support, emergency response equipment (e.g., personal protective equipment (PPE), respiratory, fire extinguishers, first aid);
- Incident documentation (accident investigation and history);
- A description of biological and human-use resources that could be impacted;
- An inventory of oil and chemical products and associated storage locations for both construction and operation phases;
- The identification of spill response equipment that will be on-site or available in case of emergency events;
- Procedures for responding to operational spills and releases;
- An incident reporting system, including notification and alerting procedures;
- A list of responsible organizations and clarification of the roles of each organization;
- Clean-up and disposal procedures;
- Training and exercises/drills;
- Plan review and modification; prevention;
- Regulatory compliance; and
- A log of all maintenance activities of critical emission control devises will be maintained. The log will record the following:
  - Identification of the unit;
  - Time/date of log entry;
  - Nature of event;

- Time and duration of event; and
- Action taken.

The ERCP will also reference relevant and appropriate standards to supplement code requirements as applicable. Envirosoil commits to submitting a Final ERCP to appropriate regulatory agencies for review prior to operations.

For additional emergency response support, Envirosoil intends to work with industry service providers such as GFL (Dartmouth), and CleanEarth Technologies (Goffs, NS), as well as appropriate government agencies, including the Canadian Coast Guard. Envirosoil also has access to internal emergency response team locally (Rocky Lake Drive, Bedford) that is available to respond to incidents during the project. The capacity of local fire and ambulance services to respond to incidents has been evaluated during preparation of the draft ERCP (refer to Appendix G). Envirosoil will continue to work closely with related agencies on the issue of public safety during all phases of the project.

5.2 Accidents, Malfunctions and Unplanned Events

This section identifies accidents, malfunctions, or unplanned events that could occur during any phase of the proposed project. The assessment focuses on events that are considered credible based on the project description and the experience of the assessment team in evaluating similar projects.

Contingency planning is a key component of Envirosoil's approach to its existing operations. Envirosoil has developed detailed operational procedures to guide its everyday operations, and has developed contingency and emergency response procedures to quickly process upsets or abnormal operating conditions while limiting environmental effects. Various emergency scenarios will be incorporated in planning for operation of the project, including potential for failure and repair.

The proposed operation will have robust emergency response and contingency plans with respect to accidents and malfunctions. The implementation of spill containment measures and experienced staff with thorough training will significantly reduce the likelihood of accidents and malfunctions at this site. Spill containment measures will be implemented on areas where spills or leakages are likely to occur, specifically in the loading/unloading and processing areas. Fire, spill, and medical response plans will be in place to address potential accidents or malfunctions that may arise from operations, and will be amended during Nova Scotia Environment and Climate Change's (NSECC) Industrial Approval application process to include any specifics necessary for effective management of the proposed operations.

5.2.1 Approach and Environmental Impacts

The general approach to assessing the potential environmental impacts of the selected potential accident, malfunction, or unplanned event scenarios involves the following:

- Describing the potential accident, malfunction, or unplanned event;

- Considering if the potential accident, malfunction, or unplanned event could occur during the life of the project, and during which phase(s) or activity(ies);
- Describing the project planning and safeguards established to minimize the potential for such occurrences to happen;
- Consideration of the contingency or emergency response procedures applicable to the event;
- In consideration of the above, assessing the residual environmental effects of accidents, malfunctions, and unplanned events on surface water or other features, and determining the significance of the potential residual environmental effects of these accidents, malfunctions, or unplanned events (and their likelihood of occurrence, as applicable); and
- Surface water impacts will be monitored through routine visual checks and through certified lab analysis at the direction of NSECC in accordance with the Approval to Operate.

This section assesses the environmental effects of each of the credible accidents, malfunctions, and any unplanned event identified, and identifies mitigation measures to address the potential residual environmental effects.

5.2.1.1 Hazardous Materials

An accidental release of fuel or other liquid hazardous materials (e.g., petroleum, oil, lubricants - POL) used in vehicles or equipment on-site may occur during refuelling of machinery or trucks as a result of human error or equipment malfunction during construction activities. During operation of the facility, there is potential for release of chemicals used in operations as well. Such a spill may contaminate soils and groundwater and, through runoff, contaminate surface water resources.

The accidental release of a hazardous material through a spill could affect primarily surface water resources, groundwater, soils and air quality on a temporary and localized basis. Untreated wastewater or fuel spills may enter a waterbody potentially affecting water quality and fish and their habitat, with the extent of effects depending upon the quantity released.

Mitigation

- Key mitigation to prevent an accidental release of a hazardous material is described in the provincial Environmental Assessment Registration Document - **Section 5.8** – Standard Mitigation Measures (refer to: https://novascotia.ca/nse/ea/Waste-Oil-Recycling-and-Water-Treatment-Facility); and
- Over 300 m of 18" fence boom (as well as all the necessary support equipment) will be located at the site (consistent with the contingency measure for the existing asphalt storage facility at the same site) and will be immediately available if required in the event of a spill. The pre-planned and expedient deployment of this boom would minimize the effects of any spills to the marine environment.

Potential Residual Environmental Effects

With spill containment provided during operation and maintenance, and careful implementation of best practices, the risk of spills resulting during both construction and operation and maintenance phases of the project is expected to be low. The risk of contamination from spills and leaks during the operation and maintenance phase will be reduced further by preventive measures, contingency planning and spill response and mitigation. Based on the project's design, and with the implementation of mitigation measures, contingency and emergency response procedures, and best practices, the potential residual environmental effects of an accidental release of a hazardous material during all phases of the project are not significant, with a high level of confidence.

5.2.1.2 Untreated Wastewater and/or Petroleum Hydrocarbons

An accidental release of waste oil, untreated wastewater and/or petroleum hydrocarbons could occur at the transfer locations or within the processing area, during the operation and maintenance phase of the project. An accidental release may be the result of equipment failure, human error, or material failure. A release of untreated wastewater or petroleum hydrocarbons from the transfer areas or process area could affect soil or water quality (surface water) if not contained. A release of untreated wastewater and/or waste petroleum hydrocarbons from the transfer locations or processing area could affect soil or water quality (groundwater or ocean/surface water).

Mitigation

Key mitigation to prevent an accidental release of untreated wastewater and/or waste petroleum hydrocarbons includes:

- Transfer of waste water and waste oil will only occur on a containment pad;
- Trained operators will control the transfer of material form delivery trucks via pumps;
- Receiving tanks will be equipped with high-level float which will terminate pumping if the high-level condition is reached to eliminate the potential for overfill;
- Operation of the facility will include regular inspection of all piping, hoses and tanks for leaks or potential points where a leak could occur, such as fractures and breaks;
- Storage tanks will be inspected, repaired and reconfigured in accordance with API 653 – Tank Inspection, Repair, Alteration and Reconstruction;
- External tanks have a dike capable of holding 100% of the largest tanks capacity + 10% of each additional tank;
- Water from the exterior tank berm is passed through an underground Oil Water Separator prior to discharge to municipal sewer. The Oil Water Separator is designed to meet all required discharge limits;
- The project area is fully secured by fencing reducing the risk of intentional vandalism to the facility and its components;
- Over 300 m of 18" fence boom (as well as all the necessary support equipment) will be located at the site (consistent with the contingency measure for the existing asphalt storage facility at the same

site) and will be immediately available if required in the event of a spill. The pre-planned and expedient deployment of this boom would minimize the effects of any spills to the marine environment; and

- Routine influent and effluent testing for key parameters and indicator surrogates that will aid in quickly identifying a process failure.

Facility operations personnel will be given adequate training and orientation to allow them to perform their jobs safely and to respond to minor spills and leaks. Employees will be informed of potential hazards and safe operating procedures and will be familiar with the facility's Site Safety Plan and Safety Data Sheets (SDSs) for products used and stored at the site.

Potential Residual Environmental Effects

Regular inspection of all components in industrial facilities is a standard component of a management system (e.g., SOPs) to prevent costly and potentially damaging leaks. Identifying potential issues early though an inspection plan allows for repairs or replacement of problem sections before a release occurs. Through the implementation of an inspection plan, the potential residual environmental effects of an accidental release of wastewater and/or petroleum hydrocarbons to the environment during all phases of the project are not significant, with a high level of confidence.

5.2.1.3 Excessive Quantities of Wastewater

An accidental release of excessive quantities of wastewater to be discharged could occur during the operation. The majority of the system is housed in-doors and any exterior tanks are located within a lined containment dyke. An accidental release may be the result of equipment failure or human error. A release of excessive wastewater from the wastewater treatment facility could affect the water quality at the discharge location and/or water quality (surface water) if not contained.

A new industrial oil water separator will be installed adjacent the proposed tank farm and will discharge treated stormwater runoff to Halifax Water's storm sewer system.

Mitigation

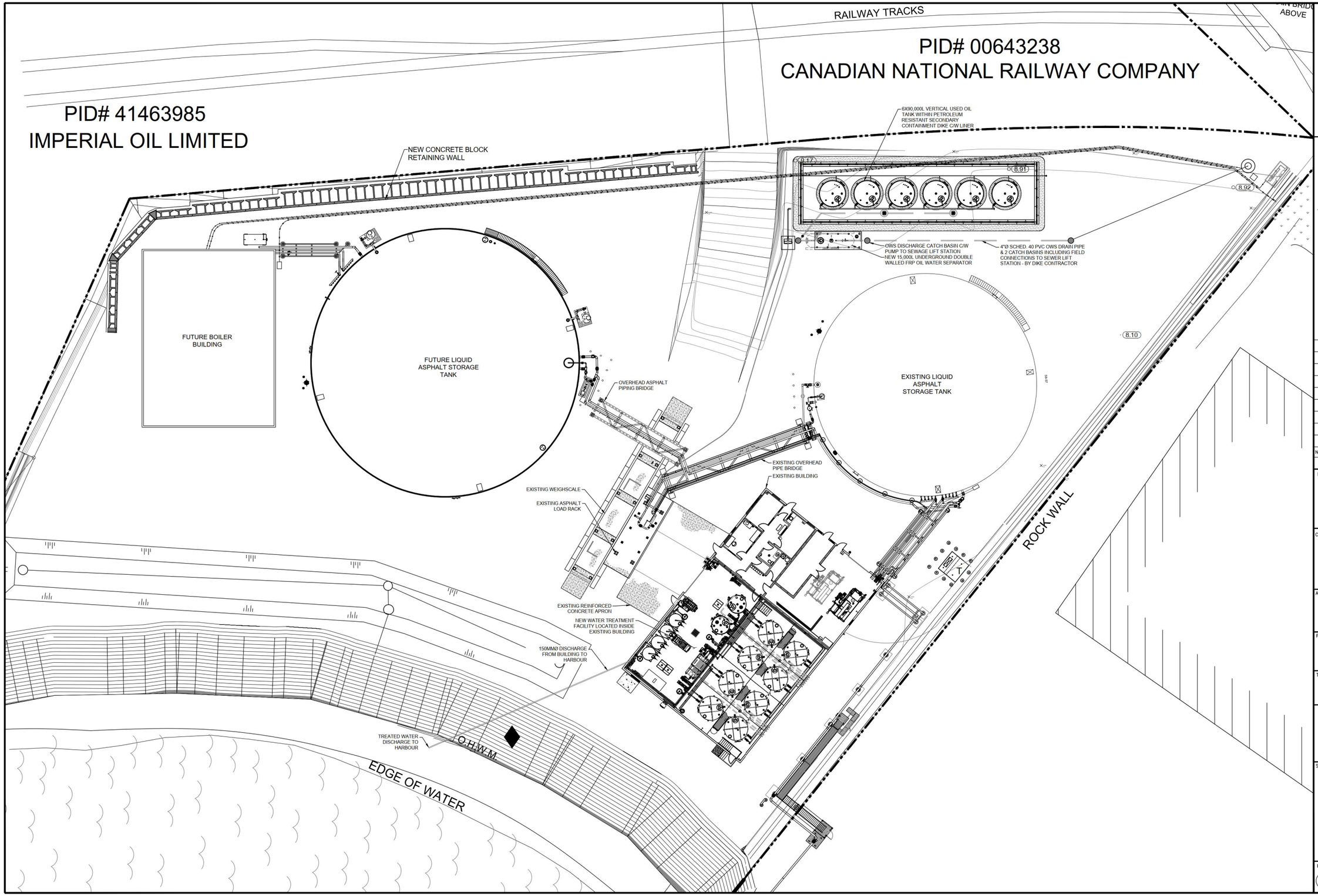
- Flow meters, pumps and control systems will be closely monitored and regularly inspected, repaired, and replaced, as required;
- Pump flow rates will be monitored to maintain an acceptable level of wastewater flow throughout the treatment system; and
- Trained operators will monitor outgoing wastewater quantities.

Potential Residual Environmental Effects

Through the implementation of mitigation measures as well as containment for all processes on site, accidental release of excessive quantities of wastewater to the environment is not expected. Discharge from site is done on an as-approved basis based on the incoming water quantities and does not allow for uncontrolled continuous flow, preventing unforeseen excess discharges through manual and automatic monitoring. It is important to consider, and as a relative comparison, that the Eastern Passage WWTP is rated to discharge up to 25 ML/d, approximately 1,500m away from the Pleasant Street site. In comparison, the proposed Envirosoil facility will discharge on average only 0.04 ML/d.

Appendix A

Drawings



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☐	– FOR TENDER		
☐	– FOR CONSTRUCTION		
☐	– FOR AS BUILT		

NOTES:

- INSTALLER TO VERIFY LOCATION OF BUILDING AND PROPERTY LINES BEFORE BEGINNING WORK
- INSTALLER TO CHECK SITE FOR EXISTING SITE SERVICES SUCH AS: WATER AND SEWER LINES, ELECTRICAL LINES, ETC... PRIOR TO ANY EXCAVATION.
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- ALL TANKS TO BE INSTALLED LEVEL

CONCRETE SPEC:
32MPa
5%-8% AIR
400MPa REBAR YIELD STRENGTH
80mm SLUMP

No.	DESCRIPTION	BY	DATE

REVISIONS

Logo: envirosoil

Client: ENVIROSOIL

Address: PLEASANT STREET DARTMOUTH, NS

Project: NEW WASTE OIL RECYCLING & WASTE WATER TREATMENT FACILITY

Title: SITE PLAN

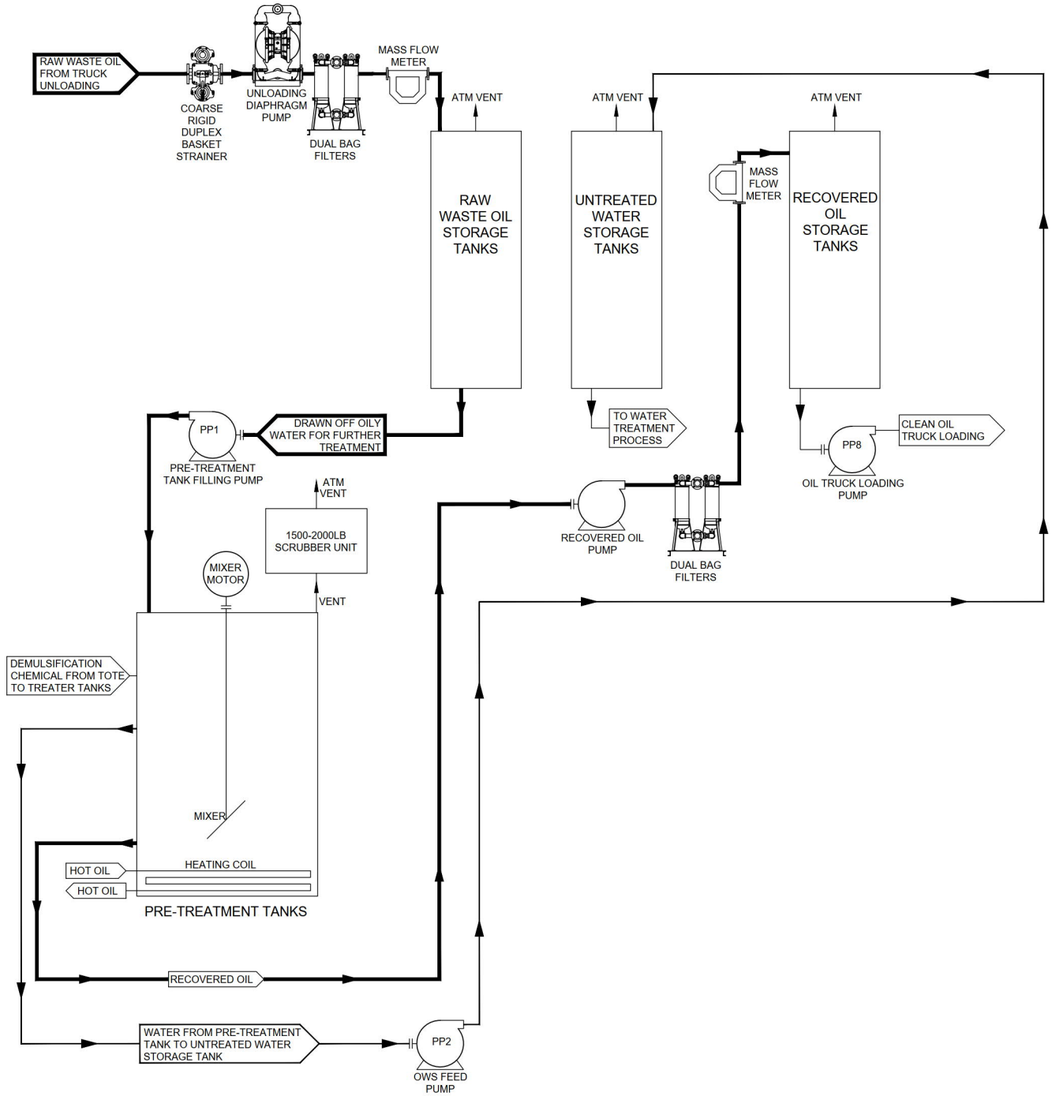
GALLAGHER TECHNICAL SERVICES LIMITED
22 DOUGLAS DRIVE
QUISPAMSIS, NB
E2G 1Y3
PHONE: 506 849 4116
FAX: 506 847 1070

Stamp:

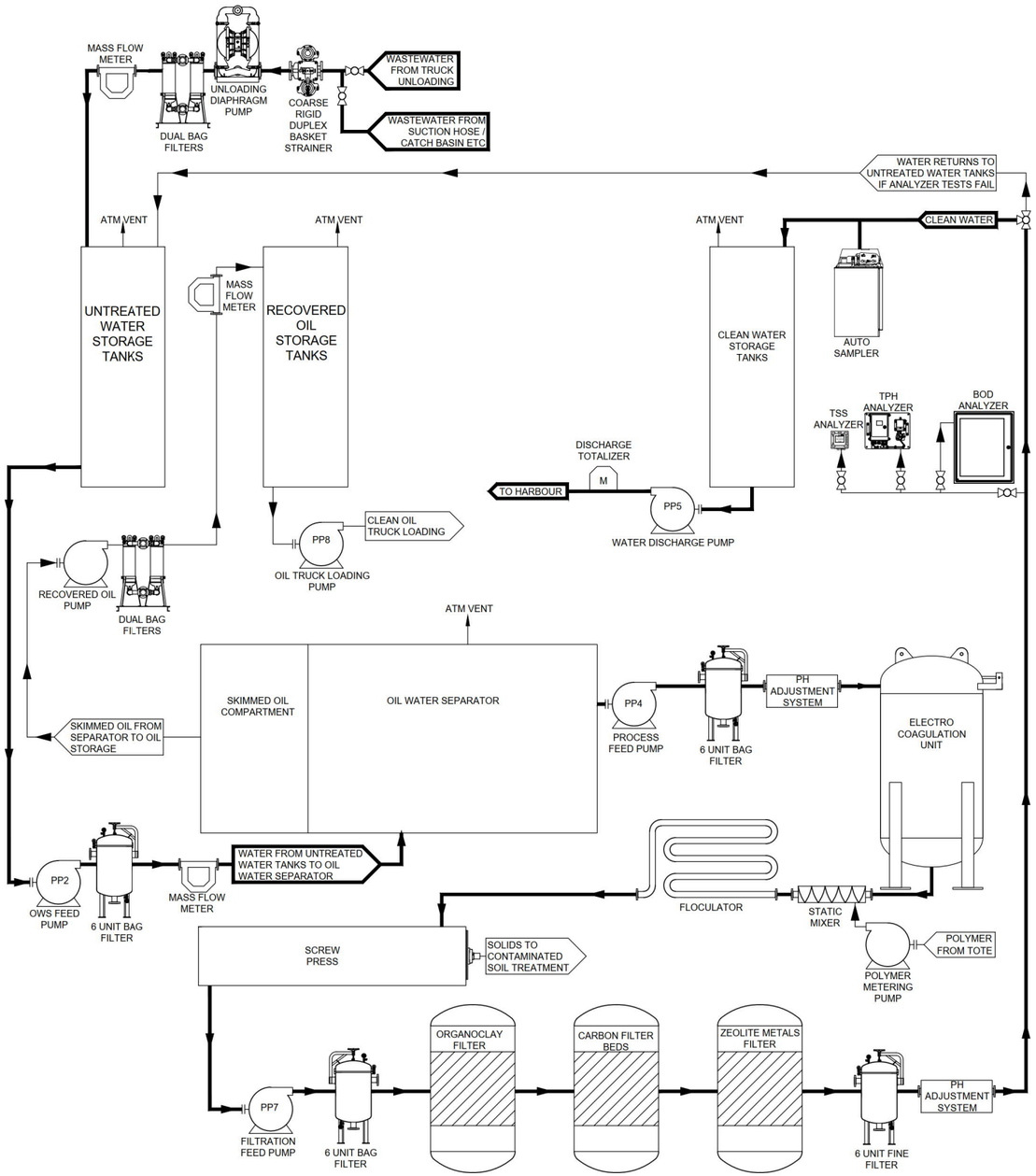
DESIGN:
DRAWN:
CHECKED:
DATE: OCT 2022
SCALE: 1" = 20'-0"
REV.: △

PROJECT NUMBER: GTS-1645

SHEET No. 1



WASTE OIL TREATMENT PROCESS FLOW DIAGRAM



WASTE WATER TREATMENT PROCESS FLOW DIAGRAM

ISSUE

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CONCRETE SPEC:

32MPa
5%-8% AIR
400MPa REBAR YIELD STRENGTH
80mm SLUMP

No.	DESCRIPTION	BY	DATE

REVISIONS

Logo: envirosoil

Client: ENVIROSOIL

Address: PLEASANT STREET DARTMOUTH, NS

Project: NEW WASTE OIL RECYCLING & WASTE WATER TREATMENT FACILITY

Title: SIMPLIFIED PROCESS FLOW DIAGRAM

GALLAGHER TECHNICAL SERVICES LIMITED
22 DOUGLAS DRIVE
QUISPAMSIS, NB
E2G 1Y3
PHONE: 506 849 4116
FAX: 506 847 1070

Stamp:

DESIGN:
DRAWN:
CHECKED:
DATE: OCT 2022
SCALE: 1/2" = 1'-0"
REV.: A

PROJECT NUMBER: GTS-1645

SHEET No. 2

BOILER ROOM HEATING OIL PUMP EQUIPMENT SCHEDULE

#	ELECTRIC MOTOR DRIVEN PUMP DESCRIPTION	MAX FLOW	IN/OUT Ø	MFR	MODEL #	HP	VOLTAGE	PHASE	VFD OR FIXED	TYPE OF PUMP
OHP1	OIL HEATER 1 PUMP	-		-	-	7.5	575VAC	3ø	-	INCLUDED WITH OIL HEATER PACKAGE
OHP2	OIL HEATER 1 HOT OIL SUPPLY	-	1-1/2" Ø	-	-	-	-	-	-	BY HEATEC
OHP3	OIL HEATER 1 WARM OIL SUPPLY	-	3" Ø	-	-	-	-	-	-	BY HEATEC
OHP4	OIL HEATER 2 PUMP	-		-	-	7.5	575VAC	3ø	-	INCLUDED WITH OIL HEATER PACKAGE
OHP5	OIL HEATER 2 HOT OIL SUPPLY	-	1-1/2" Ø	-	-	-	-	-	-	BY HEATEC
OHP6	OIL HEATER 2 WARM OIL SUPPLY	-	3" Ø	-	-	-	-	-	-	BY HEATEC

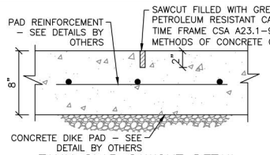
PROCESS EQUIPMENT ELECTRICAL EQUIPMENT / MOTOR SCHEDULE

#	DESCRIPTION	POWER	VOLTAGE	PHASE	VFD OR FIXED
PE1	TREATER TANK #1 MIXER	15HP	575VAC	3ø	VARIABLE
PE2	TREATER TANK #2 MIXER	15HP	575VAC	3ø	VARIABLE
PE3	SCREW PRESS	5HP	575VAC	3ø	VARIABLE
PE4	ELECTROCOAGULATION UNIT	125A	575VAC	3ø	
PE5	AIR COMPRESSOR	50HP	575VAC	3ø	

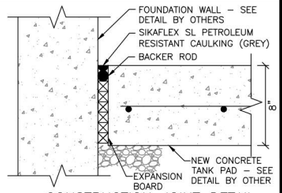
#	AIR DRIVEN PUMP DESCRIPTION	FLOW	IN/OUT Ø	MFR	MODEL #
PP9	TRUCK UNLOADING DIAPHRAGM PUMP			-	-
PP10	BUNKER BUSTER INJECTION PUMP			HUSKY	1050

PROCESS PUMP EQUIPMENT SCHEDULE

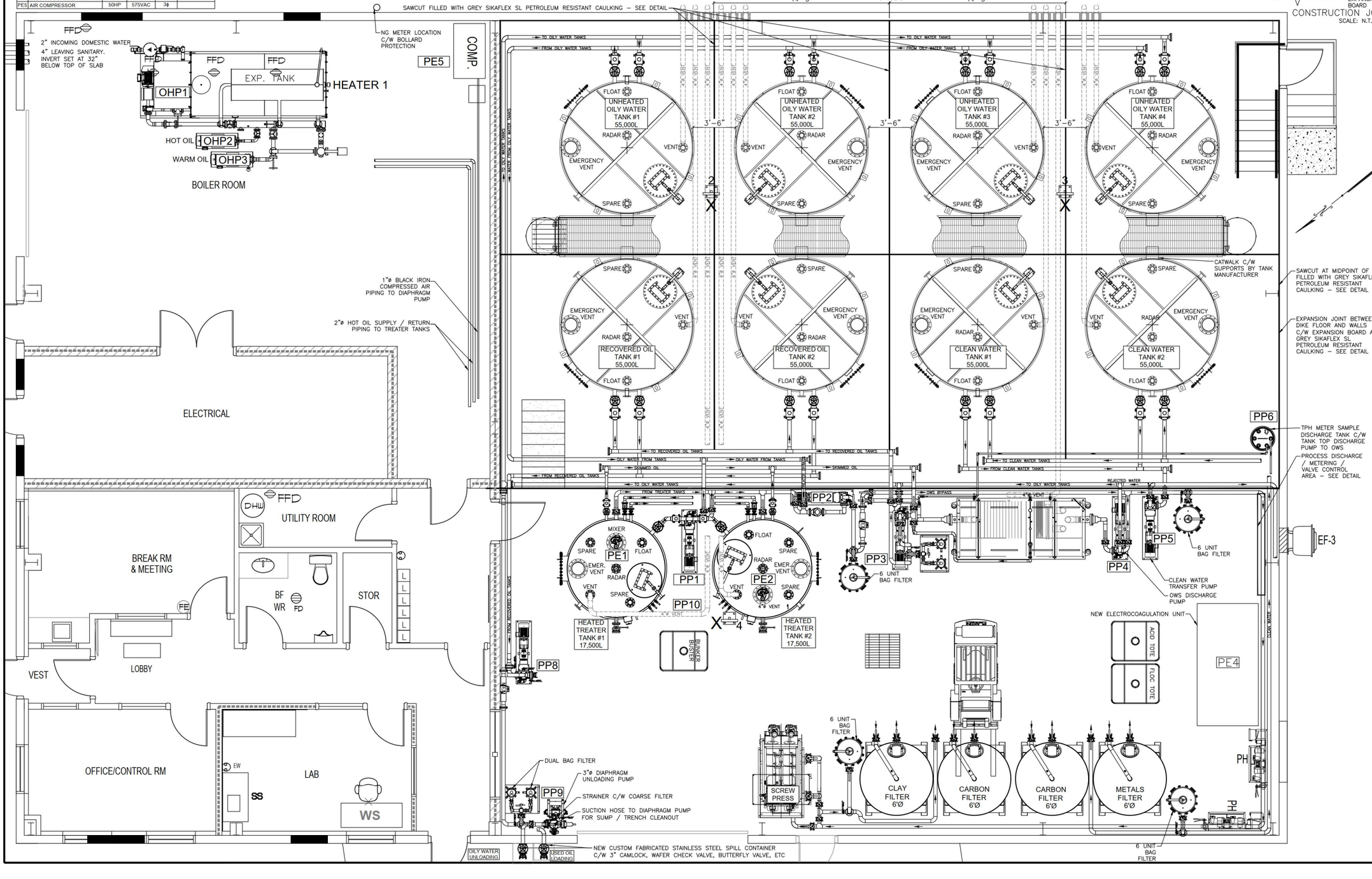
#	ELECTRIC MOTOR DRIVEN PUMP DESCRIPTION	MAX FLOW	IN/OUT Ø	MFR	MODEL #	HP	VOLTAGE	PHASE	VFD OR FIXED	TYPE OF PUMP
PP1	TREATER TANK FILLING FROM OILY WATER TANKS	150GPM	3" Ø	-	-	15	575VAC	3Ø	VARIABLE	HEAVY DUTY GEAR PUMP WITH INTERNAL PRESSURE RELIEF
PP2	WATER TREATMENT PROCESS FEED FROM OILY WATER OR TREATER TANKS	150GPM	3" Ø	-	-	15	575VAC	3Ø	VARIABLE	HEAVY DUTY GEAR PUMP WITH INTERNAL PRESSURE RELIEF
PP3	RECLAIMED OIL TO RECLAIMED OIL TANKS	150GPM	3" Ø	-	-	15	575VAC	3Ø	VARIABLE	HEAVY DUTY GEAR PUMP WITH INTERNAL PRESSURE RELIEF
PP4	OWS DISCHARGE PUMP TO PROCESS	150GPM	3" Ø	-	-	15	575VAC	3Ø	VARIABLE	HEAVY DUTY GEAR PUMP WITH INTERNAL PRESSURE RELIEF
PP5	CLEAN WATER TRANSFER	150GPM	3" Ø	-	-	15	575VAC	3Ø	VARIABLE	HEAVY DUTY GEAR PUMP WITH INTERNAL PRESSURE RELIEF
PP6	TPH DAY TANK WATER TRANSFER	10GPM	1" Ø	-	-	0.5	120VAC	1Ø	FIXED	"OFF THE SHELF" TANK TOP MOUNTED DAY TANK DISCHARGE PUMP
PP7	SCREW PRESS DAY TANK WATER TRANSFER	50GPM	2" Ø	-	-	5	120VAC	3Ø	FIXED	TANK TOP MOUNTED DAY TANK DISCHARGE PUMP
PP8	USED OIL TRUCK LOADING	150GPM	3" Ø	-	-	15	575VAC	3Ø	VARIABLE	HEAVY DUTY GEAR PUMP WITH INTERNAL PRESSURE RELIEF



TANK SLAB SAWCUT DETAIL
SCALE: NTS



CONSTRUCTION JOINT DETAIL
SCALE: N.T.S.



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CONCRETE SPEC:

32MPa
5%–8% AIR
400MPa REBAR YIELD STRENGTH
80mm SLUMP

No.	DESCRIPTION	BY	DATE

REVISIONS

Logo: envirosoil

Client: ENVIROSOIL

Address: PLEASANT STREET DARTMOUTH, NS

Project: NEW WASTE OIL RECYCLING & WASTE WATER TREATMENT FACILITY

Title: WATER TREATMENT SYSTEM BUILDING – GENERAL ARRANGEMENT

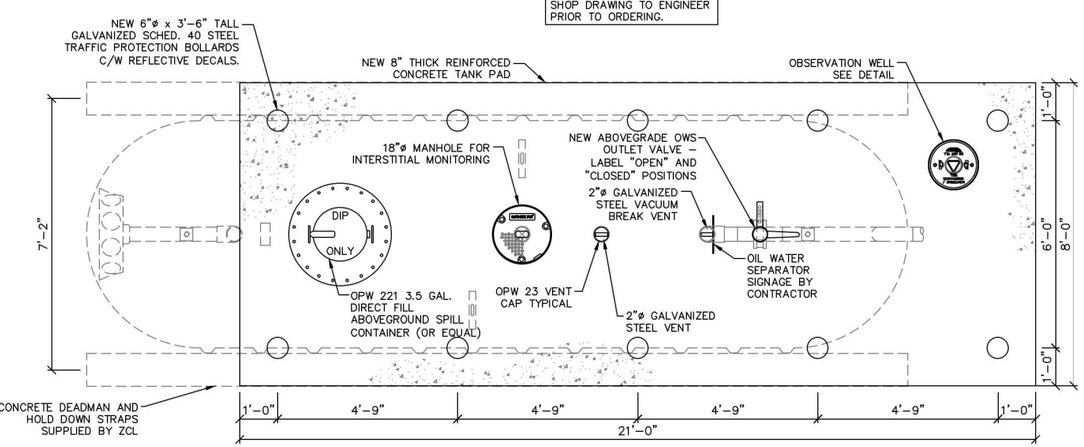
GALLAGHER TECHNICAL SERVICES LIMITED
22 DOUGLAS DRIVE
QUISPAMSIS, NB
E2G 1Y3
PHONE: 506 849 4116
FAX: 506 847 1070

Stamp:

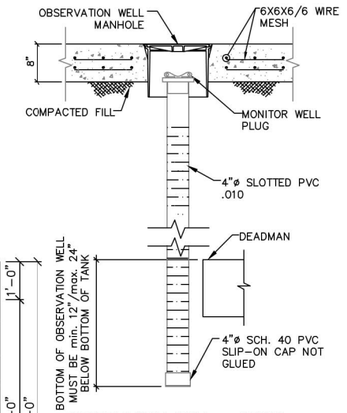
DESIGN:
DRAWN:
CHECKED:
DATE: OCT 2022
SCALE: 1/4" = 1'–0"
REV.: △

PROJECT NUMBER: GTS–1645

SHEET No. 3



TANK TOP CONCRETE - PLAN VIEW



OBSERVATION WELL - DETAIL

SCALE: NTS

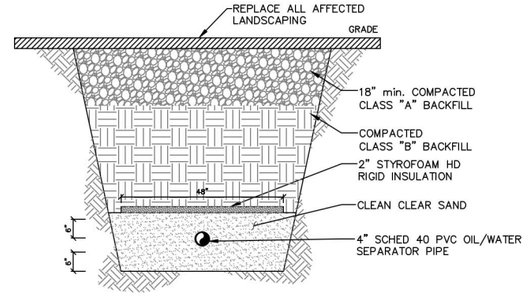
OBSERVATION WELL NOTES

1. (1) 4" DIA. PVC SLOTTED WELL SCREENS (MAX. SLOT .010") WILL BE INSTALLED AS REQUIRED BY LOCAL CODE. SLOTS WILL EXTEND TO WITHIN 24" BELOW GRADE.
2. EXTEND TANK NEST OBSERVATION WELL A MINIMUM OF 12" BELOW BOTTOM OF TANKS.
3. DO NOT PAINT INSIDE MANHOLE.
4. DO NOT GLUE REDUCERS, CAPS, OR COLLARS WITH PVC SOLVENT ADHESIVE.

NOTE:
EXCAVATION MUST BE SLOPED OR BENCHED TO WITHIN 4 ft OF THE BOTTOM OF THE EXCAVATION OR TRENCH WITH THE SLOPE OR BENCH NOT EXCEEDING 1 ft OF VERTICAL RISE TO EACH 1 ft OF HORIZONTAL RUN.

NOTE:
GEOTEXTILE TO FULLY LINE EXCAVATION, INCLUDING THE TOP OF THE TANKS ONCE 2 ft OF APPROVED BACKFILL HAS BEEN PLACED OVER TANK TOPS.

NOTE:
UNSTABLE SOILS AT BOTTOM OF EXCAVATION TO BE INSPECTED BY A GEOTECHNICAL ENGINEER FOR SUPERVISION AND INSTRUCTIONS TO ENSURE THE REQUIRED SOILS BEARING PRESSURE IS ACHIEVED.



PVC PIPE TRENCH DETAIL

SCALE: NTS

CLASS "A" GRAVEL	
SIEVE SIZE	PERCENT PASSING
1 1/2"	100
1 1/4"	95-100
3/4"	70-88
1/2"	55-78
3/8"	45-72
No. 4	30-57
No. 8	20-46
No.16	14-35
No.30	9-27
No.50	5-19
No.100	2-12
No.200	0-5

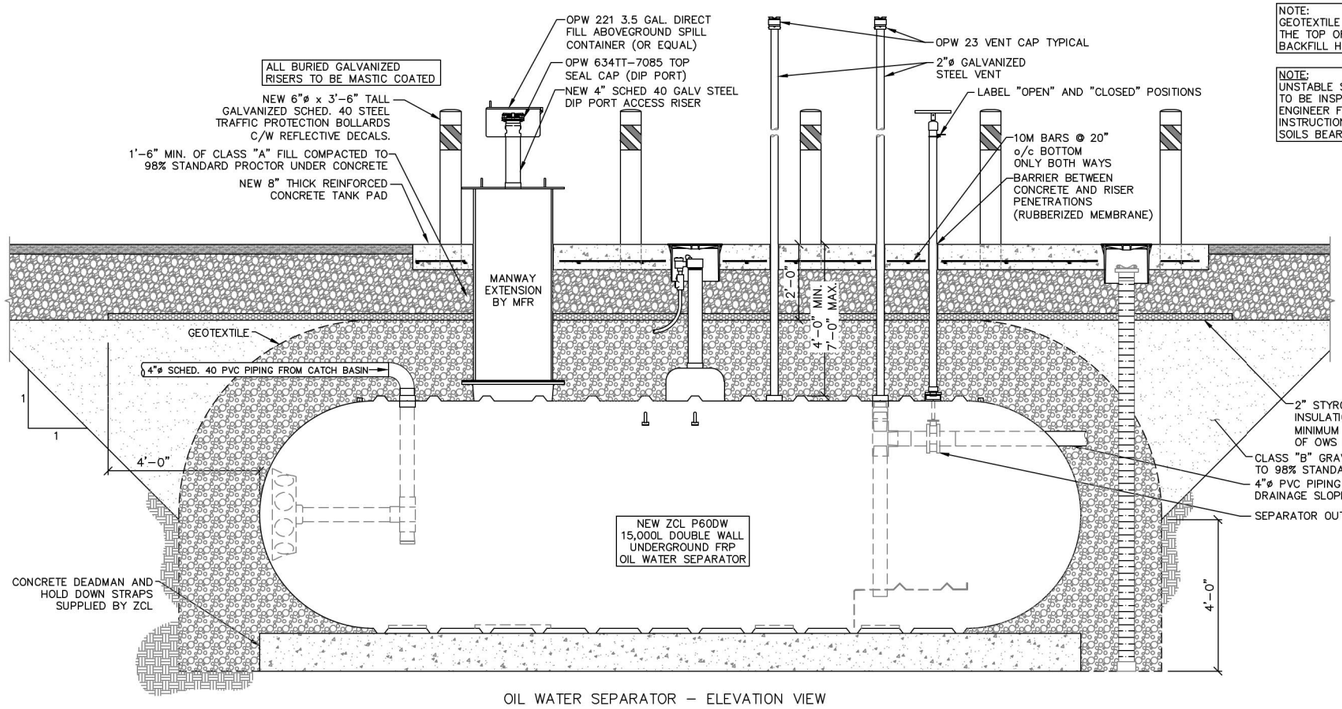
NOTE: CLASS "A" GRAVEL

CLASS "A" GRAVEL SHALL BE CRUSHED GRAVEL OR CRUSHED QUARRIED STONE OF HARD DURABLE PARTICLES FREE FROM SILT, CLAY, SLATE, FRIABLE PARTICLES, CEMENTATION, FROZEN MATERIAL, ORGANIC MATTER AND OTHER DELETERIOUS SUBSTANCES.

CLASS "B" GRAVEL	
SIEVE SIZE	PERCENT PASSING
5"	100
4"	95-100
3"	82-100
2"	62-100
1"	39-100
3/4"	30-94
3/8"	22-80
No. 4	16-66
No. 8	12-55
No.16	9-44
No.50	4-25
No.200	0-5

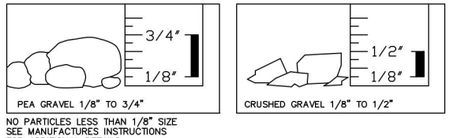
NOTE: CLASS "B" GRAVEL

FILL MATERIALS SHALL BE HARD, DURABLE PIT GRAVEL OR QUARRIED ROCK, FREE FROM SILT, CLAY, SLATE, FRABLE PARTICLES, CEMENTATION, FROZEN MATERIAL, ORGANIC MATTER AND OTHER DELETERIOUS SUBSTANCES.

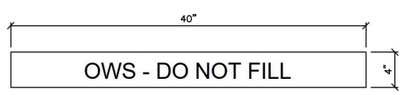


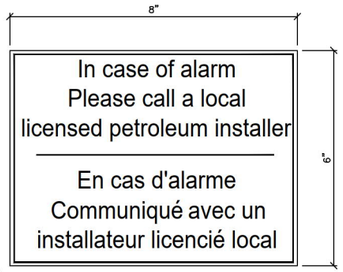
OIL WATER SEPARATOR - ELEVATION VIEW

APPROVED BACKFILL FOR FIBREGLASS SEPARATORS



NO PARTICLES LESS THAN 1/8" SIZE
SEE MANUFACTURES INSTRUCTIONS FOR ADDITIONAL DETAILS.





REQUIREMENTS:
MATERIAL: ALUMINUM OR COREX
SIZE: 8" X 6" (200mm X 150mm)
COLOURS: BLACK TEXT ON SILVER BACKGROUND
INSTALLATION INSTRUCTIONS: INSTALL NEAR OWS ELECTRONIC MONITORING PANEL.

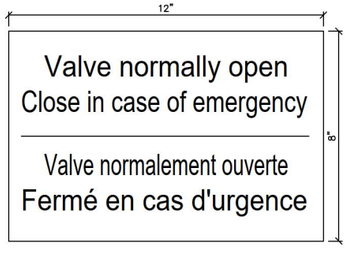
ELECTRONIC MONITORING PANEL SIGNAGE

SCALE: NTS

REQUIREMENTS:
MATERIAL: DECAL
SIZE: 40" X 4" (1016mm X 100mm)
COLOURS: BLACK TEXT ON SILVER BACKGROUND
INSTALLATION INSTRUCTIONS: INSTALL AT ALL OIL WATER SEPARATORS. LOCATE ON DIP PORT SPILL CONTAINER.

OWS DIP PORT DECAL

SCALE: NTS



REQUIREMENTS:
MATERIAL: ALUMINUM OR COREX
SIZE: 12" X 8" (300mm X 200mm)
COLOURS: BLACK TEXT ON SILVER BACKGROUND
INSTALLATION INSTRUCTIONS: INSTALL NEAR EMERGENCY SHUT OFF VALVE OF OIL WATER SEPARATORS.

OWS EMERGENCY SHUT OFF VALVE SIGN

SCALE: NTS

ISSUE

FOR	BY	DATE
■ - FOR REVIEW ONLY	TJG	OCT 2022
☐ - FOR APPROVAL		
☐ - FOR TENDER		
☐ - FOR CONSTRUCTION		
☐ - FOR AS BUILT		

NOTES:

- INSTALLER TO VERIFY LOCATION OF BUILDING AND PROPERTY LINES BEFORE BEGINNING WORK
- INSTALLER TO CHECK SITE FOR EXISTING SITE SERVICES SUCH AS: WATER AND SEWER LINES, ELECTRICAL LINES, ETC... PRIOR TO ANY EXCAVATION.
- ALL EQUIPMENT TO BE INSTALLED AND TESTED AS PER MANUFACTURES RECOMMENDATIONS
- INSTALLATION WORK TO BE COMPLETED IN ACCORDANCE WITH ALL APPLICABLE CODES.
- THIS PETROLEUM STORAGE SYSTEM CONFORMS TO ALL APPLICABLE ULC REQUIREMENTS AND STANDARDS INCLUDING ULC-S601, "SHOP FABRICATED STEEL ABOVEGROUND VERTICAL TANKS FOR PETROLEUM PRODUCTS," AND API 650 "WELDED STEEL TANKS FOR OIL STORAGE", LATEST EDITION.
- THIS DESIGN HAS ADDRESSED THE ISSUE OF POSSIBLE COLLECTION OF FLAMMABLE VAPOUR AND/OR LIQUID IN UNDERGROUND SUMPS.
- ALL WORK TO BE COMPLETED BY A PETROLEUM INSTALLER LICENSED BY THE PROVINCE OF NOVA SCOTIA.
- CONTRACTOR SHALL VERIFY ALL DIMENSIONS PRIOR TO COMMENCING WORK.
- ALL TANKS TO BE INSTALLED LEVEL

CONCRETE SPEC:
32MPa
5%-8% AIR
400MPa REBAR YIELD STRENGTH
80mm SLUMP

No.	DESCRIPTION	BY	DATE

REVISIONS

Logo: envirosoil

Client: ENVIROSOIL

Address: PLEASANT STREET DARTMOUTH, NS

Project: NEW WASTE OIL RECYCLING & WASTE WATER TREATMENT FACILITY

Title: UNDERGROUND OIL WATER SEPARATOR DETAILS

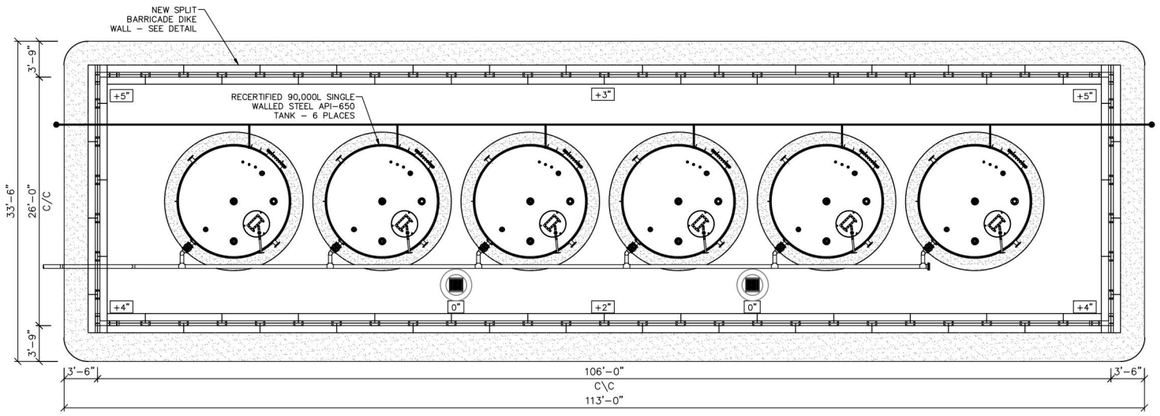
GALLAGHER TECHNICAL SERVICES LIMITED
22 DOUGLAS DRIVE
QUISPAMSIS, NB
E2G 1Y3
PHONE: 506 849 4116
FAX: 506 847 1070

Stamp:

DESIGN:
DRAWN:
CHECKED:
DATE: OCT 2022
SCALE: 1/2" = 1'
REV.: 0

PROJECT NUMBER: GTS-1645

SHEET No. 4



GENERAL NOTES:

1. GROUND RESISTANCE SHALL BE LESS THAN 10 OHMS MEASURED IN DRY CONDITIONS.
2. IF THIS VALUE CANNOT BE OBTAINED, ADD ANOTHER GROUNDING ROD 6.2m AWAY.
3. IF WATER OR SEWER PIPES ARE NEARBY, IT WILL BE NECESSARY TO GROUND THEM TO THE SYSTEM.
4. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LOCAL AND CANADIAN ELECTRICAL CODES.
5. BURY GROUND CONDUCTORS 300mm BELOW GRADE, TYPICAL OR AS NOTED. (ABOVE LINER INSIDE OF DYKE)
6. GROUND CONDUCTORS SHALL BE RUN CONTINUOUS THROUGH CONNECTIONS TO EQUIPMENT. DO NOT CUT AT CONNECTIONS. SPLICES WHERE ABSOLUTELY REQUIRED SHALL BE BURNDY SERVIT KS-23
7. COMPRESSION SPLICE BURNDY YS-L.
8. USE MANUFACTURERS RECOMMENDED COMPRESSION DIES WITH EACH CONNECTOR. ALL SURFACES OF CONNECTORS AND FITTINGS TO BE COATED WITH PENTROX COMPOUND.
9. ALL GROUNDING AND BONDING COPPER WIRES SHALL BE BURIED TO A MINIMUM OF 300mm. PROTECTION OF THE WIRES SHALL BE PROVIDED FROM THE BOTTOM OF TRENCHES TO ABOVE BALLAST AT TRACK SIDES AND WITHIN 150mm WHERE THEY RISE ABOVE GRADE LEVEL. FLEXIBLE SLEEVES SHALL BE PROVIDED TO THIS EFFECT TO AVOID ANY DAMAGE TO THE COPPER WIRES.
10. COPPER WIRE ELECTRICAL RESISTANCE:
    No.4 AWG, 0.8153 ohm/km
    No.6 AWG, 1.2966 ohm/km
11. "BURNDY" CATALOGUE NO. SHOWN FOR IDENTIFICATION ONLY. THERMOWELD, CALDWELD OR EQUAL CONNECTIONS MAY BE SUBSTITUTED ON NEW INSTALLATIONS.

NOTES

EXCAVATION AND FILL REQUIREMENTS

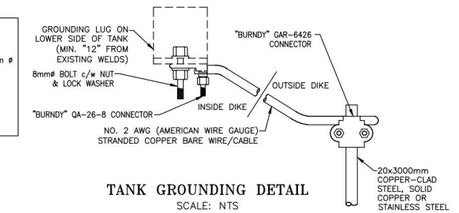
1. EXCAVATE TO THE REQUIRED LINES, LEVELS AND GRADES. DO NOT EXCAVATE OR DISTURB BEYOND THE REQUIRED LINES, LEVELS OR GRADES UNLESS REQUIRED BY THE ENGINEER.
2. WHERE THE REQUIRED LINES, LEVELS AND GRADES ARE NOT DEFINED, EXCAVATE AS NECESSARY FOR THE ITEMS WHICH ARE TO BE PLACED IN THE EXCAVATION.
3. DO NOT PLACE FILL UNTIL SUBGRADE HAS BEEN COMPACTED TO 95% OF MAX. DRY DENSITY BY MOD. PROCTOR.
4. DO NOT COVER ANY SUBGRADE OR WORK UNTIL AUTHORIZED BY THE ENGINEER,BUT OTHERWISE PLACE THE FILL AS SOON AS POSSIBLE.
5. REMOVE ALL DISTURBED MATERIAL AND ALL MATERIAL WHICH HAS BECOME UNSTABLE DUE TO INADEQUATE PROTECTION, DEWATERING AND/OR ANY OTHER REASON. REPLACE SUCH MATERIAL WITH GRANULAR "B" OR SUITABLE MATERIAL AS APPROVED BY THE ENGINEER IN 250mm LIFTS AND COMPACTED TO 95% OF MAX. DRY DENSITY BY MODIFIED PROCTOR.

LINER DETAILS

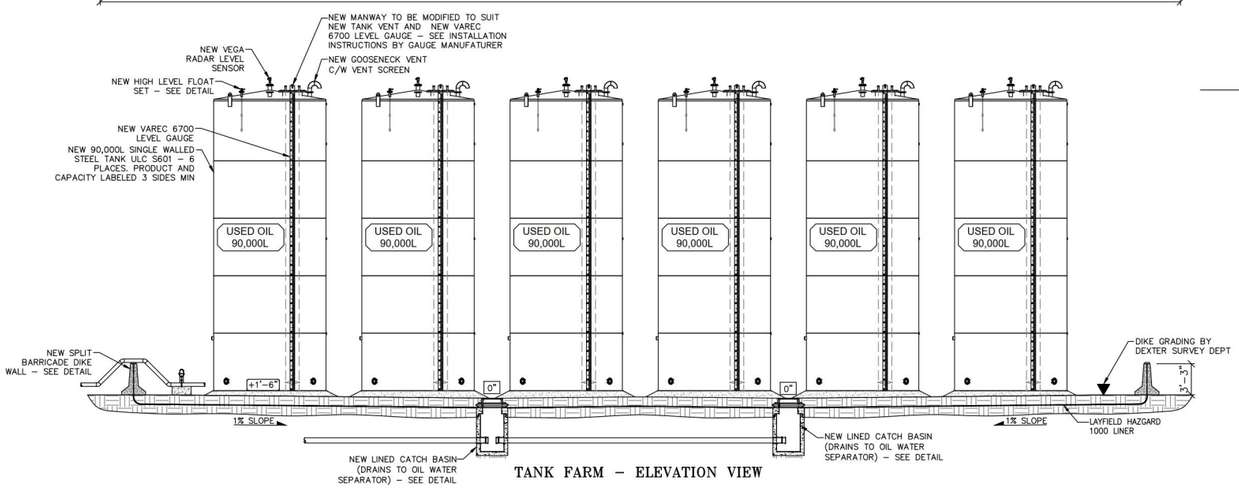
1. WHERE PIPES GO THROUGH THE DYKE, THE PERFORATION OF THE LINER MUST BE MADE BY USE OF THE SLEEVE SUPPLIED AS PART OF THE LINER.
2. THE LINER SHALL BE SEALED TO THE SUMP BASIN LOCATED AT THE LOW POINT OF THE TANK FARM FLOOR
3. GRANULAR 'A' TO BE COMPACTED TO 100% BY MOD. PROCTOR.
4. EARTH DYKE AND SUB- BASE TO BE COMPACTED IN 150mm LIFTS, USING MECHANICAL EQUIPMENT, TO 100% STANDARD PROCTOR DRY DENSITY.
5. SLOPE LINER FROM CORNERS OF DYKE WALL TO SUMP.

NOTES:

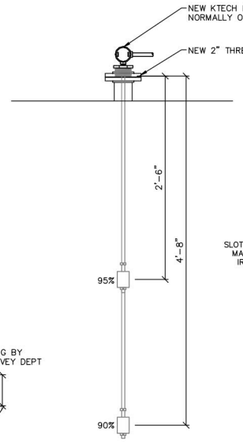
1. WHEN TANK TO GROUND RESISTANCE IS GREATER THAN 10 OHMS, USE 2 GROUND RODS ON OPPOSITE SIDES FOR TANKS OF 30.5m ø OR LESS. IF MORE THAN 30.5m ø USE 3 GROUND RODS.
2. WHEN SAND-BLASTING A TANK, MAKE SURE THE SANDER AND SURFACE TO BE SANDED ARE BONDED TOGETHER.
3. RUN ALL GROUND WIRE BENEATH TANK FARM FLOOR SURFACE (GRAVEL OR CONCRETE), BUT ABOVE LINER.
4. DO NOT INSTALL GROUND ROD INSIDE DYKE AREA



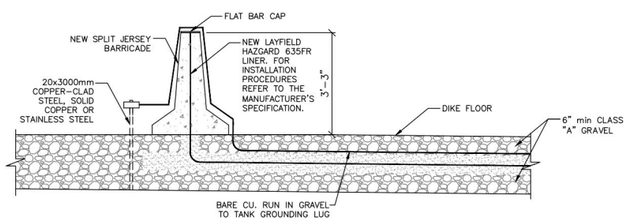
TANK GROUNDING DETAIL
SCALE: NTS



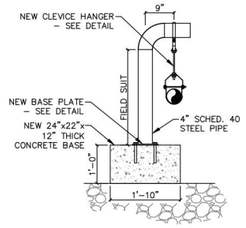
TANK FARM – ELEVATION VIEW



HIGH LEVEL FLOAT SWITCH – DETAIL
SCALE: NTS



DIKE WALL DETAIL
SCALE: NTS



PIPE SUPPORT DETAIL
SCALE: NTS

CLASS "A" GRAVEL	
SIEVE SIZE	PERCENT PASSING
1 1/2"	100
1 1/4"	95–100
3/4"	70–88
1/2"	55–78
3/8"	45–72
No. 4	30–57
No. 8	20–46
No.16	14–35
No.30	9–27
No.50	5–19
No.100	2–12
No.200	0–5

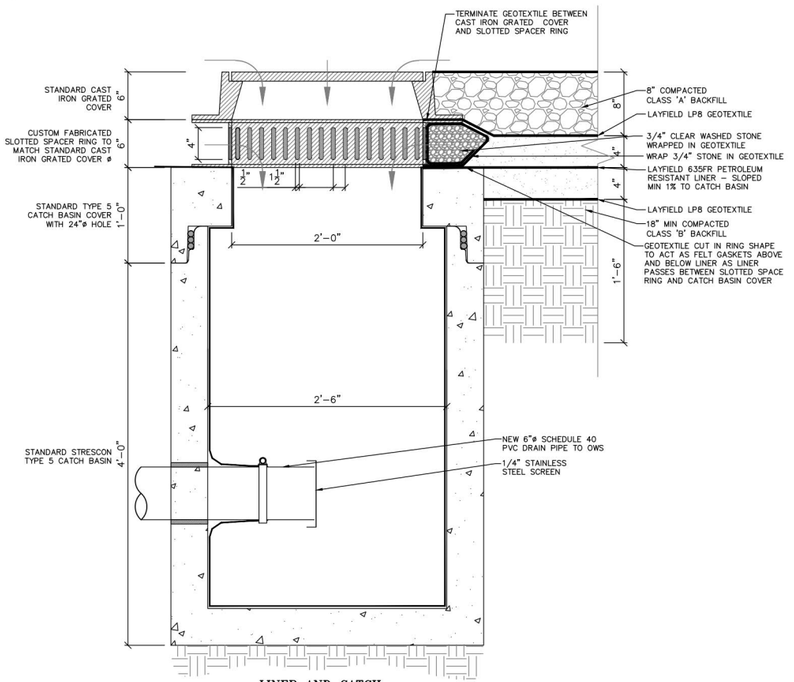
NOTE: CLASS "A" GRAVEL

CLASS "A" GRAVEL SHALL BE CRUSHED GRAVEL OR CRUSHED QUARRIED STONE OF HARD DURABLE PARTICLES FREE FROM SILT, CLAY, SLATE, FRIABLE PARTICLES, CEMENTATION, FROZEN MATERIAL, ORGANIC MATTER AND OTHER DELETERIOUS SUBSTANCES.

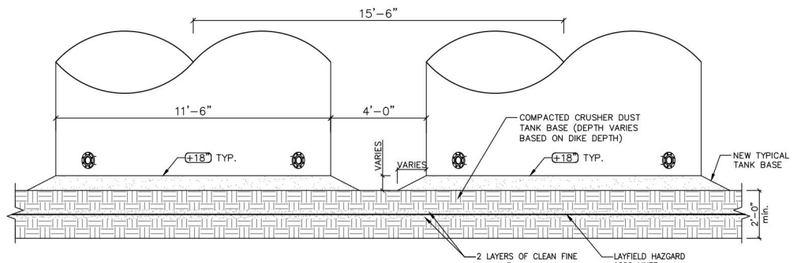
CLASS "B" GRAVEL	
SIEVE SIZE	PERCENT PASSING
5"	100
4"	95–100
3"	82–100
2"	62–100
1"	39–100
3/4"	30–94
3/8"	22–80
No. 4	16–66
No. 8	12–55
No.16	9–44
No.50	4–25
No.200	0–5

NOTE: CLASS "B" GRAVEL

FILL MATERIALS SHALL BE HARD, DURABLE PIT GRAVEL OR QUARRIED ROCK, FREE FROM SILT, CLAY, SLATE, FRIABLE PARTICLES, CEMENTATION, FROZEN MATERIAL, ORGANIC MATTER AND OTHER DELETERIOUS SUBSTANCES.



LINER AND CATCH BASIN DETAIL
SCALE: NTS



TYPICAL TANK BASE DETAIL
SCALE: NTS

NOTE:
ELEVATIONS SHOWN ARE RELATIVE TO EACH OTHER ONLY AND ARE NOT INTENDED TO RELATE TO ANY OTHER ELEVATIONS THROUGH THE DRAWING SET

NOTE:
THE THICKNESS OF CRUSHER DUST BACKFILL UNDER THE TANKS INCREASES AS GROUND SLOPES DOWN TOWARDS CATCH BASIN (TO KEEP TANK BOTTOM ELEVATIONS EQUAL).

NOTE:
BONDING CONNECTIONS SHALL BE ELECTRICALLY AND MECHANICALLY FIRM. JACKS, PLUGS, CLAMPS AND CONNECTING POINTS SHALL BE CLEAN UNPAINTED METAL TO PROVIDE POSITIVE ELECTRICAL CONNECTION.

DIKE CAPACITY CALCULATION:

–NFC REQUIRES A DIKE BE ABLE TO HOLD 100% OF THE LARGEST TANK + 10% OF EACH ADDITIONAL TANK.

VOLUME REQUIRED = 100% OF LARGEST TANK + 10% OF EACH ADDITIONAL TANK
= 90,000L + 7(9,000L)
= 90,000L + 63,000L
= 153,000L (5,404 ft³)

–CONSERVATIVELY, REMOVE FOOTPRINT OF ALL TANKS FROM TOTAL DIKE AREA, LEAVING THE FOLLOWING AVAILABLE CONTAINMENT AREA:

AVAILABLE AREA = 1960FT²

–WALL HEIGHT REQUIRED:

5,404 ft³ = 1960FT² X H
H = 2.76 ft

ADD 6" FREEBOARD = WALL HEIGHT TO BE 39"

GEOTECHNICAL INSTRUCTIONS:

EXCAVATE TO 600mm (2') BELOW THE UNDERSIDE OF THE TANK FARM ELEVATIONS. THE EXPOSED SUBGRADE SURFACE SHALL THEN BE PROOF ROLLED WITH A LARGE STEEL DRUM ROLLER AND INSPECTED AND APPROVED BY THE ENGINEER. ANY SOFT AREAS SHALL BE SUBEXCAVATED AND REPLACED WITH GRANULAR "B" MATERIAL (SEE BELOW).

THE SUBBASE SHALL CONSIST OF 450mm (1.5') GRANULAR "B" PLACED IN TWO LIFTS.

THE BASE SHALL CONSIST OF 150mm (6") OF GRANULAR "A" MATERIAL AND ELEVATED CRUSHER DUST TANK PADS.

ALL GRANULAR MATERIALS TO BE COMPACTED TO 100% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY USING SUITABLE VIBRATORY COMPACTION EQUIPMENT. COMPACTION TESTING WILL BE PROVIDED BY THE ENGINEER (PROVIDE 3 DAYS NOTICE).

ISSUE

FOR	BY	DATE
■ – FOR REVIEW ONLY	TJG	OCT 2022
☐ – FOR APPROVAL		
☐ – FOR TENDER		
☐ – FOR CONSTRUCTION		
☐ – FOR AS BUILT		

NOTES:
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- ALL TANKS TO BE INSTALLED LEVEL

CONCRETE SPEC:
32MPa
5%–8% AIR
400MPa REBAR YIELD STRENGTH
80mm SLUMP

No.	DESCRIPTION	BY	DATE

REVISIONS

Logo: envirosoil (ISO 14001 • ISO 9001)

Client: ENVIROSOIL

Address: PLEASANT STREET DARTMOUTH, NS

Project: NEW WASTE OIL RECYCLING & WASTE WATER TREATMENT FACILITY

Title: EXTERIOR USED OIL STORAGE DIKE

GALLAGHER TECHNICAL SERVICES LIMITED
22 DOUGLAS DRIVE
QUISPAMSIS, NB
E2G 1Y3
PHONE: 506 849 4116
FAX: 506 847 1070

Stamp:

DESIGN:
DRAWN:
CHECKED:
DATE: OCT 2022
SCALE: 1/8" = 1'-0"
REV.: △

PROJECT NUMBER: GTS–1645

SHEET No. 5