CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

ALPHA LANDS STORMWATER OUTFALL, DELTA, BRITISH COLUMBIA

VERSION 1.0

SEPTEMBER 30, 2020

WESGROUP PROPERTIES
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1.0 INTRODUCTION

This Construction Environmental Management Plan (CEMP) is the primary document to guide overall environmental best management practices to be implemented by the construction team for the Wesgroup Properties Ltd. (Wesgroup) stormwater outfall associated with the Alpha Lands development, Delta, British Columbia (Project). Wesgroup is delivering the outfall to the City of Delta as part of infrastructure improvements associated with development.

The objective of this CEMP is to provide Wesgroup's Contractor, including all entities engaged by or through the Contractor relating to the Project, with a prescriptive document for the protection of environmental resources during project activities related to construction consistent with Contract Specifications for the Project. This CEMP provides:

- Performance-based environmental requirements to be met by the Contractor in conducting work in accordance with regulatory approvals, Best Management Practices (BMPs), and engineering specifications;
- Measures to mitigate, and where possible avoid, potential adverse impacts to environmental resources; and,
- An overview of environmental legislation applicable to the Project.

This CEMP provides a basis for the preparation of a site or activity specific Environmental Protection Plan (EPP) by the Contractor that accounts for their selected construction practices and mitigation strategies prior to starting construction.

It is important to note that the CEMP may require revisions upon the issuance of regulatory agency permits, approvals and authorizations, in particular conditions of such decisions. The CEMP is an adaptive document, and will be reviewed and amended accordingly if and when new information regarding the Project becomes known to Wesgroup. Amendments will be implemented to ensure mitigation measures are appropriate for construction activities associated with the Project.

2.0 PROJECT INFORMATION

2.1 Project Location and Description

Wesgroup has proposed to discharge stormwater to the Fraser River as part of the Alpha Lands Development, Delta, British Columbia (Figure 2.1). The lands occur along the southern shoreline of the South Arm distributary channel of the Fraser River.

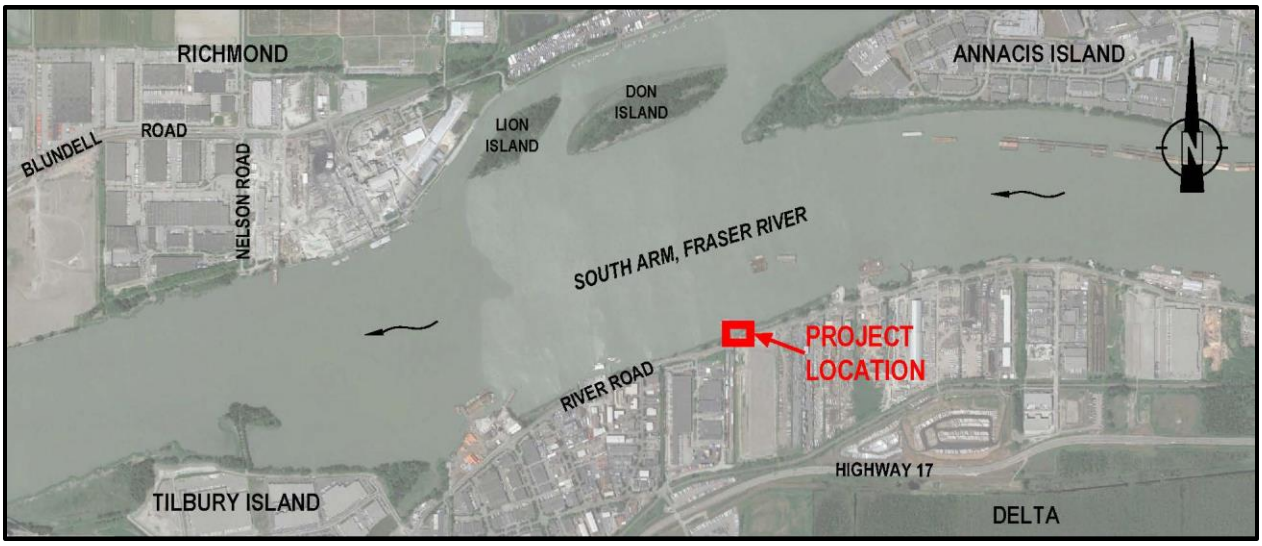


Figure 2.1 Project Location

The project consists of the installation of a stormwater outfall below the high water elevation of the Fraser River. The project site is defined by the design and construction footprints of the outfall within the intertidal and riparian zones of the Fraser River.

The design of the stormwater outfall is presented by Dwg. No. 2449-01-04 Rev.00 "Outfall Channel Design and Alignment km 26 Fraser River" (June 10, 2020) Envirowest Consultants Inc. (Attachment A), and Dwg. No. 16-222 Rev.05 "Alpha Landfill – North Portion Permanent 750ø Crossing" Aplin Martin (Attachment A).

2.2 Project Schedule

Works are scheduled to occur between November 01, 2020 and February 28, 2021.

Acknowledging the constraint of tides on works, the work program is divided into three phases. The overall work program is expected to occur over a period of 1 to 2 weeks. The three phases of the work program are as follows.

- The first phase will likely require 1 to 2 days and would involve activities not requiring extreme low tides. The activities would be conducted in the dry, and would include site preparation and any excavations located above low water, small tide. It is anticipated that the installation of the manhole would occur as part of the first phase.

- The second phase will likely require 4 to 6 days and would involve activities implemented during low water, large tide. The outfall pipe, headwall and outfall channel would be constructed. Works would be conducted above water levels.

- The third phase will likely require 1 to 2 days and would involve activities associated with clean-up and the decommissioning of equipment and materials. These activities would be conducted above water levels, and would not be unduly constrained by tides.

2.3 Site Description

Detailed site conditions at the location of proposed works are presented by the Fisheries and Oceans Canada Request for Review (March 27, 2020) (Attachment B).

The alignment of the outfall crosses intertidal marsh and intertidal mudflat. The riparian zone of the alignment largely consists of riprap revetment on the face of the fill slope of River Road.

3.0 CONTACTS AND RESPONSIBILITIES

3.1 Key Project Personnel

This section of the CEMP describes the roles and responsibilities of Wesgroup and the Project's Contractor for implementing, inspecting, and reporting on the effectiveness of environmental protection and mitigation measures.

Wesgroup and the Contractor, and all respective personnel working on the Project, have a responsibility to protect environmental, socioeconomic, First Nation and heritage values. Personnel involved with the planning and implementation of the Project's overall environmental program are presented in Table 1. Details on the roles and responsibilities these personnel follow. Specific requirements of the Contractor will be detailed in the Contract Specifications.

Table 3.1 Key Project Contacts

Name	Role	Organization	Phone Number
TBD	Project Manager	Wesgroup	
TBD	Wesgroup's Engineer	TBD	
TBD	Wesgroup's Construction Manager	TBD	
TBD	Wesgroup's Environmental Monitor	TBD	
TBD	Contractor Project Manager	Contractor	
TBD	Contractor Environmental Manager	Contractor	
TBD	Municipal Inspector	City of Delta	

3.2 Wesgroup Properties Ltd.

Wesgroup is responsible responsibility for overall Project implementation, including the administration of contracts, technical quality control, adherence to and performance of engineering requirements of Contract Specifications. Wesgroup, in collaboration with its Engineer and Construction Manager, is responsible to:

- ensure compliance with terms and conditions of regulatory permits, approvals, and authorizations, relevant legislation, and best management practices and standards;
- coordinate construction inspections to ensure compliance with engineering specifications and standards;
- ensure effective communication links among respective personnel of Wesgroup and the Contractor;
- manage communications and relations with public stakeholders, regulatory agencies and First Nations;
- delegate authority and communicate requirements as needed regarding all aspects of the Project;
- assess the qualifications, experience and performance record of the Contractor's Environmental Manager and Specialist(s), and the Contractor's environmental record, as part of tender evaluations; and,
- engage a Qualified Environmental Practitioner as Wesgroup's Environmental Monitor.

3.3 Wesgroup's Environmental Monitor

The scope of responsibilities for Wesgroup's Environmental Monitor will include inspection, evaluation and audit of the work of the Contractor and its Environmental Manager and Environmental Specialist(s). Roles and responsibilities of Wesgroup's Environmental Monitor include:

- communication of the requirements of this CEMP to the Contractor's Project Manager, Environmental Manager, and Environmental Specialist(s);
- audit of environmental orientation and training sessions delivered to Contractor staff by the Contractor's Environmental Manager;
- review of the Contractor's EPP and component details, procedures, and plans as they relate to compliance with this CEMP, regulatory permits and approvals issued to the Project, relevant legislation, and best management practices and standards;
- review of the Contractor's environmental monitoring reports, as prepared by the Contractor's Environmental Manager, for completeness, accuracy, adequacy of applied mitigation measures, and compliance with the environmental protection requirements of this CEMP;
- report to Wesgroup on the effectiveness of mitigation measures being implemented to avoid or limit project-related environmental impacts, difficulties and/or deficiencies encountered, and how such difficulties and/or deficiencies were addressed;
- audit reports and manifests produced by the Contractor's Environmental Manager and Environmental Specialist(s);
- verify that copies of environmental agencies' permits/approvals and spill response and emergency procedures are maintained at work site(s) at all times;
- audit and evaluate compliance of work practices, procedures and effectiveness of mitigation measures with terms and conditions of regulatory approvals, with this CEMP, and with applicable EPP and component details, procedures, and plans;

- as required, provide recommendations to the Contractor through Wesgroup's Project Manager to addressed deficiencies in compliance with this CEMP and the EPP, and respective component details, procedures, and plans, with regulatory permits and approvals, with relevant legislation, and with best management practices and standards;
- review the Contractor's Environmental Monitoring Completion Reports;
- assist in emergency situations or incidents with regard to the implementation of mitigation to minimize adverse environmental effects; and,
- recommend suspension of construction activities to Wesgroup's Project Manager, based on non-compliance with this CEMP or the EPP, contravention of regulatory permits and approvals, contravention of relevant legislation, absence of best management practices and standards, and/or environmental damage resulting from construction related activities, until appropriate actions to achieve compliance and/or prevent further environmental damage are identified and implemented to the satisfaction of Wesgroup.

3.4 Contractor

Performance-based environmental goals and objectives, to be met by the Contractor for the Project, will be contained within the Contract Specifications. Obligating the Contractor ensures that environmental goals and objectives of the Project are met in a timely and effective manner. The Contractor's roles and responsibilities, as defined in the Specifications, include:

- compliance with project and environmental conditions of regulatory agency permits, approvals and/or authorizations issued to the Project, and all relevant federal, provincial, and municipal laws, statutes, by-laws, regulations, orders and policies;
- retention of a qualified Environmental Manager responsible for the duties listed in the specification; the Environmental Manager reports directly to the Contractor's Project Manager and Wesgroup's Environmental Monitor;
- development and implementation of a site and activity-specific Environmental Protection Plan (EPP) in accordance with requirements of Contract, and with prescriptive performance-based environmental protection requirements of this CEMP; and,
- retention of Environmental Specialists as necessary to assist the Contractor's Environmental Manager with preparation and implementation of the Contractor's Environmental Protection Plan, including environmental monitoring, environmental reports, requirements, emergency spill response, clean-up activities, and incident investigation reports, and compliance with the environmental protection requirements of this CEMP.

4.0 RELEVANT ENVIRONMENTAL LEGISLATION

Table 4.1 provides a list of relevant environmental legislation and legal requirements applicable to the Project. The list will be revisited and updated as required throughout the construction phase of the Project to address prospective changes in construction activities that may introduce further regulatory requirements.

Table 4.1 Relevant Environmental Legislation			
Act, Regulation or Bylaw	**Description**	**Applicability**	**Approval or Permit in Place or Addressed**
Federal			
Fisheries Act: administered by Fisheries and Oceans Canada (DFO) and Environment and Climate Change Canada	The *Fisheries Act* provides protection of fish, fish habitat and water quality. The *Fisheries Act* prohibits the death of fish other than by fishing, the 'harmful alteration, disruption and destruction' of fish habitat, and the deposition of deleterious substances to water frequented by fish. The protection of marine mammals from harm is provided by the Marine Mammal Regulations SOR/93-56 of the *Fisheries Act*. Marine mammals include pinnipeds (seals and sea lions) and cetaceans (dolphins, porpoises and whales).	Works will engage the water column and the river bottom within the Fraser River. Fish, as defined by the *Fisheries Act*, occur within the design and construction footprints of the Project. It is unlikely that marine mammals will occur within the design and construction footprints of the Project. Substances considered deleterious substances if released to the environment will be used as part of Project construction.	An Application for Authorization has been submitted to DFO. Inwater works will be conducted during the timing window for works of least risk to fish (June 16 through to February 28). Spill response and reporting will be conducted as described under the subject header **Provincial**, Spill Reporting Regulation (below).
Navigation Protection Act: administered by Transport Canada through the Navigation Protection Program (NPP)	The *Navigation Protection Act* protects the public right of free and unobstructed passage through navigable waters.	Works will not engage the navigation channel of the Fraser River.	The Project will be required to submit a 'Notice of Works' to the NPP. An NPP approval will not be required.
Canada Marine Act: administered by the Vancouver Fraser Port Authority (Port Authority)	The *Canada Marine Act* requires Ports to facilitate Canada's trade in a way that ensures the safe movement of goods.	In administering the *Canada Marine Act*, the Vancouver Fraser River Port Authority is required to conduct an environmental review, in accordance with the *Canadian Environmental Assessment Act, 2012* of any proposed activity on Port lands. The stormwater outfall occurs on Port lands.	An application for a Port Authority Project Permit has been submitted.
Migratory Birds Convention Act, 1994: administered by the Canadian Wildlife Service of Environment Canada (CWS)	The *Migratory Birds Convention Act, 1994* protects migratory birds, their eggs and their nests.	Inwater works will be completed by February 28, the end of the 'least risk to fish' work window. This also avoids the period of active nesting for most bird species.	An approval or permit from CWS with regard to migratory birds is not required. Constraints to construction attributable to nesting by migratory birds are not associated with the Project.

Table 4.1 Relevant Environmental Legislation contd			
Provincial			
Spill Reporting Regulation of the *Environmental Management Act:* administered by the BC Ministry of Environment and Climate Change Strategy (ECCS)	The Spill Reporting Regulation establishes a protocol for reporting the unauthorized release of substances into the environment, in this instance the Fraser River.	Substances, such as hydrocarbons, that are harmful if released to the environment will be used as part of construction of the Project.	This CEMP provides an emergency and spill response protocol. The Contractor is to assign a specific individual to lead implementation of the protocol. All spills of a toxic or hazardous substance (of any volume) into the Fraser River will be immediately reported verbally to the Port Authority, ECCS, Environment and Climate Change Canada (ECCC); an Environmental Incident Report will be submitted to the Port Authority, ECCS and ECCC within 24 hours of the verbal report.
Wildlife Act: administered by the BC Ministry Forests, Lands, Natural Resource Operations and Rural Development	The *Wildlife Act* defines wildlife as all native and some non-native amphibians, reptiles, birds and mammals. Wildlife is managed by the *Act.*	Wildlife, as defined by the *Wildlife Act*, are not anticipated to be negatively affected during construction of the Project.	Constraints to construction attributable to the presence and activities of wildlife are not associated with the Project.
Heritage Conservation Act: administered by the BC Ministry Forests, Lands, Natural Resource Operations and Rural Development	Archaeological sites on Provincial lands are protected by the *Heritage Conservation Act*. The Project occurs on Federal lands. The management of prospective archaeological resources will be conducted in accordance with Union of BC Indian Chiefs "First Nations Heritage Planning Toolkit".	Archaeological sites are not known to occur within the design and construction footprints of the Project.	In the event that evidence of what is suspected to be an archaeological resource is encountered, the Contractor will implement a "Chance Find' protocol in accordance with the Union of BC Indian Chiefs "First Nations Heritage Planning Toolkit".
Municipal			
City of Delta Noise Regulation Bylaw No. 1906, 1972	The City of Delta Regulation Bylaw regulates construction noise and sound within the limits of the municipality.	Marine construction is the primary activity of the Project.	Construction is restricted to 0700 to 1900 hours during weekdays, 0900 to 1700 hours Saturdays, with no construction permitted on Sundays and holidays.

5.0 PROJECT MITIGATION MEASURES AND ENVIRONMENTAL SPECIFICATIONS

The performance-based environmental standards to be met by the Contractor will be covered by the Contract Specifications. A summary of outstanding project mitigation measures and environmental specifications is provided below.

5.1 Training and General Practices

Training and general management practices will be implemented by the Contractor to facilitate the protection of the environment during the construction phase of the Project. These include, but are not limited to:

- ensuring that all staff and sub-contractors have received CEMP training and are adequately trained in the implementation of best environmental practices and standards before the commencement of overall construction, and before specific tasks and/or activities that have the disproportionate risk of adverse effects upon environmental resources;
- conducting a tailgate meeting with staff and/or sub-contractors regarding the CEMP whenever a change of conditions may affect the risk of impacts to the environment; changes of conditions include changes in construction personnel, work activities, weather, and the presence of visitors within the limits of the site;
- documentation of all training sessions, meetings, and instructions through signed training and tailgate forms, and written instructions signed by the instructor; documentation will include a description of subjects addressed and the identification and signatures of all training session and meeting attendees;
- ensuring that adequate supplies are onsite to implement impact mitigation measures and respond to incidents (e.g. spill response); and,
- embracing an adaptive management approach to the implementation of prescriptive measures contained within the CEMP, and best management practices and standards; the Environmental Monitor is part of this adaptive approach, and should be consulted during consideration and implementation of actions intended to mitigate adverse effects upon environmental resources.

5.2 Site Access, Mobilization and Laydown Areas

The City of Delta Noise Bylaw No.1906, 1972 defines the hours of construction on weekdays, Saturdays, Sundays and holidays. Further, the prospective application of any additional restriction on a specific construction activity will be with regard to the control of noise and vibration, and the prospective disturbance of the surrounding community.

Site access, mobilization and laydown will capitalize upon existing site conditions, and will largely occur within the design footprint of the Project.

Equipment and material storage will occur on upland. Construction material (e.g. aggregates) will be delivered to the Project location by trucks along municipal roads.

Equipment will access the Project location from land. Marine access is not anticipated.

The Contractors EPP will delineate in detail the distinct work areas associated with site access, mobilization and laydown of equipment, the operation of equipment, and the delivery and storage of equipment and construction materials.

5.3 Machinery and Equipment

- A list of all equipment and machinery to be used onsite during construction will be provided by the Contractor to Wesgroup prior to construction. All non-road diesel equipment will be subject to the emission ratings of construction vehicles and/or equipment is to be "Tier 2" or better (*Canadian Environmental Protection Act* (1999), On Road Vehicle and Engine Emissions Regulation (2004)).

The following measures will be implemented by the Contractor to mitigate the risk of adverse impacts to environmental resources:

- inspection of all equipment prior to mobilization to the site will occur to ensure they are in good operating order and free of leaks, excess and oil grease;
- major maintenance and repairs of all equipment will be done offsite;
- all equipment, including light-duty vehicles, will have a spill containment kit onboard at all times;
- inspection of equipment on a daily basis, prior to commencement of construction, by the operator will occur to ensure it is in good operating order; the inspection will be documented and reported to the Contractor; minor maintenance may occur onsite to address deficiencies; major maintenance will occur offsite to address deficiencies;
- cleaning of equipment, involving surfactants and/or degreasers, will occur offsite; and,
- use of only biodegradable oil and/or hydraulic fluid within machinery and equipment.

5.4 Equipment Refuelling Procedures

The Contractor will implement the following mitigation strategies to ensure that petroleum and other hazardous products are not discharged to the environment during refuelling:

- any land-based storage of petroleum and/or other hazardous products will be located at least 30 metres from the mean high water elevation of the Fraser River, and the storm water drainage system;
- petroleum storage will be in accordance with the Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum Products

and Allied Petroleum Products (Canadian Council of Ministers of the Environment 2003);

- any land-based petroleum storage facility will be surrounded by an impermeable berm, capable of containing at least 125 percent of the stored volume or comprise a double walled tank, protected from accidental rupture by barriers capable of preventing heavy equipment and/or vehicle access (with the exception of the fuel truck);
- refuelling of equipment will only be undertaken by personnel trained for this work;
- refuelling of equipment will only be undertaken with immediate access to a spill response kit;
- storage containers will be inspected daily for leaks and/or other structural deficiencies;
- stationary equipment will be inspected on a daily basis for structural deficiencies;
- stationary equipment with fuel tank capacity exceeding 25 litres will be placed within a tray capable of containing at least 125 percent of the volume of the fuel tank; and,
- spill event reporting (Emergency and Spill Response Plan) will be implemented immediately in the event of a spill.

5.5 Emergency Response

A comprehensive emergency response protocol is required to implement a rapid response of emergency services and/or the containment and clean-up of spills.

Clear and rapid communication is required to minimize potential impacts associated with an emergency. Wesgroup, the BC Ministry of Environment and Climate Change Strategy, Environment and Climate Change Canada, the Port Authority, and the City of Delta will be contacted in the event of a spill (as defined and in accordance with the Spill Reporting Regulation of the *Environmental Management Act* (British Columbia)). Further, the Canadian Coast Guard will be contacted regarding any spill of hazardous material to the Fraser River. Contact information is provided by Table 5.1.

Emergency and Spill Response Plan

Accidental spills of deleterious materials resulting in impacts to the environment may occur during the Project, despite all reasonable efforts to prevent such an event. The following measures will be implemented by the Contractor to reduce the risk of, and/or control an accidental discharge.

Table 5.1 Emergency Contact Information	
Name	**Phone Number**
Emergency Services (Fire, Ambulance, Police)	911
Port Authority Operations Centre	604-665-9086
Local Non-emergency police (Delta)	604-946-4411
Local Non-emergency fire (Delta, Tilbury, Hall No.7)	604-215-4842
Delta Hospital (5800 Mountainview Blvd.)	604-946-1121
Emergency Management BC (formerly PEP)	1-800-663-3456
Fisheries and Oceans Canada Radio Room	604-666-3500
Canadian Coast Guard	604-775-8881
Tri-Arrow Industrial Recovery Inc. (third party spill	604-682-2751
HazCo Emergency Response (third party spill response)	1-800-667-0444
Safety-Kleen Emergency Response (third party spill	1-888-375-5336
City of Delta Project Manager	
City of Delta Inspector	
Wesgroup's Construction Manager	604-
Wesgroup's Environmental Monitor	604-
TBD, Contractor Project Manager	604-
TBD, Contractor Environmental Manager	604-

The Contractor will conduct a daily visual inspection of all prospective sources of hazardous materials for signs of leakage and/or other conditions that may contribute to a spill; daily visual inspections will ensure that all personal protective equipment and other emergency response equipment is in place and readily accessible.

The Contractor will post the list of key emergency contacts (Table 5.1) at conspicuous locations throughout the site and within onsite offices.

Spill Response Kits

The Contractor will maintain Large and Small Fuel Spill Emergency Response Kits at the Project site.

The Large Fuel Spill Emergency Response Kit will be kept at the site trailer and/or equipment barges, and will be applied to spills generally exceeding 100 litres, and will include:

- minimum 100 propylene 'white' oil and lubricant absorbent pads;

- minimum 50 cellulose ‘general purpose’ glycol absorbent pads;
- minimum 20 propylene containment booms (each 3.0 metres long);
- minimum 100 metres ‘Restricted Access’ barrier tape;
- minimum 25 black contractors garbage bags (6 mil);
- personal protective equipment (20 nitrile gloves (both hands), 2 splash goggles, 2 poly coated tyveck suits and boots, 2 P100 dual cartridge respirators);
- Safety Data Sheets for any hazardous substances used on site;
- key emergency contacts with telephone numbers; and,
- written procedures for emergency response and spill reporting.

Small Fuel Spill Emergency Response Kits will be kept in each Construction Vehicle, and will be used for spills generally not exceeding 100 litres, and will include:

- minimum 25 propylene ‘white’ oil and lubricant absorbent pads;
- minimum 10 cellulose ‘general purpose’ glycol absorbent pads;
- minimum 3 propylene containment booms (each 3.0 metres long);
- minimum 2 black contractors garbage bags (6 mil);
- personal protective equipment (6 nitrile gloves (both hands), 1 splash goggle); and,
- key emergency contacts (Table 5.1) with telephone numbers.

Spill Response

The Contractor will immediately take the necessary steps, including reliance on external resources, to abate an uncontrolled discharge. The Contractor will provide the necessary labour, equipment, materials and absorbents to contain and remove the spill, clean up the affected area, dispose of waste materials at an approved disposal site, and restore the area.

Any individual who notices a potential spill, spill, or equipment malfunction will stop work immediately and shut down equipment. The person involved will contact the Contractor Project Manager and/or the Contractor Environmental Manager. The person involved will commence spill response; the Contractor Project Manager and/or Contractor Environmental Manager will facilitate additional spill response measures as required.

Initial response to spills is as follows:

- assess safety risks in the spill area;
- notify Contractor Project Manager and/or Contractor Environmental Manager;
- stop the discharge of deleterious substance if safe to do so;
- secure and isolate the spill area;
- investigate and conduct an initial assessment of the situation (identify product, equipment involved, affected area, spill status, time at which spill commenced);
- commence recovery of the deleterious substance with onsite emergency spill equipment and material if safe to do so; and,

- complete the spill notification and reporting procedure as described in the following section.

The Contractor will conduct a Spill Event Debriefing following response and clean-up of a spill. The debriefing will review the spill event timeline and actions leading up to, during and after the event, the response and its effectiveness, adverse environmental effects, further remedial action requirements, and lessons learned.

Spill Event Reporting

Spill event reporting is focused upon communications directed to Wesgroup, Environment and Climate Change Canada, the BC Ministry of Environment and Climate Change Strategy, the Port Authority and the City of Delta. Spill event reporting to the BC Ministry of Environment and Climate Change Strategy (Emergency Management BC) will be in accordance with the Spill Reporting Regulation of the *Environmental Management Act*. Actions are to be implemented immediately and communicated directly to Wesgroup, Environment and Climate Change Canada, the BC Ministry of Environment and Climate Change Strategy, the Port Authority and the City of Delta, specifically:

- all spills of a toxic or hazardous substance onto land or into the Fraser River (of any volume) will be immediately reported verbally to Wesgroup, Environment and Climate Change Canada, the BC Ministry of Environment and Climate Change Strategy, the Port Authority and the City of Delta; a written Environmental Incident Report (EIR) is to be submitted by the Contractor to Wesgroup, Environment and Climate Change Canada, the BC Ministry of Environment and Climate Change Strategy, the Port Authority and the City of Delta within 24 hours of the verbal report;
- the EIR will be submitted by the Contractor as an attachment to the weekly monitoring report; and,
- site remediation is to be conducted upon successful containment of the spill incident and as directed by the Contractor, Wesgroup's Environmental Monitor, Environment and Climate Change Canada, the BC Ministry of Environment and Climate Change Strategy, the Port Authority, the City of Delta, and other responding regulatory agencies; remedial works may include, but are not limited to, the removal of all contaminated materials (i.e., constituents of concern in soil and/or groundwater) to levels approved by regulatory authorities.

In verbally reporting a spill to Wesgroup, Environment and Climate Change Canada, the BC Ministry of Environment and Climate Change Strategy, the Port Authority, and the City of Delta, the caller will provide Wesgroup, Environment and Climate Change Canada, the BC Ministry of Environment and Climate Change Strategy, the Port Authority, and the City of Delta with the following information:

- name and contact number of the person and affiliation (e.g. company) initiating the call;
- name and contact number of the person and affiliation (e.g. company) that cause the spill;
- location and time of spill;

- type and quantity of substance spilled;
- cause and effects of spill;
- details of remedial actions taken and/or proposed;
- description of spill location and surrounding areas;
- name of authorities and/or agencies responding to the spill location; and,
- name of other persons and/or authorities and/or agencies notified of spill or to be notified of spill.

5.6 Hazardous Material Management and Spill Prevention

The proper management of hazardous materials mitigates the prospect for spills of hazardous material that may be associated with the construction phase of the Project. Measures to mitigate the prospect for spills, and the overall management of hazardous materials, are as follows:

- hazardous waste containers will be leak-resistant, possess removable tops, kept upright, and kept closed except when being filled or emptied;
- each container or areas used to store hazardous waste will be clearly labeled as containing hazardous waste;
- each container or areas used to store hazardous waste will be equipped with secondary containment sufficient to contain the entire volume of waste;
- hazardous waste storage areas will be checked weekly and a corresponding log will be kept; waste disposal will be recorded on the waste disposal tracking sheet;
- a Waste Stream Profile form will be prepared by the Contractor for each hazardous waste and kept on file at the relevant site office;
- training records for those involved with the handling and transportation of hazardous waste will be kept at the relevant site office;
- hazardous waste will be managed in compliance with applicable fire codes;
- hazardous materials including, but not limited to, fuels, bitumens, solvents, cleaners, used fuel and oil filters, and other construction materials will be stored and handled to minimize loss and to allow containment and recovery in the event of a spill;
- the Contractor will designate area(s) for the transfer and temporary storage of hazardous materials and waste; land-based storage is to be at least 30 metres away from the mean high-water elevation of the Fraser River and the storm water drainage system; there will not be marine-based storage of hazardous materials; land-based storage area(s) will be clearly delineated by signage and appropriately managed;
- the Contractor will promptly remove hazardous waste and/or hazardous materials from the Project location that are not in active use;
- the Contractor will be responsible for maintaining proper Workplace Hazardous Materials Information Systems (WHMIS) labels and Safety Data Sheets for all hazardous materials used and stored onsite; and,
- hazardous waste generated by the Contractor during the course of construction activities will be disposed of in accordance with the Hazardous Waste Regulation of the *Environmental Management Act* (British Columbia); waste includes, but is not limited to, waste oils, greases, lubricants, solvents, batteries, and used spill clean-up materials.

The Contractor will prepare a Hazardous Waste Management Plan for submission to and approval by Wesgroup. The Plan will contain means of collection and disposal of waste, and monitoring and reporting protocols. It will be included as a component of the EPP.

5.7 Contaminated Soil and Groundwater Management

Prospective encounters, during construction, of soil and groundwater with concentrations of contaminants may require special considerations with regard to permitting and/or disposal. Sampling and analyses may be required to characterize both sediments and sediments for the purposes of permitting and/or disposal.

Permits for the handling, storage, transport and/or disposal of soil and water during construction are the responsibility of the Contractor.

Wesgroup may, from time to time, check soil and groundwater for contaminants during construction. If contaminated material is encountered or suspected, construction activities within the affected area are to immediately cease and Wesgroup and the Engineer notified. The Engineer may prepare a plan or direct the Contractor to prepare a plan for identification, handling, or disposal of contaminated soil or groundwater.

5.8 Non-Hazardous Waste Management

Collection, sorting and temporary onsite storage of non-hazardous solids associated with onsite activities will occur. Non-hazardous waste will be disposed offsite on a regular basis, before onsite storage containers are filled. Commercial waste disposal contractors will collect and dispose of office waste offsite. Non-hazardous solid waste, such as, but not limited to, waste wood, asphalt, concrete, and metals will be disposed of offsite at an approved disposal facility in compliance with the *Environmental Management Act* (British Columbia) and applicable Regulations.

The Contractor will prepare a Non-Hazardous Waste Management Plan for submission to and approval by Wesgroup. The Plan will contain means of collection and disposal of waste, and monitoring and reporting protocols. It will be included as a component of the EPP.

5.9 Concrete

Cast-in-place concrete is not associated with the Project.

In the event cast-in-place concrete is used, the Contractor will conduct all construction activities involving the use of concrete, cement, mortars and other Portland cement or lime-containing construction materials in a manner that prevents sediments, debris, concrete (cured or uncured), and concrete wastewater from being deposited into the Fraser River or the storm water drainage

system, either directly or indirectly. Containment, whether on land, on barges, or in concrete trucks, will be provided for concrete wastewater and solid concrete waste; concrete wastewater and solid concrete waste will not be disposed of in the Fraser River or proximal shoreline environments. Concrete wastewater associated with the wash down of concrete trucks will be contained within the concrete truck and transported back to the batch plant for reuse.

A concrete spill response kit will be kept onsite and will be readily accessible during concrete pours. The kit will include:

- 2 tanks (minimum 100 litres) of pressurized carbon dioxide;
- 2 flow control valves;
- 2 lengths of 25-metre-long weighted perforated hose and multiple aerators;
- a calibrated pH meter; and,
- Safety Data Sheets for uncured concrete.

Staff and sub-contractors will be trained in the application and use of the spill response kit by the Contractor.

All events where uncured concrete, concrete solid waste, and/or concrete wastewater escapes containment, the Contractor will collect the material and dispose of it offsite in accordance with applicable legislation. If it cannot be readily removed from the site (e.g. by vacuum truck), the kit will be applied to any isolated bodies of water isolated containing such material until an ambient pH of 6.5-9.0 is achieved; multiple treatments may be necessary (e.g. on successive days). Drainage containing uncured concrete, concrete solid waste, and/or concrete wastewater will be prevented from entering the Fraser River or the storm water drainage system.

As applicable, the Contractor will prepare a Concrete Management Plan for submission to and approval by Wesgroup. The Plan will include monitoring and reporting protocols. It will be included as a component of the EPP.

5.10 Air Quality

The generation of airborne pollutants is expected to be largely attributable to vehicular exhaust emissions. The generation of dust will be extremely localized, and will be largely restricted to access points associated with the upland portion of the Project location. Any waste soils will be staged at and about the access points and loaded on trucks for transport offsite to a permitted disposal location.

The Contractor will implement the following measures to mitigate impacts to air quality:

- the Contractor will control dust and other airborne emissions from activities including, but not limited to, vehicular and machinery movement, excavation, and stockpiling;
- dust will be controlled onsite through the application of water on dry soils; chemical dust suppressants are not to be used; water will be applied with distributors equipped with a

spray system that will ensure uniform application and with a means of shut-off; the application rate will be adjustable to suit the desired treatment of the site; the application rate will be sufficient to only reduce the potential for the dispersion of soil particles; the application rate will not be of a magnitude to induce erosion of soils and the delivery of the soils to the Fraser River or to the storm water system;

- paved surfaces and/or roads in immediate proximity to access points are to be swept by mechanical or manual means as often as necessary to minimize the accumulation and/or entrainment of fugitive sediments;
- highway trucks will cover loads with tarpaulin to prevent development of airborne particulates;
- burning of refuse or other material is prohibited;
- emission ratings of construction vehicles and/or equipment is to be "Tier 2" or better (*Canadian Environmental Protection Act* (1999), On Road Vehicle and Engine Emissions Regulation (2004));
- diesel fuel is to contain less than 15 ppm sulphur content;
- equipment is to operate at optimum rated loads and be regularly maintained;
- light duty vehicle engines are to be shut off after 1-minute idling; and,
- heavy duty truck engines are to be shut off after 5 minutes idling.

Qualitative monitoring of air quality (i.e. visual observation of air quality) will be undertaken by the Contractor. Monitoring will focus on activities that have the greatest potential for impacts upon air quality.

The Contractor will prepare an Air Quality Management Plan for submission to and approval by Wesgroup. It will include methods to control dust, and will include records of inspection of construction vehicles and/or equipment for emissions. The Plan will include monitoring and reporting protocols. It will be included as a component of the EPP.

5.11 Erosion and Sediment Control

All water within upland construction work areas will be controlled, collected, treated, and discharged to the sanitary sewer system subject to the discharge restrictions contained within the EPP. No water is to be discharged to the sanitary sewer system that exceeds acceptable discharge requirements.

The EPP will also require the contractor to provide a wheel wash and incorporate other measures as necessary to ensure sediment, concrete slurry, cement, and other construction materials or debris are not carried off-site by construction equipment or vehicles.

In-situ water quality sampling to assess turbidity, total suspended sediments, and pH will be undertaken by Wesgroup's Environmental Monitor throughout the duration of the Project whenever there is evidence that site water is entering storm drains, or if surface street runoff exceeds prescribed quality levels due to materials being tracked off-site.

Waters discharged to the Fraser River through storm water outfalls will also be sampled during significant rainfall events (SREs) (e.g. 25 millimetres in 24 hours) to assess the extent to which sediments may be entering the receiving waters of the Fraser River.

Erosion and sediment control shall comply with the following water quality criteria.

- When background is less than or equal to 50 nephelometric turbidity units (NTU) or 100 milligrams per litre (mg/L) non-filterable residue (NFR), induced turbidity should not exceed 5 NTU or 10 mg/L above the background value.
- When background is greater than 50 NTU or 100 mg/L NFR, induced turbidity should not exceed background values by more than 10% of the background value.

"Background value" is defined as the NTU or NFR value of an appropriate reference site within the Fraser River that is not affected by construction activities.

The Contractor will prepare an Erosion and Sediment Control Plan for submission to and approval by Wesgroup. The Plan will include monitoring and reporting protocols. The Plan is to include mitigation activities, such as seeding with erosion control grass-forb seed mixtures, and the application of erosion control matting (e.g. coconut fibre and straw blankets). It will be a component of the EPP.

5.12 Noise and Vibration

The City of Delta Noise Bylaw No.1906, 1972 defines the hours of construction on weekdays, Saturdays, and Sundays and holidays. Further, the prospective application of any additional restriction on a specific construction activity will be with regard to the control of noise and vibration, and the prospective disturbance of the surrounding community.

Mitigation measures to limit the impact of noise and vibration include:

- maintenance of construction equipment in good working order;
- operation of equipment within load tolerances and ratings;
- frequent maintenance of equipment, in particular lubrication, replacement of worn parts, and replacement of deficient exhaust systems;
- shut off of heavy equipment after 5 minutes idling;
- avoidance of unnecessary engine revving and use of engine brakes;
- minimization of the use of back-up beepers within the compliance parameters of WorkSafe BC regulations; and,
- relocation and reorientation of stationary equipment as to engage natural noise screening/dampening features.

The Contractor will prepare a Noise and Vibration Control Plan for submission to and approval by Wesgroup. The Plan will include monitoring and reporting protocols. It will be a component of the EPP.

5.13 Fish and Fish Habitat

The Contractor will not, directly or indirectly, deposit or permit the deposit of a deleterious substance of any type in water frequented by fish in a manner contrary to Section 36(3) of the *Fisheries Act* (Canada), or adversely affect fish or fish habitat in a manner contrary to Section 35(1) of the *Fisheries Act* (Canada).

Inwater works are not anticipated. Works will be conducted during appropriate low tide events above water level. Irrespective of this impact mitigation measure, works will be conducted during the timing window for works of least risk to fish (June 16 through to February 28).[1] The timing window was initially developed for inwater works, and was specific to the mitigation of impacts to downstream migrating juvenile salmonids. Incidentally, the work window also protects upstream migrating eulachon; this species is typically migrating through the North Arm distributary channel fronting the Project location from approximately March through to May. Likewise, late juvenile and adult white sturgeon feeding upon eulachon during spring and summer (April 01-August 01) are also protected.

As inwater works are unlikely, extraordinary measures, such as side scan sonar to detect the presence of fish, are not prescribed for the mitigation of impacts on white sturgeon.

The EPP will acknowledge that deleterious substances will not be discharged to the Fraser River. Further, it will also acknowledge that works will occur during appropriate low tide events to avoid inwater activities, and that works will be conducted during the timing window of least risk to fish.

5.14 Vegetation and Wildlife

Vegetation within the shoreline environment of the Project location consists predominantly of intertidal marsh. Marsh will be salvaged and replanted. The restoration of salvaged marsh will be augmented with the planting of nursery stock marsh vegetation. Detail with regard to the restoration of marsh vegetation is provided by the Fisheries and Oceans Canada Request for Review (March 27, 2020) (Attachment B).

Active raptor nests, including those of bald eagles, do not occur at or in proximity to the Project location. Great blue heron nests are also absent. The immediate upland environment is defined by River Road. Active nests of raptors and herons will not be affected by Project related activities.

Nesting by bird species, in particular small passerines, typically occur from early spring through to mid-summer. Project related activities will not occur during this period. Nesting within intertidal cattail marsh and intertidal swamp in proximity to the Project location will not be affected.

[1] https://www.dfo-mpo.gc.ca/pnw-ppe/timing-periodes/bc-s-eng.html#area-29 (September 30, 2020).

The EPP will acknowledge that works will not be conducted during the active nesting of small passerines within shoreline environments in proximity to the Project location.

5.15 Historical and Archaeological Management

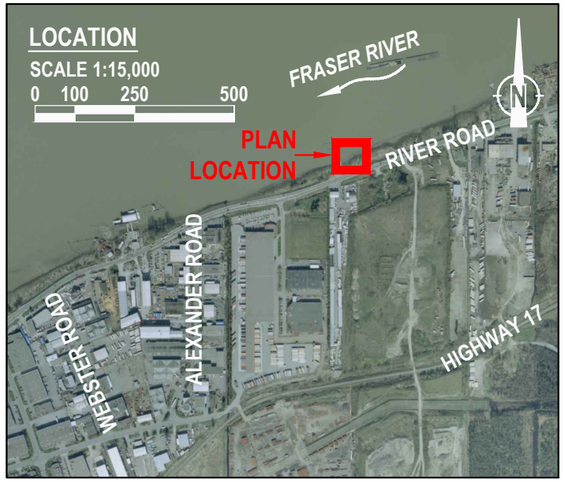
There are no known archaeological or heritage resources at risk at the Project location. Nevertheless, in the event that potential archaeological resources are encountered during construction, specifically during excavation of native sediments, the Contractor will work under "Archaeological Chance Find Procedure" protocols including ceasing construction activities that may disturb potential resources and immediately contacting appropriate authorities.

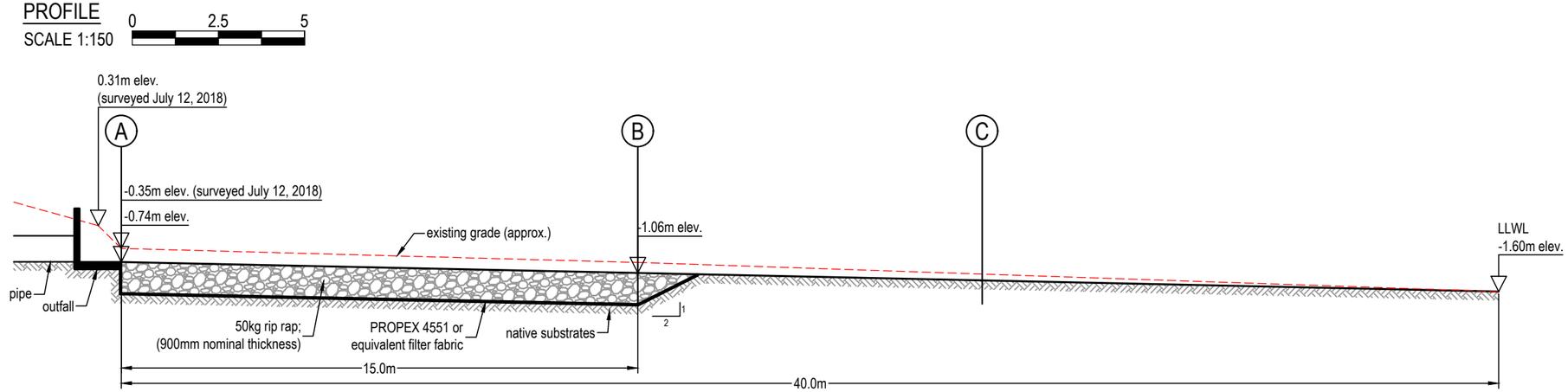
A brief, non-exclusive summary of the protocols is as follows:

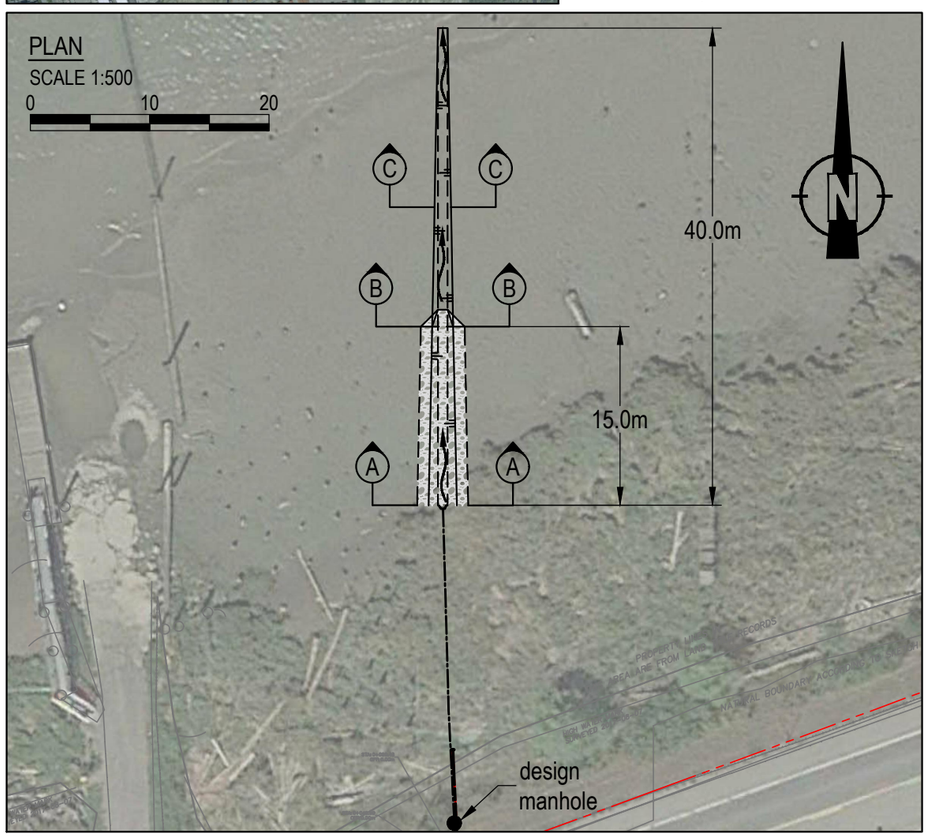
- if suspected archaeological and/or cultural objects are observed, the Contractor will notify Wesgroup and FLNRORD immediately; all work resulting in the observation area is to be halted immediately and cordoned off from adjacent activities to await inspection by a qualified archaeologist;
- a qualified archaeologist is to be contacted upon the observation of archaeological and/or cultural objects; the archaeologist will determine protocols in coordination with the Contractor, Wesgroup and FLNRORD;
- suspected archaeological and/or cultural objects are to be covered with plastic sheeting to await arrival of the qualified archaeologist; and,
- if archaeological and/or cultural objects are confirmed to be present (by the qualified archaeologist), no further construction is to be undertaken within and immediately adjacent to the affected area until otherwise notified by Wesgroup and FLNRORD.

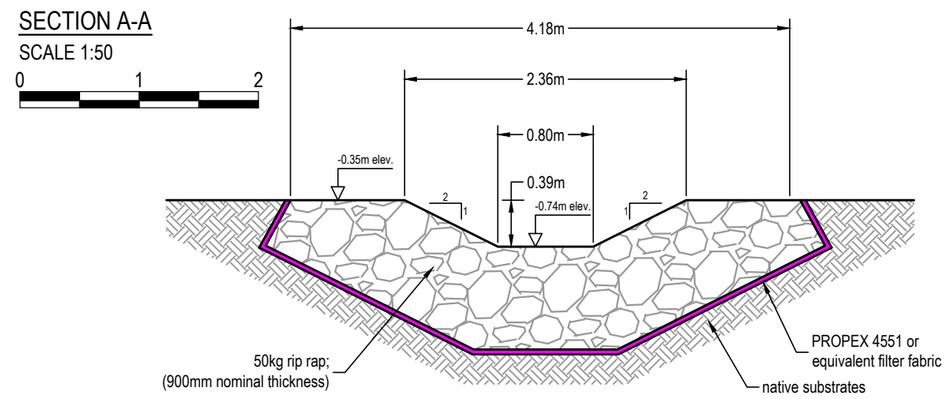
The Contractor will prepare an Archaeological Chance Find Procedure for project related works. It will be submitted to Wesgroup for review and approval. The Procedure will include monitoring and reporting protocols. It will be a component of the EPP.

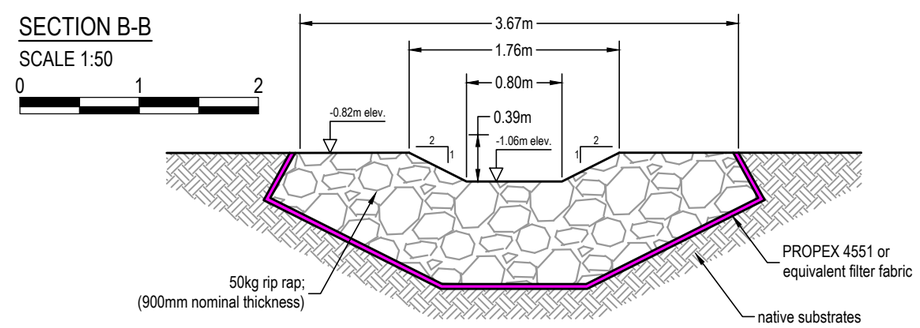
ATTACHMENT A: Design Drawings

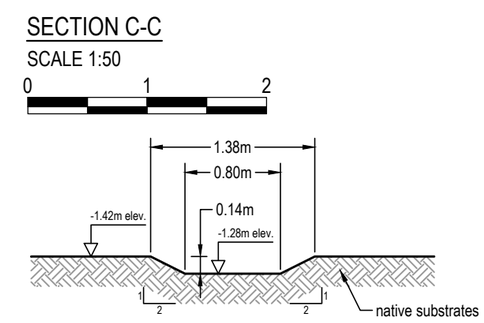












FOR PERMITTING

NOTES
- All elevations in metres geodetic.
- Marsh elevations surveyed July 12, 2018.
- Survey undertaken by Envirowest Consultants Inc.with Trimble Geo7x.

REFERENCES
1. Drawing No. 16-222. Rev. 5. "Alpha Landfill - North Portion Permanent 750Ø Crossing". June 09, 2020. Aplin & Martin Consultants Ltd.
2. File: 2018-07-11-16-222-drainage concept no outfall sketch.dwg. Received July 12, 2018; Wesgroup Properties.
3. 2016 Ortho Photograph From Google Earth.
4. 2004 Ortho Photograph From Metro Vancouver.

CITY OF DELTA

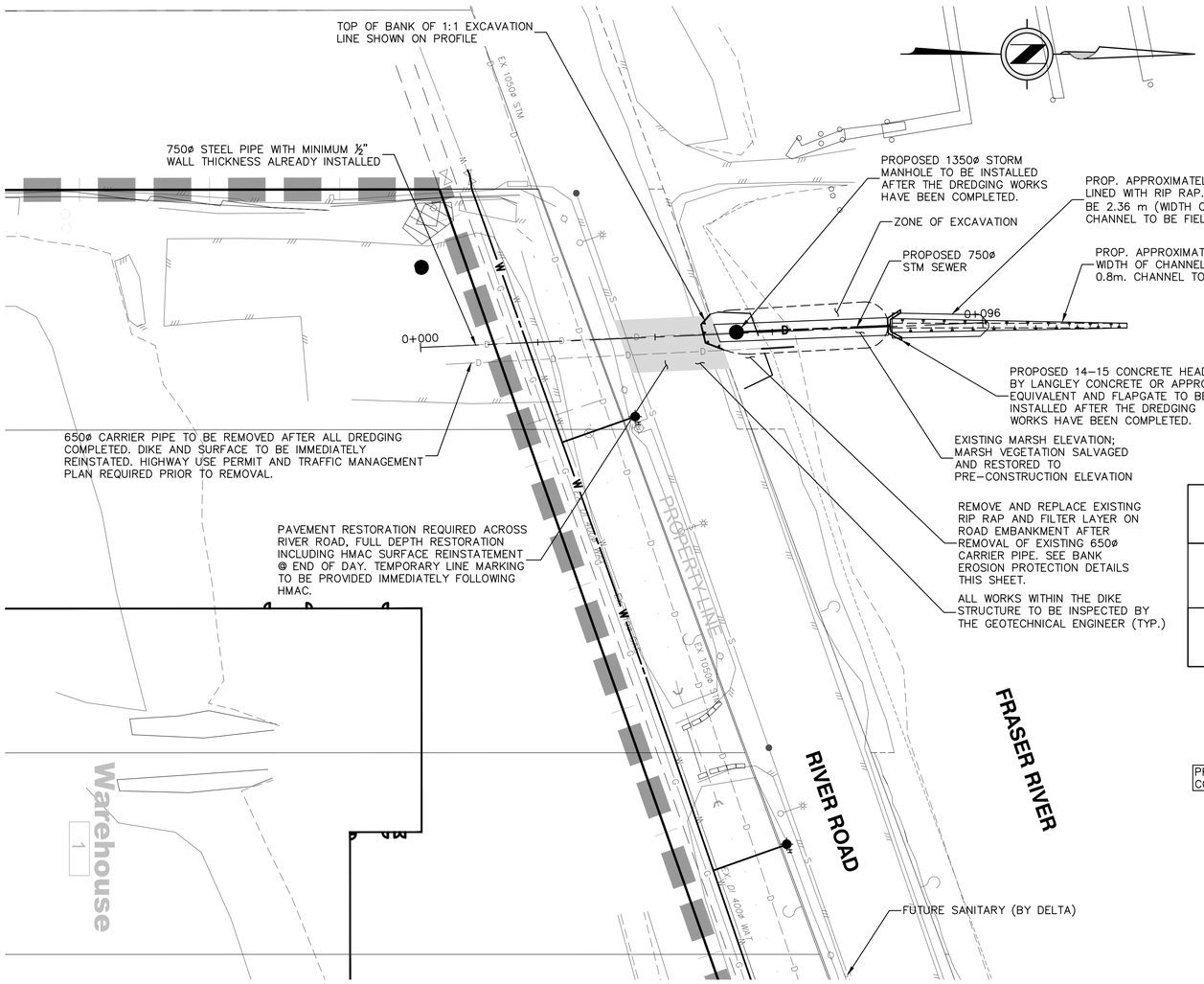
8576, 5894, 8620 & 8644 RIVER ROAD
Delta, BC

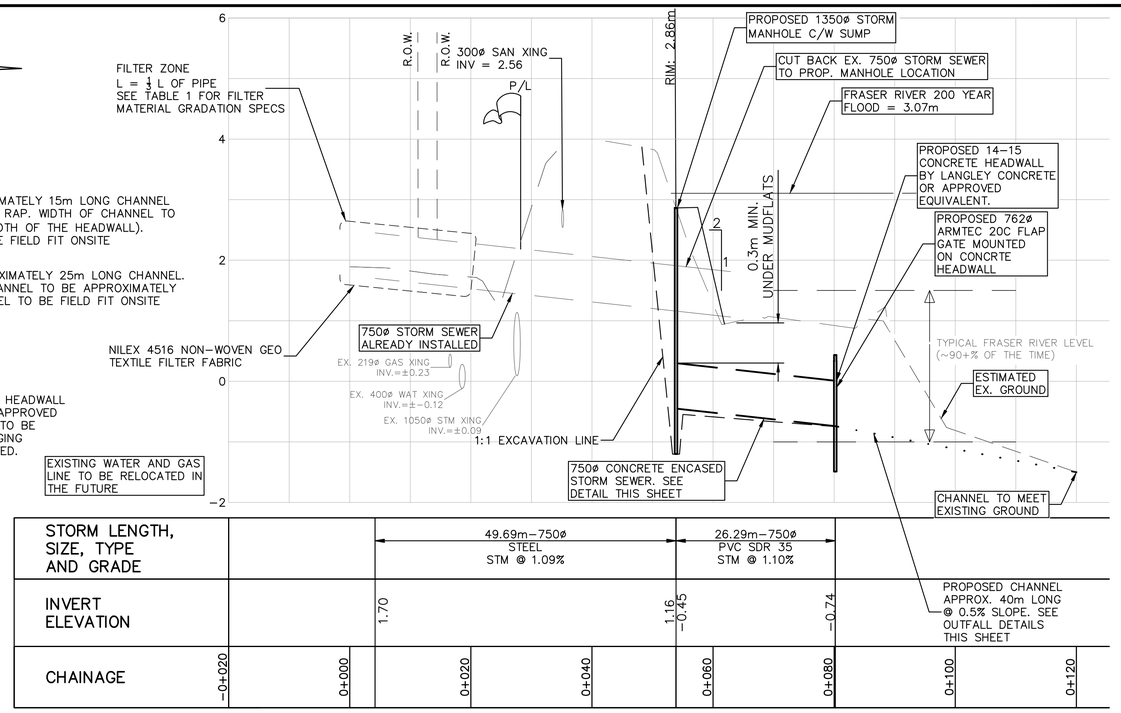
envirowest
www.envirowest.ca
envirowest consultants inc.
Suite 101 - 1515 Broadway Street
Port Coquitlam, British Columbia
Canada V3C 6M2
office: 604-944-0502
facsimile: 604-944-0507
saper-vedere@envirowest.ca

OUTFALL CHANNEL DESIGN AND ALIGNMENT km 26 FRASER RIVER

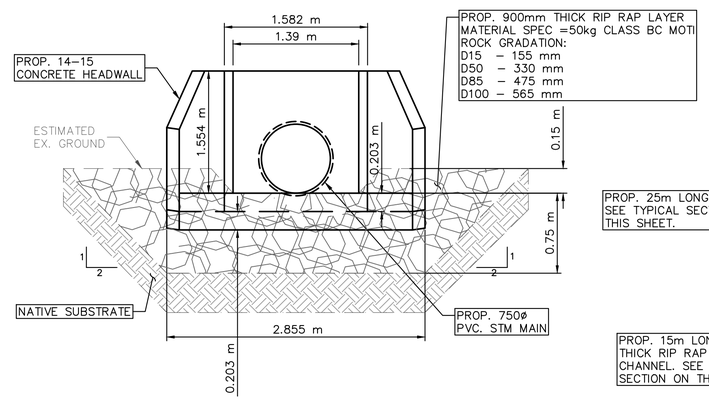
DESIGN:	DRAWN:	CHECKED:	REVISION:	REVISION DATE:
MAA	RK/SDJ	MAA	00	
SCALE: As Shown			DRAWING NUMBER: 2449-01-04	
DATE: June 10, 2020				

DATE: 2020-07-15 - 3:34pm
PATH: \\ENV-FS-R\Alpha\Envirowest Files\2020\Fraser River\2449-01 River Rd\AutoCAD\Final\2449-01-04 Outfall Channel Design and Alignment.dwg
LAYOUT: 958-14-04

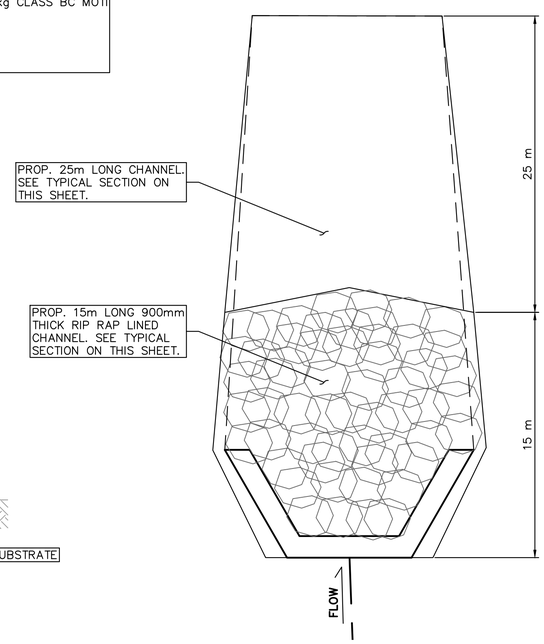




750ø STEEL PIPE WITH HEADWALL



OUTFALL AND 25m LONG CHANNEL TYPICAL SECTION DETAIL
N.T.S.



OUTFALL DETAIL
N.T.S.

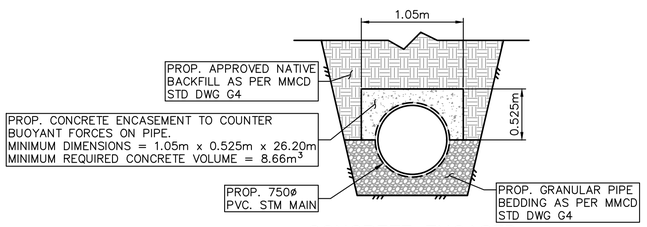
CONSTRUCTION METHODOLOGY NOTES:

1. HEAVY MACHINERY REQUIRED WITHIN MUDFLAT AREA TO BE OPERATED ON BLASTING PADS, TIMBER PADS, OR APPROVED EQUAL TO DISPERSE LOAD.
2. CONSTRUCTION IS TO OCCUR DURING A SINGLE EXTREME LOW WATER EVENT. OTHERWISE, SIGNIFICANT TRENCH WATER WILL BE PRESENT AND PUMPING/TRENCH SLOPE STABILITY IS LIKELY TO BE REQUIRED.
3. OUTFALL PIPE WILL BE FULLY SUBMERSED FOR MUCH OF ITS LIFETIME. CONCRETE ENCASEMENT ALONG THE UPPER HALF OF THE PIPE AS PER THE DETAIL ON THIS SHEET WILL COUNTER–ACT THE EFFECTS OF BUOYANCY. CONCRETE ENCASEMENT WAS DESIGNED FOR THE WORST CASE SCENARIO WHERE THE PIPE IS FULLY SUBMERGED WHILE ALSO FULL OF AIR.
4. QUICKSET CONCRETE WILL LIKELY BE REQUIRED AS A STANDARD CONCRETE CURE TIME OF 24–48 HOURS WILL NOT BE FEASIBLE. DURING CONCRETE CURING, IF WATER INGRESS IS OF CONCERN, FORMWORK AND CURING CONCRETE MUST BE COMPLETELY SEALED. MINIMUM 6 mil POLY SHEETING TO WRAP CURING CONCRETE INSIDE OF THE FORMWORK TO CREATE A WATER–TIGHT SEAL.

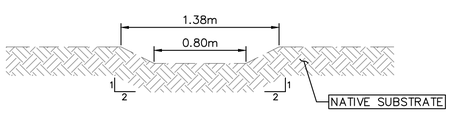
BANK EROSION PROTECTION

ARMOUR (RIP RAP LAYER)
PROP. 900mm THICK RIP RAP LAYER MATERIAL SPEC =50kg CLASS BC MOTI ROCK GRADATION:
D15 – 155 mm
D50 – 330 mm
D85 – 475 mm
D100 – 565 mm

RIP RAP FILTER LAYER
PROP. 300mm FILTER LAYER THICKNESS MATERIAL SPEC = WELL GRADED PIT–RUN OR PROCESSED GRAVEL AND COBBIES. MATERIAL GRADATION:
D10 – 1–3mm
D15 – 5–6mm
D50 – 5–10mm
D60 – 8–17mm
D85 – 55–70mm
D95 – 130–140mm



CONCRETE ENCASED TYPICAL SECTION DETAIL
N.T.S.



25m LONG CHANNEL TYPICAL SECTION DETAIL
N.T.S.

LEGAL DESCRIPTION: .
.
B.M. MONUMENT NO. . ELEVATION: .
LOCATED AT . STREET & . AVENUE

REV. NO.	DESCRIPTION	DR	CH	DATE	APP
1	ADDED CATHODIC PROTECTION	SS	CAB	2018–01–19	CAB
2	ISSUED FOR TENDER	SS	CAB	2018–01–26	CAB
3	DELTA COMMENTS ADDRESSED	OA	CAB	2018–02–26	CAB
4	PIPES SWITCHES AS PER FRPD COMMENTS	SS	CAB	2018–05–29	CAB
5	REVISED TO SUIT ENVIRONMENTAL DRAWINGS	KM	CAB	2020–06–09	CAB

APLIN MARTIN
ENGINEERING ARCHITECTURE PLANNING SURVEYING
201 - 12448 82 Avenue, Surrey, B.C. Canada V3W 3E9
Tel: (604) 597-9058, Fax: (604) 597-9061, Email: general@aplinmartin.com

CLIENT:
WESGROUP PROPERTIES
SUITE 910, FOUR BENTALL CENTRE, 1055 DUNSMUIR STREET
PH. 604-648-1800

PROJECT:
ALPHA LANDFILL
8576, 8594, 8620 & 8644 RIVER ROAD, DELTA

2020–06–09

The location of existing underground utilities are shown in an approximate way only & have not been independently verified by the owner or its representative. The contractor shall determine the exact location of all existing utilities before commencing work, and agrees to be fully responsible for any and all damages which might be occasioned by the contractor's failure to exactly locate and preserve any and all underground utilities.

TITLE:
ALPHA LANDFILL - NORTH PORTION
PERMANENT 750Ø CROSSING

DESIGN: SS CHECK: CB
DRAWN: OA APPR: CB
A & M FILE: **16-222**
PROJECT NO. .
SCALE : HORZ. 1:500 VERT. N/A
DRAWING DATE: **JANUARY, 2017**
DRAWING NO. .
A & M DRAWING NO. **16-222 -**
SHEET NO.
REV. **5**

ATTACHMENT B: Fisheries and Oceans Canada Request for Review

Request for Review

A) Contact information

Name of Business/Company:

City of Delta

Name of Proponent:

Doreann Mayhew
Acting Director of Community Planning and Development

Mailing address:

4500 Clarence Taylor Crescent

City/Town:

Delta

Province/Territory:

British Columbia

Postal Code:

V4K 3E2

Tel. No. :

604 946-4141

Fax No.:

Email:

DMayhew@delta.ca

Select additional contact:
Contractor/Agency/Consultant *(if applicable):*

Mark A. Adams, R.P.Bio.
Envirowest Consultants Inc.

Mailing address:

Suite 101 1515 Broadway Street

City/Town:

Port Coquitlam

Province/Territory:

British Columbia

Postal Code:

V3C 6M2

Tel. No. :

604 312 2406

Fax No.:

Email:

adams@envirowest.ca

Is the Proponent the main/primary contact? ◉ Yes ○ No

If no, please enter information for the primary contact or any additional contact.

B) Description of Project

If your project has a title, please provide it.

Alpha Lands; 8576, 8594, 8620 and 8644 River Road, Delta, British Columbia

Is the project in response to an emergency circumstance*? ○ Yes ◉ No

Does your project involve work in water? ○ Yes ◉ No

If yes, is the work below the High Water Mark*? ◉ Yes ○ No

What are you planning to do? Briefly describe all project components you are proposing in or near water.

The project consists of the installation of a stormwater outfall below the high water elevation of the Fraser River. The project site is defined by the design and construction footprints of the outfall manhole, outfall pipe, outfall headwall, and outfall channel within the intertidal and riparian zones of the Fraser River. A design drawing is attached.

How are you planning to do it? Briefly describe the construction materials, methods and equipment that you plan to use.

Phased construction will be implemented to mitigate the areal extent of impacts. The outfall channel will be constructed first. Temporary road access to the intertidal flats will be facilitated by the placement of blasting mats and/or timber pads across the intertidal marsh. To facilitate safe machine access, coarse aggregates (e.g. 6 inch clear quarry rock) will be placed on the fill slope of River Road and the temporary road to reconcile grade differential. Bulk excavation of the channel will be conducted by a tracked hydraulic excavator working on pads. Excavated material will be hauled and disposed offsite in accordance with applicable statutes. The excavator will place rock in accordance with the design drawings and field directions of the design engineer. Rock will be placed to the design location of the headwall. All work will be conducted during low tide (large tide); in water works will not be conducted.

The headwall, pipe and manhole will be installed in distinct phases. All phases will be conducted during low tide; in water works will not be conducted.

The concurrent excavation for the headwall and a section of pipe (north of the manhole) will displace intertidal marsh. Prior to excavation, the headwall and pipe will be staged on rock previously placed within the outfall channel. Construction aggregates will be staged landward of the design location of the headwall and pipe within a temporary construction area delineated by safety fencing.

Intertidal marsh will be salvaged as sections of sod and individual plants; salvaged marsh vegetation will also be staged within the temporary construction area. Sediments will be excavated, aggregates placed for bedding of the headwall and pipe, the headwall installed, remaining rock of the outfall channel installed at and about the headwall, the pipe installed, and, fill/foundation aggregates placed around the headwall and pipe. The aggregates will be dressed with excavated sediments; excess sediments will be hauled and disposed offsite in accordance with applicable statutes.

Salvaged marsh vegetation will include Baltic rush (Juncus balticus) planted within the design and construction footprints of proposed works during July 2019. The plantings were part of the restoration of marsh impacted by the placement and operation of dredge pipes associated with the placement of dredge sand as pre-load at th project address (letter attached).

All salvaged marsh vegetation will be placed upon the sediments to existing surficial elevations. Salvaged vegetation will be augmented with nursery stock plugs of Baltic rush planted at 0.20 m spacings. The entire area of impacted marsh will be restored with salvaged vegetation and, as required, planted with nursery stock Baltic rush.

The manhole and the remaining section of pipe (south of the manhole to the road) will engage riprap on the fill slope of River Road. The fill slope is an engineered element of River Road. Rock and soils will be excavated, aggregates placed for bedding of the manhole and pipe, the manhole and pipe installed, and fill/foundation aggregates placed around the manhole and pipe. Placed fill/aggregates will be dressed with riprap; soils will be hauled and disposed offsite in accordance with applicable statutes. Exposed soils along the margins of the riprap will be seeded with red fescue (Festuca rubra).

Include a site plan (figure/drawing) showing all project components in and near water.

Are details attached? ◉ Yes ○ No

Identify which work categories apply to your project.

- ☐ Aquaculture Operations
- ☒ Aquatic Vegetation Removal
- ☐ Beaches
- ☐ Berms
- ☐ Blasting / Explosives
- ☐ Boat Houses
- ☐ Boat Launches / Ramps
- ☐ Breakwaters
- ☐ Bridges
- ☐ Cable Crossings
- ☐ Causeways
- ☐ Culverts
- ☐ Dams
- ☐ Dewatering / Pumping
- ☐ Docks
- ☐ Dredging / Excavation
- ☐ Dykes
- ☐ Fishways / Ladders
- ☐ Flow Modification (hydro)
- ☐ Groundwater Extraction
- ☐ Groynes
- ☐ Habitat Restoration
- ☐ Ice Bridges
- ☐ Log Handling / Dumps
- ☐ Log Removal
- ☐ Moorings
- ☐ Open Water Disposal
- ☐ Piers
- ☒ Riparian Vegetation Removal
- ☐ Seismic Work
- ☐ Shoreline Protection
- ☐ Stormwater Management Facilities
- ☐ Surface Water Taking
- ☐ Tailings Impoundment Areas
- ☐ Temporary Structures
- ☐ Turbines
- ☐ Water Control Structures
- ☐ Water Intakes / Fish Screens
- ☒ Water Outfalls
- ☐ Watercourse Realignment
- ☐ Weirs
- ☐ Wharves
- ☐ Wind Power Structures
- ☐ Other Please Specify

Was your project submitted for review to another federal or provincial department or agency? ◉ Yes ◯ No

If yes, indicate to whom and associated file number(s).

Port of Vancouver PER 19-218 DFO 19-HPAC-00254 (letter of advice attached)

C) Location of the Project

Coordinates of the proposed project Latitude _____ N Longitude _____ W

OR UTM zone NAD 83 UTM 10 ; 501041 Easting

544439 Northing

Include a map clearly indicating the location of the project as well as surrounding features.

Name of Nearest Community (City, Town, Village): Delta

Municipality, District, Township, County, Province: British Columbia

Name of watershed (if applicable): Fraser River

Name of watercourse(s) or waterbody(ies) near the proposed project: Fraser River

Provide detailed directions to access the project site:

Start at 401 Burrard Street, Highway 99 south through George Massey Tunnel, east on River Road to project site on south side of River Road, immediately east of Bridgeview Marine (marine sales); small dock and ramp is located on Fraser River, north of River Road, across from Bridgeview Marine.

D) Description of the Aquatic Environment

Identify the predominant type of aquatic habitat where the project will take place.

- (●) Estuary (Estuarine)
- ( ) Lake (Lacustrine)
- ( ) On the bank/shore at the interface between land and water (Riparian)
- ( ) River or stream (Riverine)
- ( ) Salt water (Marine)
- ( ) Wetlands (Palustrine)

Provide a detailed description of biological and physical characteristics of the proposed project site.

The project site is defined by the design and construction footprints of the outfall manhole, outfall pipe, outfall headwall, and outfall channel. The project occurs within the intertidal and riparian zones of the Fraser River.

The riparian zone is associated with the fill slope of River Road; it is characterized by riprap.

Intertidal marsh is relatively high elevation marsh; active erosion of the face of the marsh is evident. The marsh extends to the toe of fill slope of River Road. Characteristic marsh species include reed canary grass (Phalaris arundinacea), reed fescue (Festuca arundinacea), Lyngby's sedge (Carex lyngbyei), Baltic rush (Juncus balticus), softstem bulrush (Scirpus validus), small-fruited bulrush (Scirpus microcarpus), spikerush (Eleocharis palustris), river horsetail (Equisetum fluviatile), purple loosestrife (Lythrum salicaria), marsh orchid (Habenaria dilatata), water plantain (Alisma plantago-aquatica), water parsnip (Sium suave), yellow marsh marigold (Caltha palustris var. asarifolia), yellow iris (Iris pseudacorus), skunk cabbage (Lysichitum americanum), Pacific silverweed (Potentilla anserina), horehound (Lycopus americanum), aster (Aster sp.), bedstraw (Galium sp.), birdsfoot trefoil (Lotus corniculatus), and springbank clover (Trifolium wormskioldii). Wrack is prevalent within the marsh.

Existing marsh vegetation includes Baltic rush planted within the design and construction footprints of proposed works during July 2019. The plantings were part of the restoration of marsh impacted by the placement and operation of dredge pipes associated with the placement of dredge sand as pre-load at the project address. The active erosion at the face of the marsh is independent of the placement and operation of dredge pipes.

Intertidal mudflat occurs throughout the distal portion of the project corridor largely defined by the outfall channel.

Representative photographs of the project site are attached.

Include representative photos of affected area (including upstream and downstream area) and clearly identify the location of the project.

E) Potential Effects of the Proposed Project

Have you reviewed the Pathways of Effects (PoE) diagrams (http://www.dfo-mpo.gc.ca/pnw-ppe/pathways-sequences/index-eng.html) that describe the type of cause-effect relationships that apply to your project?

(●) Yes ( ) No

If yes, select the PoEs that apply to your project.

- [x] Addition or removal of aquatic vegetation
- [ ] Change in timing, duration and frequency of flow
- [ ] Cleaning or maintenance of bridges or other structures
- [ ] Dredging
- [x] Excavation
- [ ] Fish passage issues
- [ ] Grading
- [ ] Marine seismic surveys
- [ ] Organic debris management
- [ ] Placement of marine finfish aquaculture site
- [x] Placement of material or structures in water
- [x] Riparian Planting
- [ ] Streamside livestock grazing
- [ ] Structure removal
- [ ] Use of explosives
- [ ] Use of industrial equipment
- [ ] Vegetation Clearing
- [ ] Wastewater management
- [ ] Water extraction

Will there be changes (i.e., alteration) in the fish habitat*? (•) Yes ( ) No ( ) Unknown

If yes, provide description.

A drawing is attached that delineates the type and areal extent of changes.

Will the fish habitat alteration be permanent*? (•) Yes ( ) No ( ) Unknown

Is there likely to be destruction or loss of habitat used by fish? (•) Yes ( ) No ( ) Unknown

What is the footprint (area in square meters) of your project that will take place below the high water mark*?

521 square metres

Is your project likely to change water flows or water levels? ( ) Yes (•) No ( ) Unknown

If your project includes withdrawing water, provide source, volume, rate and duration.

n/a

If your project includes water control structure, provide the % of flow reduction.

n/a

If your project includes discharge of water, provide source, volume and rate.

Upland drainage from development discharged to Fraser; water quality treatment to occur prior to discharge to the Fraser River.

Will your project cause death of fish? ( ) Yes (•) No ( ) Unknown

If yes, how many fish will be killed (for multi-year project, provide average)? What species and lifestages?

n/a

Are there aquatic species at risk (http://www.sararegistry.gc.ca/species/aquatic_e.cfm) present? If yes, which ones?

No; n/a

What is the time frame of your project?

The construction will start on 06/16/2020 and end by 08/31/2020

If applicable, the operation will start on 09/01/2020 and end by operate indefinitely

If applicable, provide schedule for the maintenance

n/a

If applicable, provide schedule for decommissioning

n/a

Are there additional effects to fish and fish habitat that will happen outside of the time periods identified above? ○ Yes ◉ No

(If yes, provide details)

Have you considered and incorporated all options for redesigning and relocating your project to avoid negative effects to fish and fish habitat?

◉ Yes ○ No

If yes, describe.

Location of manhole within fill slope of River Road; previous design iterations had manhole within intertidal zone.

Have you consulted DFO's Measures to Avoid Harm to Fish and Fish Habitat (http://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures/index-eng.html) to determine which measures apply to your project?

◉ Yes ○ No

Will you be incorporating applicable measures into your project? ◉ Yes ○ No

If yes, identify which ones. If No, identify which ones and provide reasons.

Project Planning: timing at low tide (large tide), no in water works; spill contingency and response plans

Erosion and Sediment Control: no storage of excavated sediments onsite; sediments isolated and contained within upland site south of River Road.

Shoreline/Bank Re-vegetation and Stabilization: vegetation salvaged and restored

Fish Protection: no inwater works

Operation of Machinery: Clean and good working condition; free of fluid leaks and invasive species; no inwater works; all storage and maintenance within upland area south of River Road

Have you considered and incorporated additional best practices and mitigation measures recommended in relevant guidelines to avoid negative effects to fish and fish habitat?

○ No ◉ Yes

If Yes, include a list of the guidelines being used to avoid negative effects to fish and fish habitat.

1) Restoration of onsite habitats.
2) Stormwater quality treatment (technical correspondences and drawings attached).

Are there any relevant best practices or mitigation measures that you are unable to incorporate? ○ Yes ◉ No

(If yes, identify which ones.)

Can you follow appropriate Timing Windows (http://www.dfo-mpo.gc.ca/pnw-ppe/timing-periodes/index-eng.html) for all your project activities below the High Water Mark*?

(•) Yes ( ) No

(If no, provide explanations.)

n/a

What residual effects to fish and fish habitat do you foresee after taking into account the avoidance and mitigation measures described above?

The residual effect of the project is the conversion of intertidal mudflat to riprap. Some riprap will ultimately be covered with sediments.

F) Signature

I, Mark A. Adams (print name) certify that the information given on this form is to the best of my knowledge, correct and completed.

Signature

27/03/2020
Date

Information about the above-noted proposed work or undertaking is collected by DFO under the authority of the *Fisheries Act* for the purpose of administering the fisheries protection provisions of the *Fisheries Act*. Personal information will be protected under the provisions of the *Privacy Act* and will be stored in the Personal Information Bank DFO-PPU-680. Under the *Privacy Act*, Individuals have a right to, and on request shall be given access to any personal information about them contained in a personal information bank. Instructions for obtaining personal information are contained in the Government of Canada's Info Source publications available at www.infosource.gc.ca or in Government of Canada offices. Information other than "personal" information may be accessible or protected as required by the provision of the *Access to Information Act*.

**All definitions are provided in Section G of the Guidance on Submitting a Request for Review*

Fisheries and Oceans Canada
Pêches et Océans Canada

Pacific Region
3190 Hammond Bay Road
Nanaimo, BC V9T 6N7

Région du Pacifique
3190 rue Hammond Bay
Nanaimo, CB V9T 6N7

Your file *Votre référence*

May 9, 2019

Our file *Notre référence*

19-HPAC-00254

Sunny Sandher
Wesgroup Properties
#910 – 1055 Dunsmuir Street
Vancouver, BC, V7X 1L3

Via email: ssandher@wesgroup.ca

Subject: Stormwater Outfall, Fraser River, Delta – Implementation of Measures to Avoid and Mitigate Serious Harm to Fish

Dear Sunny Sandher:

The Fisheries Protection Program (the Program) of Fisheries and Oceans Canada (DFO) received your Request for Project Review on March 19, 2019. We understand that you propose to:

- Install a stormwater outfall below the high water mark (HWM) of the Fraser River, to convey storm flows from a new development on River Road in North Delta. Works will include construction of a new outfall channel, pre-cast concrete headwall and two sections of 750 mm diameter pipe totalling 81.4 m in length.

Our review considered the following information:

- Request for Project Review form including design drawings and photographs submitted by Envirowest Consultants Inc. (Envirowest) to DFO via email on March 19, 2019; and,
- E-mail correspondence between Sandy Foxall (DFO) and Mark Adams (Envirowest) on May 3, 2019.

Your proposal has been reviewed to determine whether it is likely to result in serious harm to fish which is prohibited under subsection 35(1) of the *Fisheries Act* unless authorized. Your proposal has also been reviewed to determine whether it is likely to affect listed aquatic species at risk, any part of their critical habitat or the residences of their individuals in a manner which is prohibited under sections 32, 33 and subsection 58(1) of the *Species at Risk Act*, unless authorized.

To avoid and mitigate the potential for serious harm to fish, we recommend you implement the measures listed below, as per your project plan and our discussion with Envirowest:

Canada

- Environmental monitoring will be conducted during works below the HWM by a qualified environmental monitor (EM);
- Works will be conducted during the instream work window (June 15 to Feb 28) for the Fraser River Estuary;
- No in-water works with connectivity to the Fraser River are proposed as works will be scheduled during low tide;
- No excavated sediment material will be stored onsite. All excavated material will be immediately removed and isolated and contained within an upland site south of River Road;
- Intertidal marsh vegetation will be salvaged and returned unharmed to its original location wherever possible. The salvage will occur prior to construction of the outfall channel to avoid compaction of the sod during machine access. It will be stored on geofabric and a shade cloth will be placed over the sod if works occur during summer. The sod will be watered as required while displaced;
- Riparian vegetation clearing will be minimized wherever possible. Any disturbed riparian vegetation will be re-seeded with similar vegetation (i.e., red fescue grass) upon completion of construction; and,
- Monitoring of reclaimed vegetation will be conducted for 1 to 2 growing seasons, as required, to confirm recovery.

Provided that you incorporate these measures into your project as proposed, the Program is of the view that your proposal will not result in serious harm to fish or prohibited effects on listed aquatic species at risk. As such, an authorization under the *Fisheries Act* or a permit under the *Species at Risk Act* is not required.

Should your plans change or if you have omitted some information in your proposal, further review by the Program may be required. Consult our website (http://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html) or consult with a qualified environmental consultant to determine if further review may be necessary. It remains your responsibility to avoid causing serious harm to fish and avoid prohibited effects on listed aquatic species at risk, any part of their critical habitat or the residences of their individuals.

It is also your *Duty to Notify* DFO if you have caused, or are about to cause, serious harm to fish that are part of or support a commercial, recreational or Aboriginal fishery. Such notifications should be directed to http://www.dfo-mpo.gc.ca/pnw-ppe/violation-infraction/index-eng.html, or to the DFO-Pacific Observe, Record and Report phone line.

Please notify this office at least 10 days before starting your project. A copy of this letter should be kept on site while the work is in progress. It remains your responsibility to meet all other federal, territorial, provincial and municipal requirements that apply to your proposal.

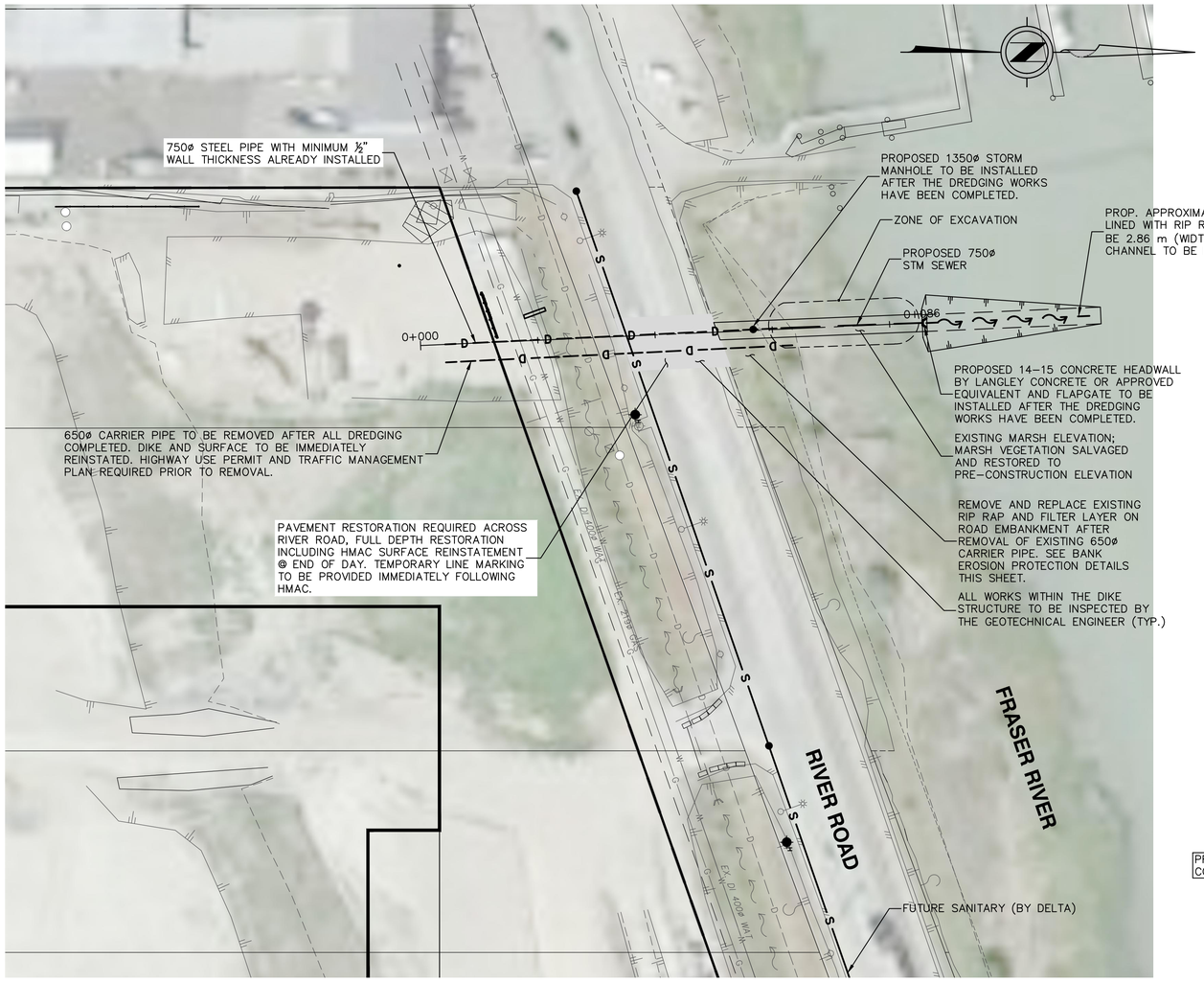
If you have any questions with the content of this letter, please contact Sandy Foxall at our Nanaimo office at 250-756-7295, by fax at 250-756-7229, or by email at

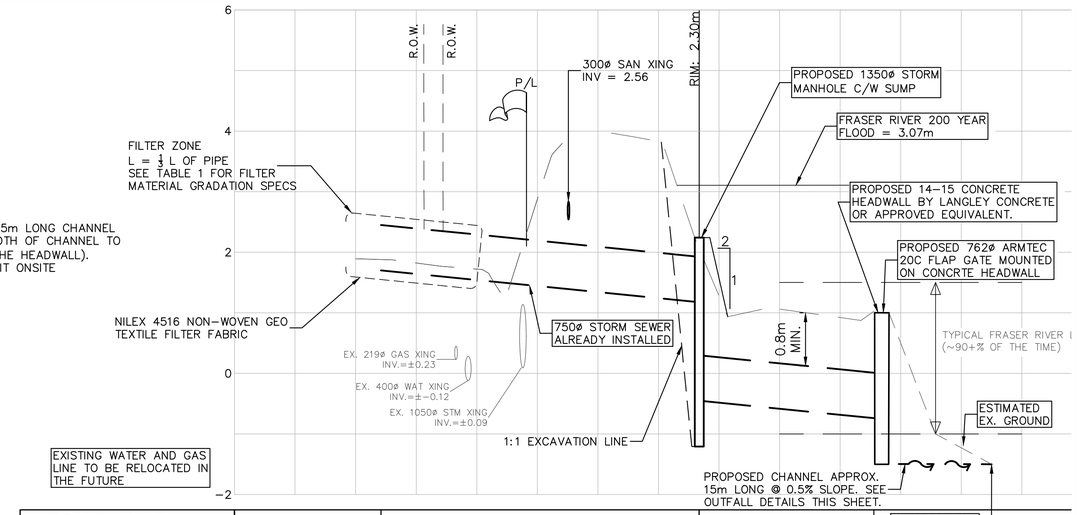
Sandy.Foxall@dfo-mpo.gc.ca. Please refer to the file number referenced above when corresponding with the Program.

Yours sincerely,

Vincent Harper
Senior Biologist
Fish and Fish Habitat Protection Program

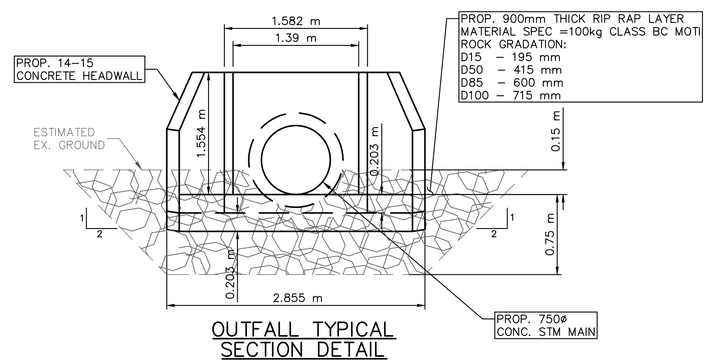
cc. Sandy Foxall, DFO, Nanaimo
Mark Adams, Envirowest, Port Coquitlam



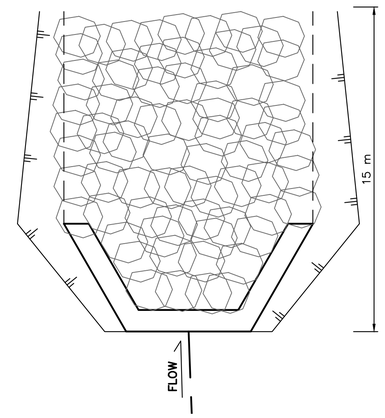


STORM LENGTH, SIZE, TYPE AND GRADE			52.55m–750ø STEEL STM @ 1.00%			28.84m–750ø PVC SDR 35 STM @ 1.00%		CHANNEL TO MEET EXISTING GROUND
INVERT ELEVATION			1.70			1.17 –0.45		–0.74
CHAINAGE	0+020	0+000	0+020	0+040		0+060	0+080	0+100

750ø STEEL PIPE WITH HEADWALL



OUTFALL TYPICAL SECTION DETAIL
N.T.S.



OUTFALL DETAIL
N.T.S.

BANK EROSION PROTECTION

ARMOUR (RIP RAP LAYER)
PROP. 900mm THICK RIP RAP LAYER
MATERIAL SPEC =100kg CLASS BC MOTI
ROCK GRADATION:
D15 – 195 mm
D50 – 415 mm
D85 – 600 mm
D100 – 715 mm

RIP RAP FILTER LAYER
PROP. 300mm FILTER LAYER THICKNESS
MATERIAL SPEC = WELL GRADED
PIT–RUN OR PROCESSED GRAVEL AND COBBIES. MATERIAL GRADATION:
D10 – 1–3mm
D15 – 5–6mm
D50 – 5–10mm
D60 – 8–17mm
D85 – 55–70mm
D95 – 130–140mm

LEGAL DESCRIPTION: .
.
B.M. MONUMENT NO. . ELEVATION: .
LOCATED AT . STREET & . AVENUE

REV. NO.	DESCRIPTION	DR	CH	DATE	APP
1	ADDED CATHODIC PROTECTION	SS	CAB	2018–01–19	CAB
2	ISSUED FOR TENDER	SS	CAB	2018–01–26	CAB
3	DELTA COMMENTS ADDRESSED	OA	CAB	2018–02–26	CAB
4	PIPES SWITCHES AS PER FRPD COMMENTS	SS	CAB	2018–05–29	CAB

APLIN MARTIN
ENGINEERING ARCHITECTURE PLANNING SURVEYING
201 - 12448 82 Avenue, Surrey, B.C. Canada V3W 3E9
Tel: (604) 597-9058, Fax: (604) 597-9061, Email: general@aplinmartin.com

CLIENT:
WESGROUP PROPERTIES
SUITE 910, FOUR BENTALL CENTRE, 1055 DUNSMUIR STREET
PH. 604-648-1800

PROJECT:
ALPHA LANDFILL
8576, 8594, 8620 & 8644 RIVER ROAD, DELTA

The location of existing underground utilities are shown in an approximate way only & have not been independently verified by the owner or its representative. The contractor shall determine the exact location of all existing utilities before commencing work, and agrees to be fully responsible for any and all damages which might be occasioned by the contractor's failure to exactly locate and preserve any and all underground utilities.

TITLE:
ALPHA LANDFILL - NORTH PORTION
PERMANENT 750Ø CROSSING

DESIGN: SS CHECK: CB
DRAWN: OA APPR: CB

A & M FILE: **16-222**

PROJECT NO. .
SCALE : HORZ. 1:500 VERT. N/A
DRAWING DATE: **JANUARY, 2017**
DRAWING NO. .
A & M DRAWING NO. **16-222 -**
SHEET NO.
REV. **4**

Figure A1. Project corridor through intertidal marsh and riparian zones; from willow shrub (arrow) to surveyor (arrow) (July 12, 2018).

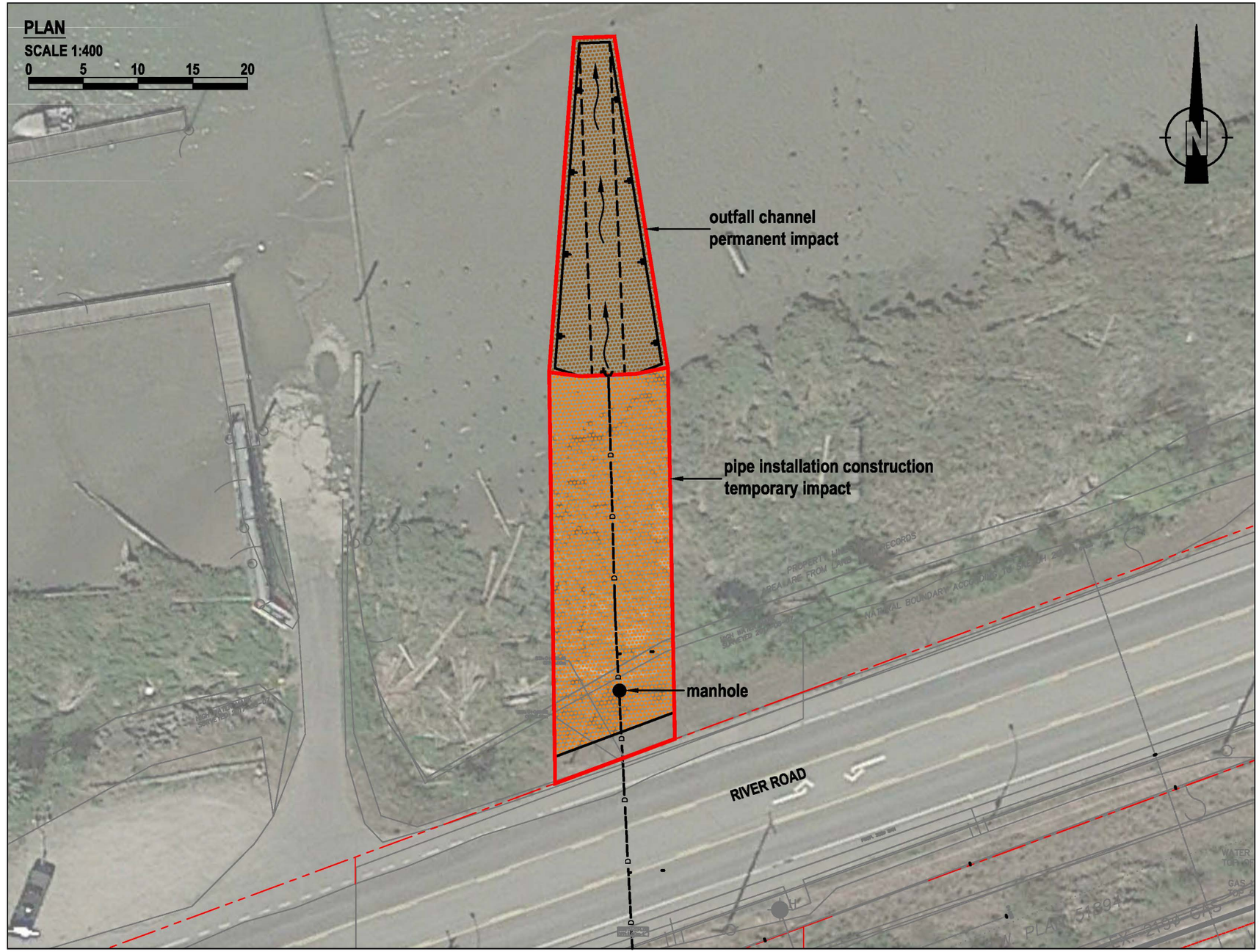
Figure A2. Wrack characteristic of project corridor (arrow) (July 12, 2018).

Figure A3. Eroding edge of intertidal marsh at its interface with intertidal mudflat within the project corridor (July 12, 2018).

Figure A4. Project corridor looking north from River Road to the Fraser River (July 12, 2018; prior to impacts to marsh attributable to the placement and operation of dredge pipes).

Figure A5. Project corridor looking north from River Road to the Fraser River during restoration of marsh (July 11, 2019; marsh initially impacted by the placement and operation of dredge pipes).

Figure A6. Intertidal mudflat of project corridor looking north from intertidal marsh to the Fraser River (July 12, 2018).



HABITAT ACCOUNT

Outfall Channel - Permanent Impact

Loss of 225m² of intertidal mudflat (mudflat replaced with riprap)

Pipe Installation Construction - Temporary Impact

45m² of intertidal mudflat removed and restored
251m² of intertidal marsh removed and restored, area planted with nursery stock Baltic rush as required to achieve pre-impact cover
64m² of riparian shrub (single willow), saplings, grasses and forbs removed; seeded with red fescue (*Festuca rubra*)

NOTE
All elevations in metres geodetic.

REFERENCES
1. Email: 2019-01-08 - 16-222 - Permanent Storm Outfall.pdf. Received March 12, 2019; Aplin Martin.
2. Drawing No. 16-222-02. Sheet 02. Revision 03. "Alpha Landfill - North Portion Carrier Pipe Crossing". January 2017. Aplin Martin.
3. Email: 2018-07-11-16-222-drainage concept no outfall sketch.dwg. Recieved July 12, 2018; Wesgroup Properties.
4. Drawing No. 16-222. Revision 04. "Alpha Landfill - North Portion Permanent 750Ø Crossing". January, 2017. Aplin Martin.
5. 2016 Ortho Photograph From Google Earth.
6. 2004 Ortho Photograph From Metro Vancouver.

CITY OF DELTA

8576, 5894, 8620 & 8644 RIVER ROAD
Delta, BC

envirowest
www.envirowest.ca
envirowest consultants inc.
Suite 101 - 1515 Broadway Street
Port Coquitlam, British Columbia
Canada V3C 6M2
office: 604-944-0502
facsimile: 604-944-0507
saper-vedere@envirowest.ca

HABITAT CHANGES

DESIGN:	DRAWN:	CHECKED:	REVISION:	REVISION DATE:
MAA	RK/CEV/SDJ	MAA	00	
SCALE: As Shown			DRAWING NUMBER: 2449-01-03	
DATE: February 26, 2020				

DATE: 2020-03-27 - 5:15pm
PATH: \\ENV-FS-R\Alpha\Envirowest Files\2020\Fraser River\2449-01 River Rd\AutoCAD\Final\2449-01-03 Habitat Changes.dwg
LAYOUT: 2449-01-03

envirowest consultants inc.
Suite 101 - 1515 Broadway Street
Port Coquitlam, British Columbia
Canada V3C 6M2
604-944-0502

December 16, 2019

Mr. Sunny Sandher
Wesgroup Properties
Suite 910 1055 Dunsmuir Street
Vancouver, BC V7X 1L3

Dear Sir,

RE: VANCOUVER FRASER PORT AUTHORITY PERMIT NUMBER 18-062
SUNBURY RIVER ROAD DEVELOPMENTS LIMITED PARTNERSHIP
8576 RIVER ROAD, DELTA, BC – PRELIMINARY INSPECTION OF RESTORATION

Intertidal marsh was impacted by the placement and operation of dredge pipes along the Fraser River shoreline fronting the referenced address. Restoration works, consisting of the removal and redistribution of dredge sand, and the planting of nursery stock Baltic rush (*Juncus balticus*), were completed on July 11, 2019.

A preliminary inspection of restoration works was conducted on December 10, 2019 (see photograph below). Although much of the intertidal marsh, including nursery stock, has senesced, works appear to be performing well in terms of restoring marsh vegetation to impacted areas.

Thank you for your attention. Should you require further information regarding the referenced subject, please contact me at adams@envirowest.ca or 604-312-2406.

Yours truly,
ENVIROWEST CONSULTANTS INC.

Mark A. Adams, R.P.Bio.
Director

MAA

envirowest consultants inc.
Suite 101 - 1515 Broadway Street
Port Coquitlam, British Columbia
Canada V3C 6M2
604-944-0502

March 25, 2020

Sunny Sandher
Development Manager
Wesgroup Properties
Suite 910 – 1055 Dunsmuir Street
Vancouver, BC V7X 1L3

Dear Sir,

RE: 8579 – 8644 RIVER ROAD, DELTA, BC
TIER 1 LOGISTICS BUILDING – STORMWATER

Please refer to our recent telephone conversations and email correspondences regarding stormwater quality and treatment associated with the operation of the tier 1 logistics building at the referenced address. The receiving water body for stormwater is the Fraser River.

It is my understanding that activities associated with companies that will occupy the building will be high-end manufacturing and assembly, and shipping and receiving. These companies will represent the final stage of the supply chain that supports equipment manufacturers. All activities associated with manufacturing and assembly will be internal to the building.

A review of plans (Attachment A) prepared by Aplin and Martin and submitted to the City of Delta as part of a building permit application presents 3 distinct catchment areas as it pertains to stormwater, specifically:

- building (roof) area;
- office parking area; and,
- trailer parking/unloading-loading bays.

Contaminant loading on the roof of the building is attributable to atmospheric fall out; loading in this regard mirrors that for the Fraser River. Drainage water from this catchment area does not require treatment.

Contaminant loading within the office parking area is largely petroleum-derived hydrocarbons from leaking vehicles, with particulate solids also delivered to the parking area. Oil-sediment separators and sedimentation/settling infrastructure are best management applications to the treatment of stormwater being discharged to the Fraser River.

The bays are also loaded with petroleum-derived hydrocarbons and particulate solids. Particulate metals are also loaded within the bays. This is largely attributable to connecting and disconnecting tractors to trailers, such as fifth wheel connections and deployment of landing gear-legs. Some particulates would also be attributable to brake grindings generated during bay operations. As for the office parking area, oil-sediment separators and sedimentation/settling infrastructure are best management applications to the

treatment of stormwater. Particulate metals are considered within the general category of sediments that would be removed during treatment of stormwater.

Aplin and Martin have prepared a technical letter (Attachment B) presenting stormwater runoff quality control measures for the operation of the building. The letter states "… a mechanical filtration unit (CDS) unit is proposed as part of the storm sewer design. All stormwater runoff from the site will run through the CDS unit before discharging to the Fraser River." The CDS unit removes oils and sediments from stormwater runoff. In this regard, the CDS unit is considered a best management application to the treatment of stormwater being discharged to the Fraser River.

Should you require further information regarding the content of this correspondence, please contact me at 604-312-2406 or adams@envirowest.ca.

Yours truly,
ENVIROWEST CONSULTANTS INC.

Mark A. Adams, R.P.Bio.
Director

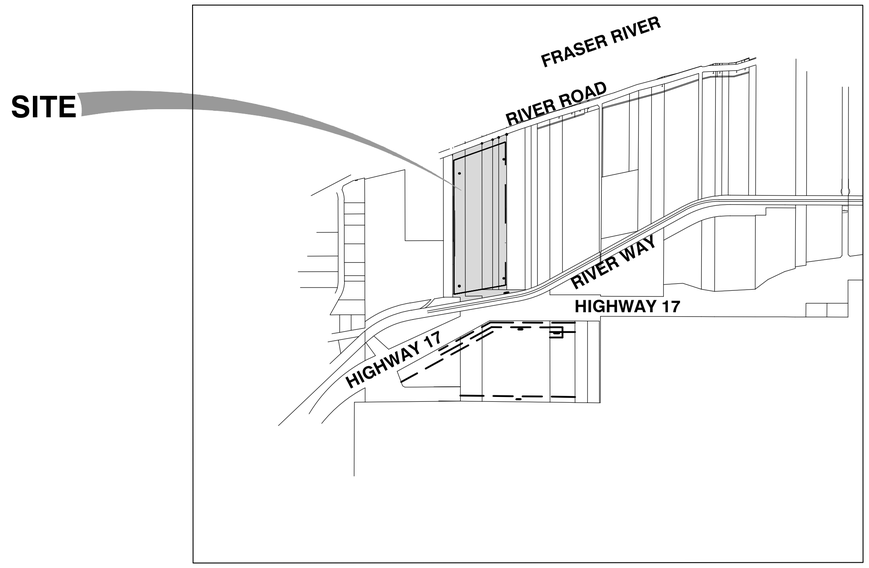
MAA

Attachment A. Site Plans
Attachment B. Technical Letter

ATTACHMENT A
Site Plans

APLIN MARTIN
ENGINEERING ARCHITECTURE PLANNING SURVEYING

201 - 12448 82 Avenue, Surrey, B.C. Canada V3W 3E9
Tel: (604) 597-9058, Fax: (604) 597-9061, Email: general@aplinmartin.com



SITE LOCATION PLAN

1:10000

DRAWING INDEX

CLIENT:

WESGROUP PROPERTIES

PROJECT:

RIVER ROAD NORTH

8576 RIVER ROAD
DELTA, BC

MUNICIPAL PROJECT No.

APLIN & MARTIN PROJECT No. 16-222

APLIN & MARTIN CONSULTANTS LTD.

A. GENERAL NOTES:

1. ALL WORKS TO BE DESIGNED IN ACCORDANCE WITH THE CURRENT VERSION OF THE "DELTA SUBDIVISION AND DEVELOPMENT STANDARDS BYLAW No. 7162".
2. ALL WORKS TO BE CONSTRUCTED IN ACCORDANCE WITH "MASTER MUNICIPAL CONSTRUCTION DOCUMENTS (MMCD) PLATINUM EDITION" AND "DELTA BYLAW 7162 SCHEDULE C – DELTA SUPPLEMENTARY DRAWINGS AND MAPS" (DELTA SUPPLEMENTARY DRAWINGS). WHERE STANDARDS DIFFER DELTA SUPPLEMENTARY DRAWINGS TO GOVERN AS DETERMINED BY THE DIRECTOR OF ENGINEERING.
3. ALL WORKS TO BE CONSTRUCTED IN ACCORDANCE WITH GEOTECHNICAL ENGINEER'S RECOMMENDATIONS.
4. THE CONTRACTOR TO VERIFY LOCATIONS AND ELEVATIONS OF EXISTING UTILITIES PRIOR TO CONSTRUCTION. CONTRACTOR TO NOTIFY THE ENGINEER OF DISCREPANCIES IMMEDIATELY. NO CHANGES TO BE MADE TO PIPE, FITTINGS, OR ALIGNMENT WITHOUT PRIOR NOTIFICATION AND APPROVAL FROM THE ENGINEER OR CITY OF DELTA.
5. CONTRACTOR TO EXCAVATE AND EXPOSE EXISTING WATER MAIN AT TIE–INS AND VERIFY INVERT AND LOCATION PRIOR TO CONSTRUCTION IN ORDER TO ADJUST WATER MAIN DESIGN TO SUIT EXISTING PIPES.
6. CONTRACTOR TO VERIFY LOCATION AND ELEVATION OF ALL EXISTING PIPE CROSSINGS AND SHALL NOTIFY THE ENGINEER OF ANY CONFLICTS.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR RESTORATION OF ANY AND ALL OFFSITE PAVEMENTS, DRIVEWAYS, FENCING, AND LANDSCAPING DISTURBED DURING THE COURSE OF CONSTRUCTION TO THE SATISFACTION OF THE DIRECTOR OF ENGINEERING.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL DELTA PERMITS FOR WORK WITHIN THE DELTA ROAD ALLOWANCE.
9. TRAFFIC CONTROL IS THE RESPONSIBILITY OF THE DEVELOPER OR DEVELOPER'S CONTRACTOR.
10. WORKSAFE BC IS TO BE GIVEN NOTICE OF CONSTRUCTION PRIOR TO START OF CONSTRUCTION.
11. CONSTRUCTION SHALL NOT COMMENCE PRIOR TO THE ISSUANCE OF A PERMISSION TO CONSTRUCT OR A NOTIFICATION TO PROCEED.
12. CONTRACTOR TO OBTAIN A HIGHWAY USE PERMIT FROM THE CORPORATION OF DELTA PRIOR TO COMMENCING ANY WORKS WITHIN THE ROAD ALLOWANCE.
13. ENGINEER OF RECORD TO PROVIDE WEEKLY INSPECTION REPORTS TO THE CITY OF DELTA.
14. ALL HYDRO/TEL/CABLE FOR THE DEVELOPMENT IS TO BE UNDERGROUND.

B. ROADWORKS NOTES:

1. CHANGES OF GRADE SHALL BE FORMED BY SMOOTH CURVES.
2. ALL SUBGRADE AND GRANULAR BASE MATERIALS TO BE COMPACTED TO 95% MODIFIED PROCTOR DENSITY.
3. ROAD CATCH BASIN RIMS TO BE SET 25mm BELOW THE FINISHED GUTTER ELEVATIONS.
4. CONTRACTOR TO EMPLOY A GEOTECHNICAL ENGINEER TO PERFORM IN–PLACE TESTING DURING THE PREPERATION OF THE SUBGRADE AND CONSTRUCTION OF THE ROAD STRUCTURE TO VERIFY THE ADEQUACY OF THE PROPOSED AND EXISTING ROAD STRUCTURE AND SUBGRADE.
5. LOOSE OR ORGANIC MATERIALS ARE TO BE EXCAVATED AND REMOVED FROM THE ROADWAY AND UTILITY TRENCHES IN THE ROADWAY.
6. FINAL ASPHALT LIFT TO BE COMPLETED EITHER AT THE END OF THE MAINTENANCE PERIOD THAT IS TIED TO EACH PHASE OF DEVELOPMENT OR AT THE DIRECTION OF THE DIRECTOR OF ENGINEERING, EXCEPT AT HALF ROADS WHERE THE FINAL ASPHALT LIFT WILL BE COMPLETED ONLY AFTER THE FULL ROAD HAS BEEN CONSTRUCTED.
7. ON ALL EXISTING ROADWAYS, CONTRACTOR IS RESPONSIBLE TO REMEDIATE ANY DAMAGE CAUSED BY THEIR CONSTRUCTION ACTIVITIES BY COMPLETING A 40mm ASPHALT MILL AND OVERLAY TO THE SATISFACTION OF THE DIRECTOR OF ENGINEERING.

C. SEWER NOTES:

1. ALL WORKS TO BE CONSTRUCTED IN ACCORDANCE WITH "MASTER MUNICIPAL CONSTRUCTION DOCUMENTS (MMCD) PLATINUM EDITION" AND "DELTA BYLAW 7162 SCHEDULE C – DELTA SUPPLEMENTARY DRAWINGS AND MAPS" (DELTA SUPPLEMENTARY DRAWINGS). WHERE STANDARDS DIFFER DELTA SUPPLEMENTARY DRAWINGS TO GOVERN AS DETERMINED BY THE DIRECTOR OF ENGINEERING.
2. ALL MANHOLES TO BE 1050mm DIAMETER TO MMCD DWG S1 OR UNLESS OTHERWISE NOTED ON THE DRAWINGS.
3. ALL MANHOLE FRAMES TO BE IN ACCORDANCE WITH MMCD DWG S1 AND COVER TO BE MARKED WITH "PRIVATE" "SANITARY OR "STORM". FRAME TO BE SET TO FINAL PAVEMENT ELEVATION COMPLETE WITH TEMPORARY ASPHALT APRON DURING INTERIM CONDITION.
4. ALL CLEANOUTS ARE TO BE AS PER MMCD DWG S6.
5. ALL LAWN BASINS TO BE AS PER MMCD DWG S12 AND LEADS ARE TO BE A MINIMUM 150mmø AND PVC PIPE SDR 28 @ 1.0% UNLESS OTHERWISE NOTED.
6. ALL TOP INLET CATCH BASINS TO BE AS PER MMCD DWG S11. CATCH BASIN LEADS ARE TO BE A MINIMUM 200mm DIAMETER AND MINIMUM 250mm DIAMETER FOR DOUBLE CATCH BASINS @ 1.0% UNLESS OTHERWISE NOTED.
7. NO CHANGES TO BE MADE TO PIPES, FITTINGS, OR ALIGNMENT WITHOUT PRIOR APPROVAL FROM THE ENGINEER.
8. CONTRACTOR IS RESPONSIBLE FOR SUPPORTING ALL UTILITY POLES DURING CONSTRUCTION.
9. FOR FLEXIBLE PIPE TYPICAL TRENCH SECTION DETAIL, REFER TO THIS SHEET.
10. ALL STORM SEWER JOINTS TO BE CLOSED UNLESS OTHERWISE NOTED ON THE DRAWINGS.
11. ALL CAPS TO BE DIMENSIONED TO PROPERTY LINE FOR AS–BUILT SUBMISSION.
12. CONTRACTOR TO CONFIRM LOCATION AND INVERTS OF EXISTING STORM AND SANITARY SEWER CONNECTIONS PRIOR TO CONSTRUCTION.
13. STORM AND SANITARY SEWER PIPES TO BE PVC SDR35 UNLESS OTHERWISE NOTED.
14. STORM AND SANITARY SEWERS TO HAVE 0.6m MINIMUM COVER.
15. STORM AND SANITARY SERVICE CONNECTIONS FOR EACH BUILDING TO BE SIZED AS NOTED ON THIS SHEET PVC SDR28 PIPE AT MINIMUM 2% SLOPE UNLESS OTHERWISE NOTED.
16. CONTRACTOR SHALL PROVIDE VIDEO INSPECTION OF ALL COMPLETED STORM AND SANITARY WORKS AS PER MMCD PLATINUM SPECIFICATIONS.
17. CONTRACTOR SHALL CLEAN ALL COMPLETED STORM AND SANITARY LINES PRIOR TO TESTING AND VIDEO INSPECTION AS PER MMCD PLATINUM SPECIFICATIONS.
18. CONTRACTOR SHALL, AS PART OF THE BASE CONTRACT, BE RESPONSIBLE TO CLEAN ALL STORM & SANITARY SEWERS JUST PRIOR TO THE TURNOVER OF THE SITE TO THE OWNER.

LEGEND FOR CONSTRUCTION DRAWINGS

PROPOSED	EXISTING	DESCRIPTION
		TEST HOLES
I.P.	I.P.P.	IRON PROPERTY PIN
		BENCH MARK – GEODETIC DATUM
		EDGE OF PAVEMENT
		CURB & GUTTER
S	S	SANITARY SEWER
S	S	SANITARY CONNECTION & INSPECTION CHAMBER
SLOTTED LID D	SLOTTED LID D	STORM SEWER
D	D	STORM CONNECTION & INSPECTION CHAMBER
D	D	STORM SEWER SERVICE
FD	FD	FRENCH DRAIN
		CATCH BASIN – TOP INLET & SIDE INLET
		LAWN DRAIN
		SWALE
		DITCH
		SIDEWALK (ASPHALT)
		SIDEWALK (CONCRETE)
W	W	WATERMAIN
		WATER SERVICE CONNECTION
W	W	WATER VALVE
W	W	AIR VALVE
H	H	HYDRANT & VALVE ASSEMBLY
W	W	CAPPED END
M	M	WATER METER
W	W	BLOW–OFF
T T	T T	UNDERGROUND TELEPHONE & MANHOLE
H H	H H	UNDERGROUND ELECTRICAL & MANHOLE
G G	G G	GASMAIN
L L	L L	TRAFFIC SIGNAL & STREET LIGHT U/G DUCTS
		ORNAMENTAL STREET LIGHT – DAVIT
		ORNAMENTAL STREET LIGHT – POST TOP
		UTILITY POLE
		UTILITY POLE W/LIGHT
J	J	JUNCTION BOX
A10		FUTURE PROPOSED PUMP CONNECTIONS

D. WATERWORKS NOTES:

1. ALL WORKS TO BE CONSTRUCTED IN ACCORDANCE WITH "MASTER MUNICIPAL CONSTRUCTION DOCUMENTS (MMCD) PLATINUM EDITION" AND "DELTA BYLAW 7162 SCHEDULE C – DELTA SUPPLEMENTARY DRAWINGS AND MAPS" (DELTA SUPPLEMENTARY DRAWINGS). WHERE STANDARDS DIFFER DELTA SUPPLEMENTARY DRAWINGS TO GOVERN AS DETERMINED BY THE DIRECTOR OF ENGINEERING.
2. CONTRACTOR SHALL EXPOSE ALL UTILITY CROSSINGS AND ALL TIE–IN LOCATIONS TO VERIFY LOCATION AND ELEVATION MINIMUM 4 BUSINESS DAYS PRIOR TO WATER MAIN CONSTRUCTION. ANY CONFLICTS OR DISCREPANCIES SHALL BE REPORTED TO THE ENGINEER IN WRITING IMMEDIATELY.
3. TIE RODS SHALL BE USED FOR ALL HYDRANTS, BLOW–OFFS AND TEMPORARY CAPS.
4. ALL WATERMAIN JOINTS LESS THAN 3.0m HORIZONTAL FROM STORM OR SANITARY MUST BE WRAPPED WITH "ENVIROTAPE".
5. FOR ALL CROSSINGS LESS THAN 0.5m VERTICAL SEPARATION WITH STORM AND SANITARY SEWERS THE WATER MAIN JOINTS ARE TO BE WRAPPED WITH "ENVIROTAPE" 3.0m ON BOTH SIDES OF THE CROSSING.
6. WATER SERVICE CONNECTIONS TO BE AS PER MMCD DWG W2a. WATER METER BOXES TO BE AS PER DELTA SUPPLEMENTARY DRAWING No. L4.19B.
7. ALL 300mm OR SMALLER PIPES TO BE RESTRAINED WITH UNIFLANGE SERIES 1360 JOINT RESTRAINTS AT PUSH ON FITTINGS, UNIFLANGE SERIES 900 TO BE USED AS FLANGE ADAPTERS, AND UNIFLANGE SERIES 1350 PIPE RESTRAINTS APPLIED AS PER THE LENGTHS IN TABLE 2 ON THIS SHEET.
8. ALL 300mm OR SMALLER PIPES TO HAVE THRUST BLOCKS INSTALLED AT FITTINGS SIZED AS PER THE CORPORATION OF DELTA SUPPLEMENTARY DRAWING No. L4.6.
9. ALL EXISTING VALVE BOXES AND LIDS IN LIMITS OF WORK TO BE ADJUSTED TO SUIT PROPOSED SURFACE.
10. ALL WATERMAINS TO HAVE MINIMUM 0.9m COVER.
11. FOR TYPICAL UTILITY TRENCH SECTION DETAIL REFER TO THIS SHEET.
12. TESTING AND CHLORINATION IS THE RESPONSIBILITY OF THE CONTRACTOR. TESTING RESULTS TO BE APPROVED PRIOR TO PROCEEDING WITH ANY TIE–INS.
13. TIE–INS TO BE COMPLETED BY CITY OF DELTA FORCES AT DEVELOPER'S COST (SUBJECT TO STAFF AVAILABILITY) OR BY CONTRACTOR UNDER CITY OF DELTA STAFF SUPERVISION.
14. SYSTEM TEST PRESSURES SHALL BE A MINIMUM OF 1.5 TIMES THE MAXIMUM OPERATING PRESSURE OR 225psi WHICHEVER IS HIGHER.
15. ALL HYDRANTS TO BE PAINTED DULUX DIAMOND EXTERIOR RED (FOR PRIVATE HYDRANTS). HYDRANT CAPS TO BE PAINTED PER THE NATIONAL FIRE PROTECTION ASSOCIATION CAPACITY RATING SYSTEM.
16. ALL CAPS TO BE DIMENSIONED TO PROPERTY LINE FOR AS–BUILT SUBMISSION.
17. WATERMAINS TO BE PVC DR 18 OR APPROVED EQUAL.

NOTICE TO CONTRACTOR

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LEGAL DESCRIPTION: .
.
B.M. MONUMENT NO. . ELEVATION: .
LOCATED AT . STREET & . AVENUE

REV. NO.	DESCRIPTION	DR	CH	DATE	APP
0	ONSITE PROGRESS SET	KM	CAB	2019–11–14	CAB
1	ONSITE PROGRESS SET	KM	CAB	2020–01–09	CAB
2	ONSITE PROGRESS SET	KM	CAB	2020–01–16	CAB
3	ISSUED FOR BP	KM	CAB	2020–01–30	CAB

APLIN MARTIN
ENGINEERING ARCHITECTURE PLANNING SURVEYING
201 - 12448 82 Avenue, Surrey, B.C. Canada V3W 3E9
Tel: (604) 597-9058, Fax: (604) 597-9061, Email: general@aplinmartin.com

CLIENT: **WESGROUP PROPERTIES**
SUITE 910, FOUR BENTALL CENTRE, 1055 DUNSMUIR STREET
PH. 604-648-1800

PROJECT: **ALPHA LANDFILL**
8576, 8594, 8620 & 8644 RIVER ROAD, DELTA

PROFESSIONAL ENGINEER – PROVINCE OF BRITISH COLUMBIA – CHRISTOPHER A. BARKER
2020–01–30

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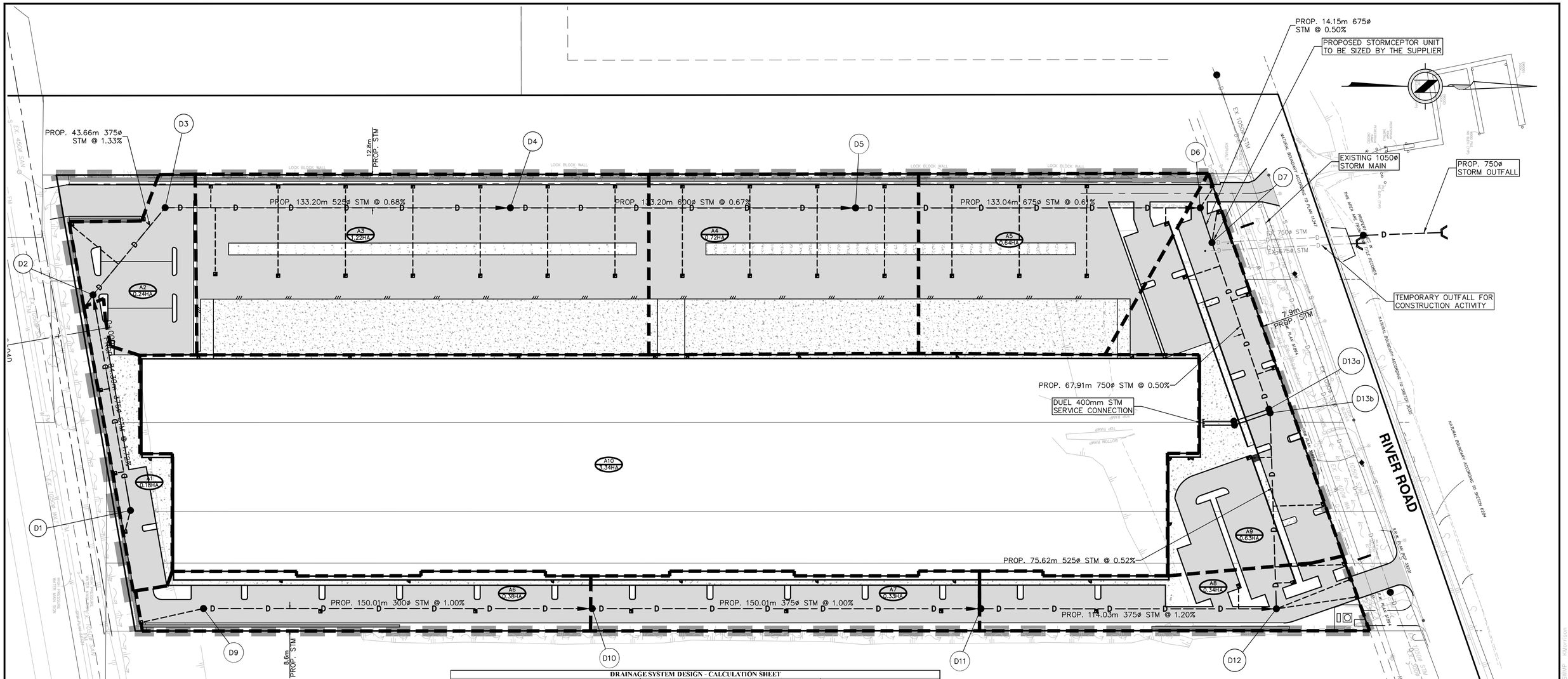
TITLE: **STANDARD NOTES**

DESIGN: KM CHECK: CB
DRAWN: KM APPR: CB
A & M FILE: **16-222**
PROJECT NO. **BP 014378**
SCALE : HORZ. 1:750 VERT. N/A
DRAWING DATE: **OCTOBER, 2019**
DRAWING NO. **.**
A & M DRAWING NO. **16-222 -02**
SHEET NO. **02**
REV. **3**

Jan 30, 2020 – 10:49am M:\16\16-222\ENGINEERING\DWG\DIGITAL PRODUCTION DWGS\16-222 – STANDARD NOTES.dwg/02 STANDARD NOTES Alderman



DRAINAGE SYSTEM DESIGN - CALCULATION SHEET

MUN. PROJECT # :	16-222	DESIGN RETURN PERIOD: 10 year / 100 year	A&M Project No: 16-222
PROJECT TITLE:	**Alpha Lands**	Manning's "n": 0.013	Sheet: 1 of 1
		Q10/100 = RAIN N = 0.00278	Date: Jan-30-20
PROJECT	8894 River Road		By : KM
LOCATION:	Delta, BC	**SURREY - KWANTLEN PARK INTENSITY CURVE**	Chk: CAB

Location of Drainage Area	From MH	To MH	Tributary Area "ha"			SUM AxR	Time of Concentration "Min"			Rain Fall Int. "i"	Q10 Q100	Sewer Design					Capacity Check	Remarks
			A	R	AxR		Inlet	Sect.	Total	mm	cms	S %	DIA mm	L m	V m/s	Qcap cms	Q10≤ Qcap	100 YEAR FLOW ROUTES
A1	D1	D2	0.18	0.95	0.17	0.17	10.00		10.00	53	0.025	1.72	375	84.4	2.082	0.230	OK	IN PIPE
				0.95	0.17	0.17				80	0.038							
A2	D2	D3	0.24	0.95	0.23	0.40	10.00	0.68	10.68	51	0.056	1.33	375	43.7	1.831	0.202	OK	IN PIPE
				0.95	0.23	0.40				77	0.086							
A3	D3	D4	1.22	0.95	1.16	1.56	10.68	0.40	11.07	50	0.216	0.68	525	133.2	1.638	0.355	OK	IN PIPE
				0.95	1.16	1.56				76	0.328							
A4	D4	D5	0.72	0.95	0.68	2.24	11.07	1.36	12.43	47	0.292	0.67	600	133.2	1.778	0.503	OK	IN PIPE
				0.95	0.68	2.24				71	0.442							
A5	D5	D6	0.64	0.95	0.61	2.85	12.43	1.25	13.68	45	0.353	0.61	675	133.0	1.835	0.657	OK	IN PIPE
				0.95	0.61	2.85				67	0.532							
	D6	D7		0.95		2.85	13.68	1.21	14.89	43	0.337	0.50	675	14.2	1.661	0.594	OK	IN PIPE
				0.95		2.85				64	0.507							
A6	D9	D10	0.38	0.95	0.36	0.36	10.00		10.00	53	0.053	1.00	300	150.0	1.368	0.097	OK	IN PIPE
				0.95	0.36	0.36				80	0.080							
A7	D10	D11	0.33	0.95	0.31	0.67	10.00	1.83	11.83	48	0.090	1.00	375	150.0	1.587	0.175	OK	IN PIPE
				0.95	0.31	0.67				73	0.137							
A8	D11	D12	0.34	0.95	0.32	1.00	11.83	1.57	13.40	45	0.125	1.20	375	137.1	1.739	0.192	OK	IN PIPE
				0.95	0.32	1.00				68	0.188							
A9	D12	D13a	0.63	0.95	0.60	1.60	13.40	1.31	14.72	43	0.190	0.52	525	77.1	1.433	0.310	OK	IN PIPE
				0.95	0.60	1.60				64	0.286							
A10	D13a	D7	3.34	0.95	3.17	4.77	14.72	0.90	15.61	41	0.550	0.50	750	67.9	1.782	0.787	OK	ABOVE PIPE
				0.95	3.17	4.77				62	0.826							
	D7			0.95		7.62	15.61	0.64	16.25	41	0.860	1.00	750	58.9	2.520	1.113	OK	ABOVE PIPE
				0.95		7.62				61	1.200							

NOTICE TO CONTRACTOR

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LEGAL DESCRIPTION: .
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B.M. MONUMENT NO. . ELEVATION: .
LOCATED AT . STREET & . AVENUE

REV. NO.	DESCRIPTION	DR	CH	DATE	APP
0	ONSITE PROGRESS SET	KM	CAB	2019-11-14	CAB
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2	ONSITE PROGRESS SET	KM	CAB	2020-01-16	CAB
3	ISSUED FOR BP	KM	CAB	2020-01-30	CAB

APLIN MARTIN
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CLIENT:
WESGROUP PROPERTIES
SUITE 910, FOUR BENTALL CENTRE, 1055 DUNSMUIR STREET
PH. 604-648-1800

PROJECT:
ALPHA LANDFILL
8576, 8594, 8620 & 8644 RIVER ROAD, DELTA

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA CHRIS A. BARKER
2020-01-30

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TITLE:
STORMWATER MANAGEMENT PLAN

DESIGN: KM CHECK: CB
DRAWN: KM APPR: CB

A & M FILE: **16-222**

PROJECT NO. **BP 014378**

SCALE : HORZ. 1: 750 VERT. N/A

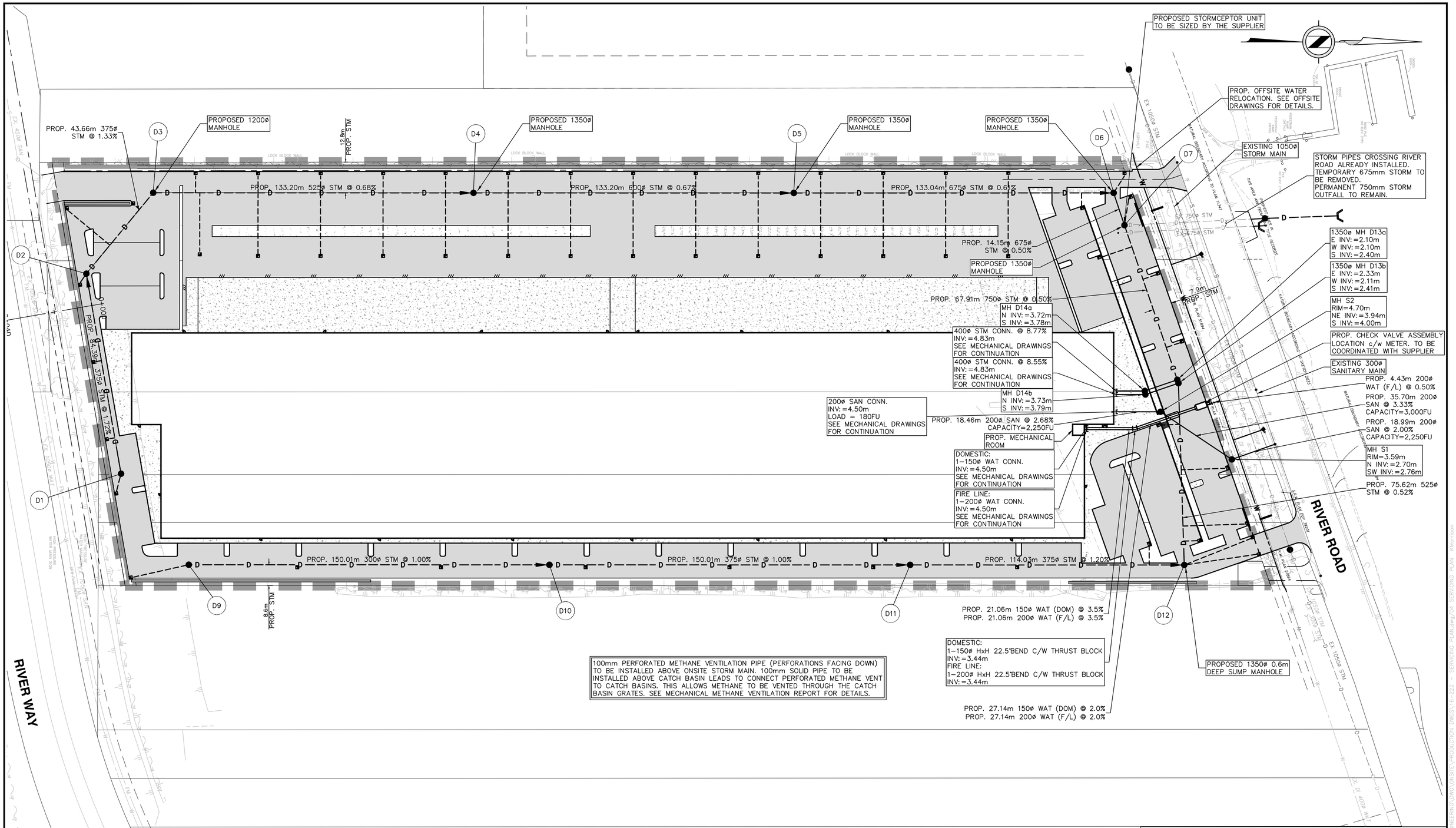
DRAWING DATE: **OCTOBER, 2019**

DRAWING NO. **.**

A & M DRAWING NO. **16-222 -03**

SHEET NO. **03**

REV. **3**



100mm PERFORATED METHANE VENTILATION PIPE (PERFORATIONS FACING DOWN) TO BE INSTALLED ABOVE ONSITE STORM MAIN. 100mm SOLID PIPE TO BE INSTALLED ABOVE CATCH BASIN LEADS TO CONNECT PERFORATED METHANE VENT TO CATCH BASINS. THIS ALLOWS METHANE TO BE VENTED THROUGH THE CATCH BASIN GRATES. SEE MECHANICAL METHANE VENTILATION REPORT FOR DETAILS.

NOTICE TO CONTRACTOR

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2	ONSITE PROGRESS SET	KM	CAB	2020–01–16	CAB
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PH. 604-648-1800

PROJECT:
ALPHA LANDFILL
8576, 8594, 8620 & 8644 RIVER ROAD, DELTA

C.A. BARKER
34349
2020–01–30

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TITLE:
SERVICING PLAN

DESIGN: KM CHECK: CB
DRAWN: KM APPR: CB

A & M FILE: **16-222**

PROJECT NO. **BP 014378**

SCALE :
HORZ. 1:750
VERT. N/A

DRAWING DATE: **OCTOBER, 2019**

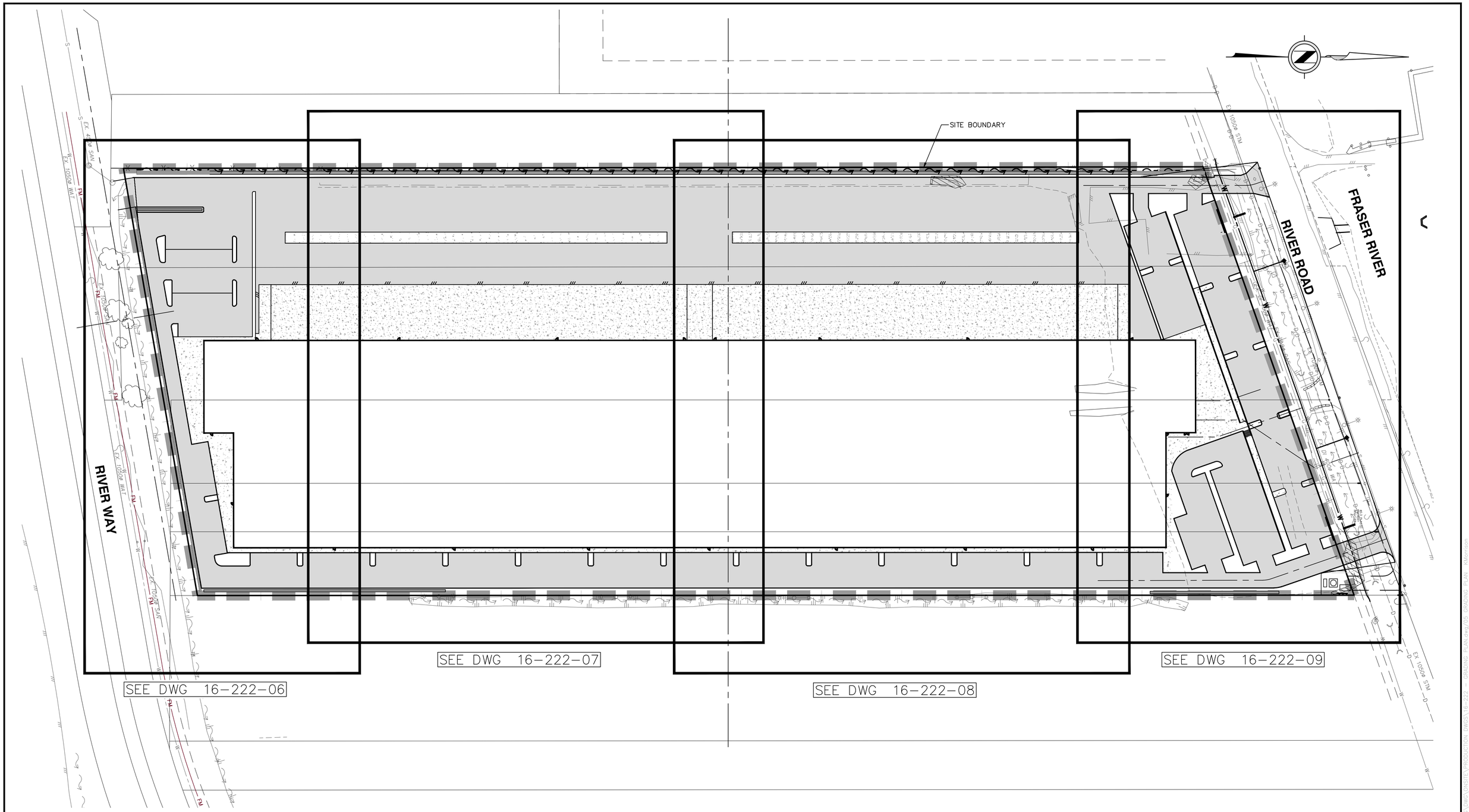
DRAWING NO. .

A & M DRAWING NO. **16-222 -04**

SHEET NO. **04**

REV. **3**

Jan 30 2020 – 1:05pm M:\2016\16–222\ENGINEERING\DWG\ONSITE\PRODUCTION DWGS\16–222 – SERVICING PLAN.dwg/04 SERVICING PLAN KMorrison



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PROJECT:
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PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — C.A. BARKER
2020-01-30

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TITLE: **GRADING PLAN**

DESIGN: KM CHECK: CB
DRAWN: KM APPR: CB

A & M FILE: **16-222**

PROJECT NO. **BP 014378**

SCALE : HORZ. 1:750 VERT. N/A

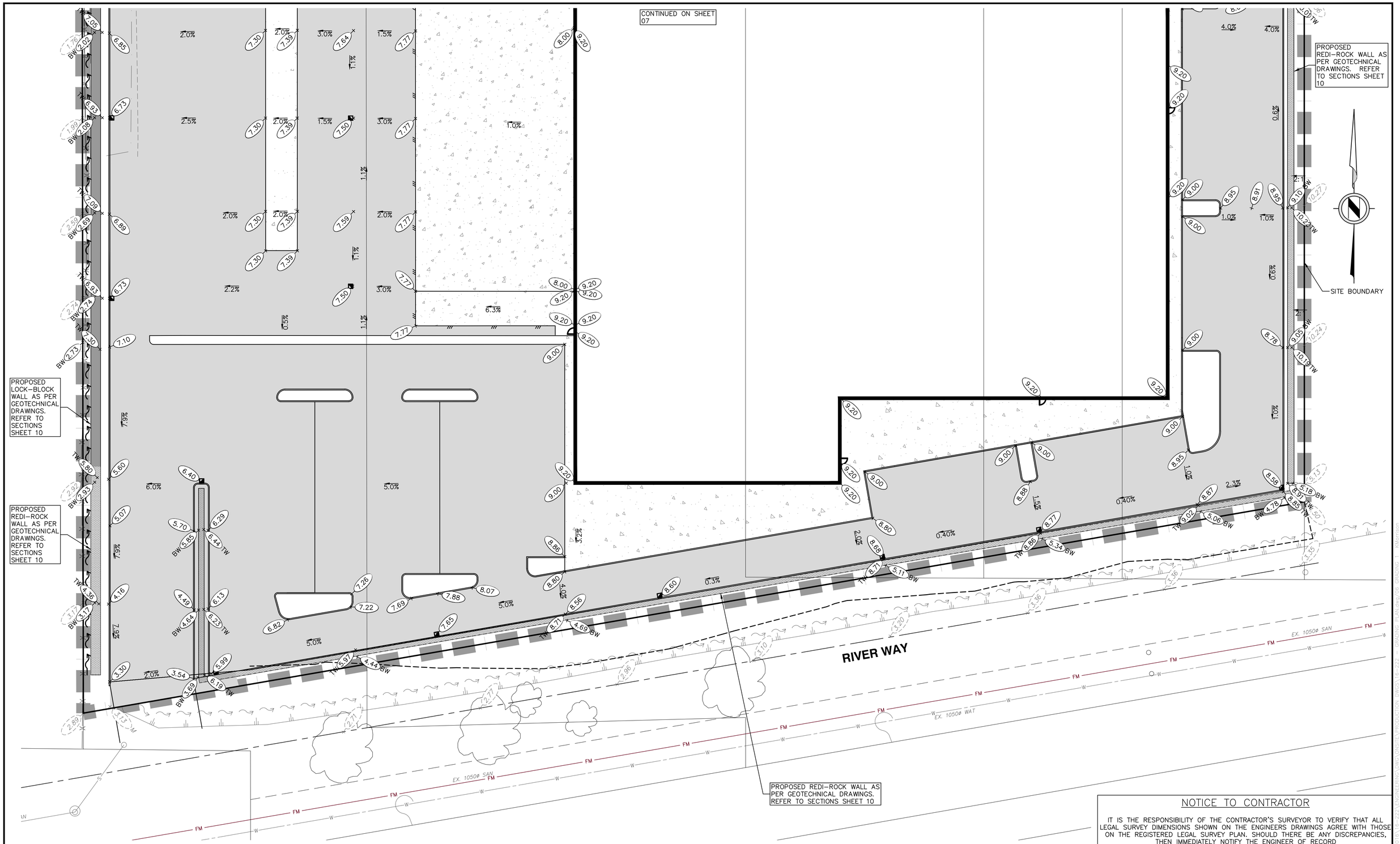
DRAWING DATE: **OCTOBER, 2019**

DRAWING NO. .

A & M DRAWING NO. **16-222 - 05**

SHEET NO. **05**

REV. **3**



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TITLE: **GRADING 1**

DESIGN: KM CHECK: CB
DRAWN: KM APPR: CB

A & M FILE: **16-222**

PROJECT NO. **BP 014378**

SCALE : HORZ. 1:250 VERT. N/A

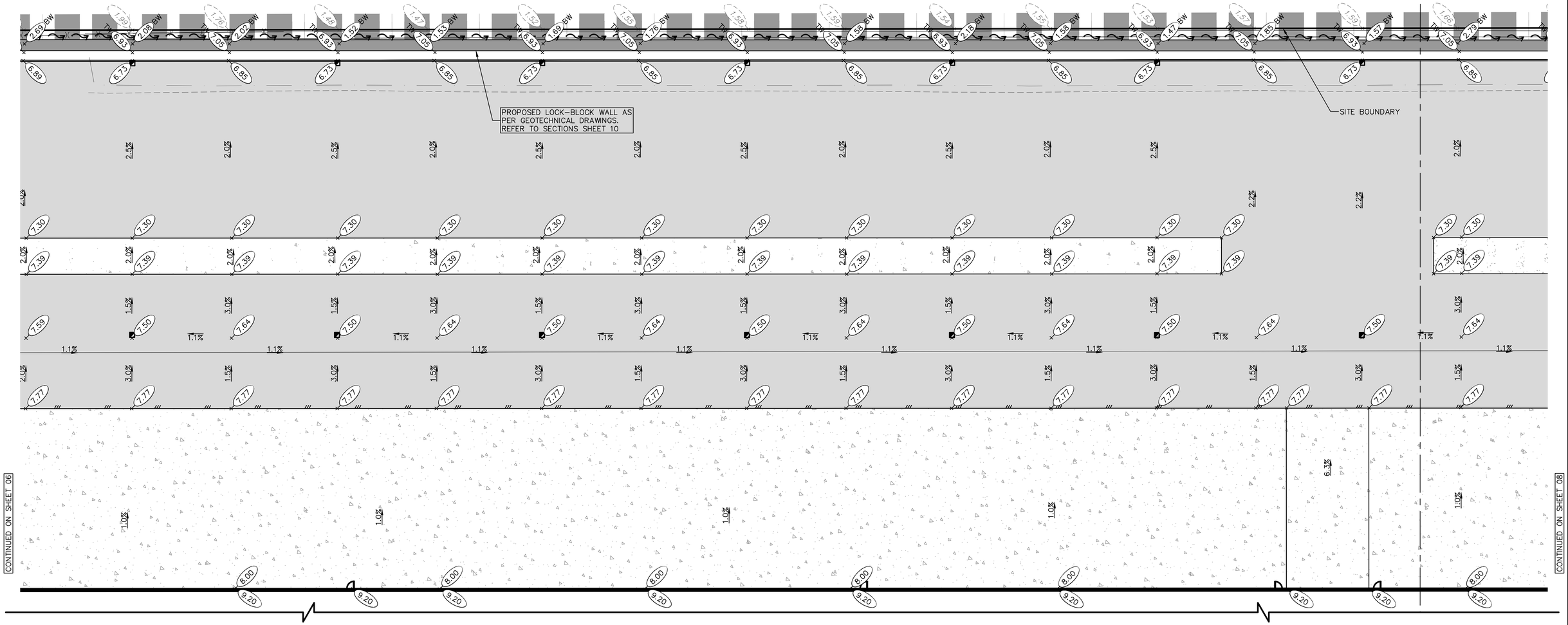
DRAWING DATE: **OCTOBER, 2019**

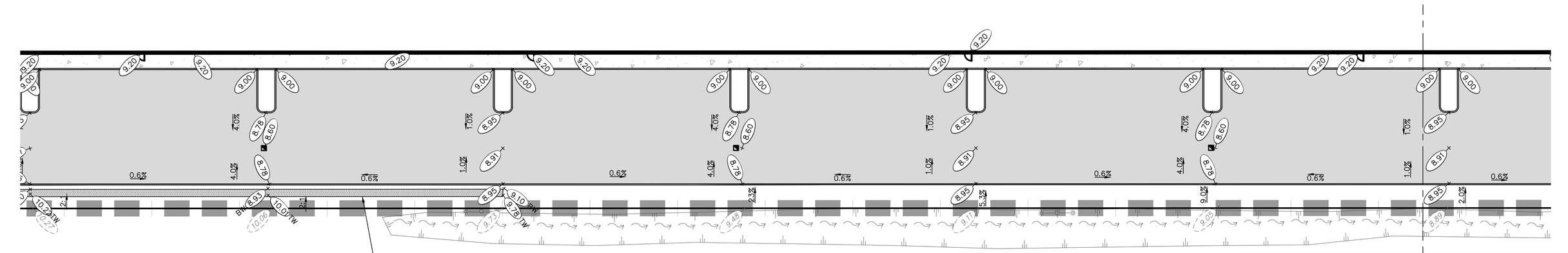
DRAWING NO. **.**

A & M DRAWING NO. **16-222 - 06**

SHEET NO. **06**

REV. **3**





NOTICE TO CONTRACTOR

IT IS THE RESPONSIBILITY OF THE CONTRACTOR'S SURVEYOR TO VERIFY THAT ALL LEGAL SURVEY DIMENSIONS SHOWN ON THE ENGINEERS DRAWINGS AGREE WITH THOSE ON THE REGISTERED LEGAL SURVEY PLAN. SHOULD THERE BE ANY DISCREPANCIES, THEN IMMEDIATELY NOTIFY THE ENGINEER OF RECORD

LEGAL DESCRIPTION: .
.

B.M. MONUMENT NO. . ELEVATION: .
LOCATED AT . STREET & . AVENUE

REV. NO.	DESCRIPTION	DR	CH	DATE	APP
0	ONSITE PROGRESS SET	KM	CAB	2019-11-14	CAB
1	ONSITE PROGRESS SET	KM	CAB	2020-01-09	CAB
2	ONSITE PROGRESS SET	KM	CAB	2020-01-16	CAB
3	ISSUED FOR BP	KM	CAB	2020-01-30	CAB

APLIN MARTIN
ENGINEERING ARCHITECTURE PLANNING SURVEYING
201 - 12448 82 Avenue, Surrey, B.C. Canada V3W 3E9
Tel: (604) 597-9058, Fax: (604) 597-9061, Email: general@aplinmartin.com

CLIENT:
WESGROUP PROPERTIES
SUITE 910, FOUR BENTALL CENTRE, 1055 DUNSMUIR STREET
PH. 604-648-1800

PROJECT:
ALPHA LANDFILL
8576, 8594, 8620 & 8644 RIVER ROAD, DELTA

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — C.A. BARKER
2020-01-30

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TITLE: **GRADING 2**

DESIGN: KM CHECK: CB
DRAWN: KM APPR: CB

A & M FILE: **16-222**

PROJECT NO. **BP 014378**

SCALE : HORZ. 1:250 VERT. N/A

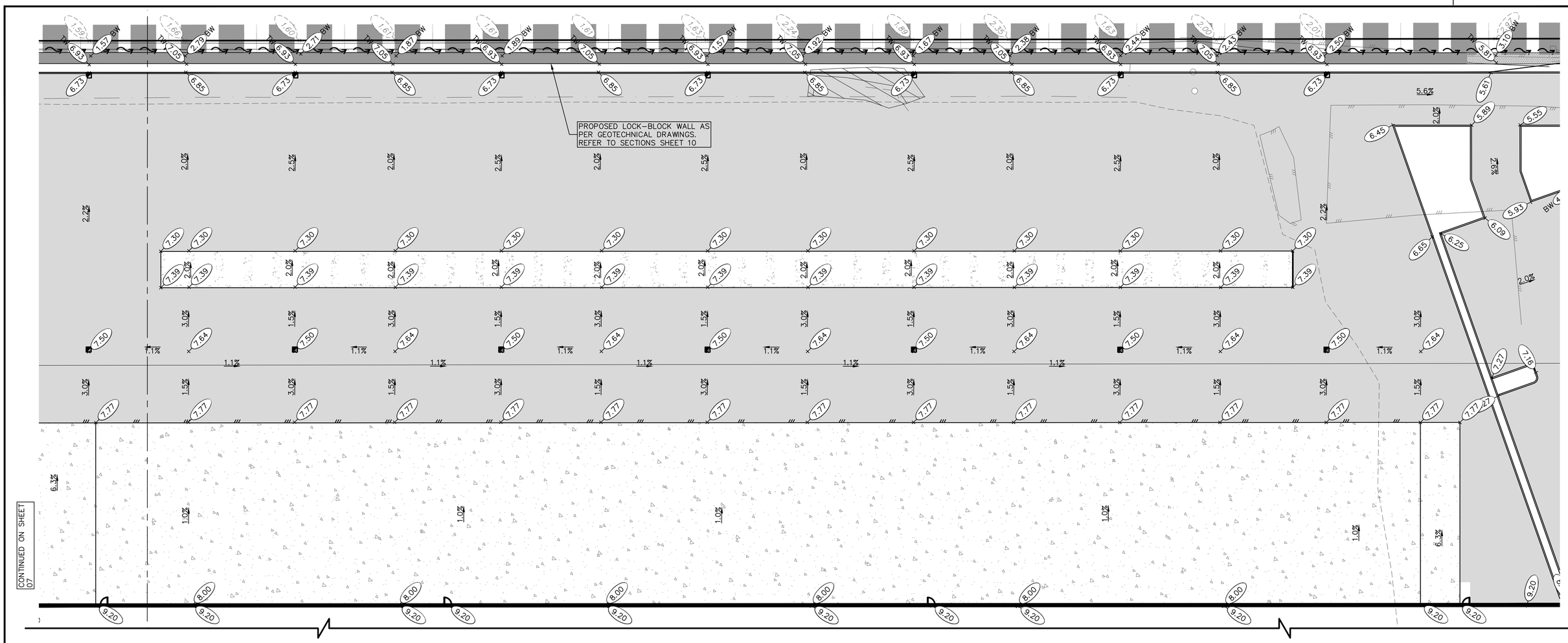
DRAWING DATE: **OCTOBER, 2019**

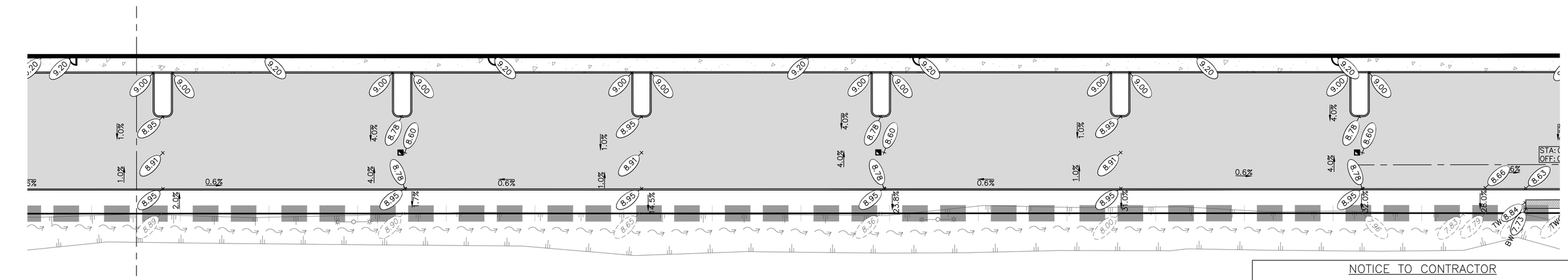
DRAWING NO. **.**

A & M DRAWING NO. **16-222 - 07**

SHEET NO. **07**

REV. **3**





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1	ONSITE PROGRESS SET	KM	CAB	2020-01-09	CAB
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PH. 604-648-1800

PROJECT:
ALPHA LANDFILL
8576, 8594, 8620 & 8644 RIVER ROAD, DELTA

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — CAB BARKER — 2020-01-30

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TITLE: **GRADING 3**

DESIGN: KM CHECK: CB
DRAWN: KM APPR: CB

A & M FILE: **16-222**

PROJECT NO. **BP 014378**

SCALE : HORZ. 1:250 VERT. N/A

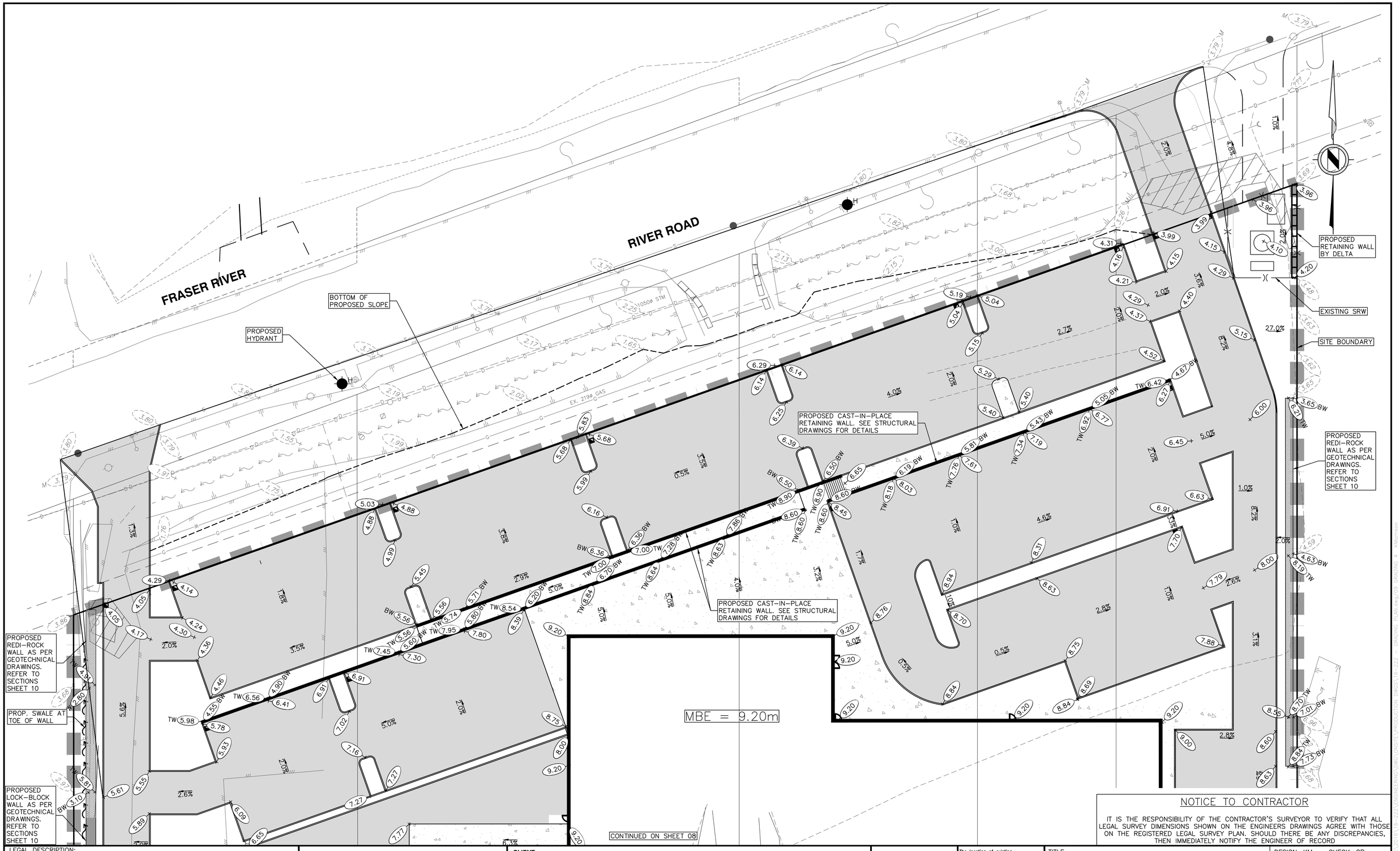
DRAWING DATE: **OCTOBER, 2019**

DRAWING NO. **.**

A & M DRAWING NO. **16-222 - 08**

SHEET NO. **08**

REV. **3**



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3	ISSUED FOR BP	KM	CAB	2020-01-30	CAB

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PH. 604-648-1800

PROJECT:
ALPHA LANDFILL
8576, 8594, 8620 & 8644 RIVER ROAD, DELTA

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — CAB BARKER — 2020-01-30

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TITLE: **GRADING 4**

DESIGN: KM CHECK: CB
DRAWN: KM APPR: CB

A & M FILE: **16-222**

PROJECT NO. **BP 014378**

SCALE : HORZ. 1:250 VERT. N/A

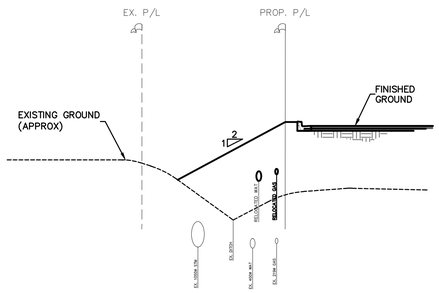
DRAWING DATE: **OCTOBER, 2019**

DRAWING NO. **.**

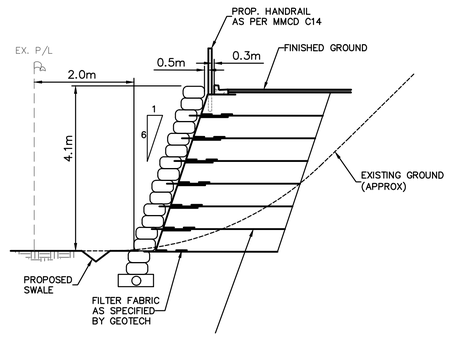
A & M DRAWING NO. **16-222 - 09**

SHEET NO. **09**

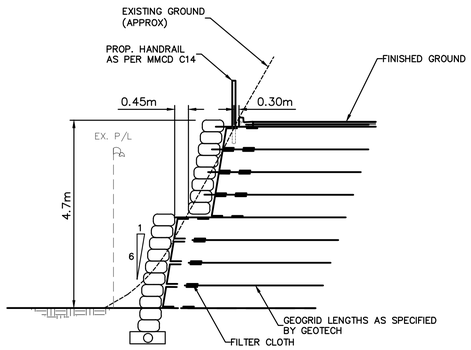
REV. **3**



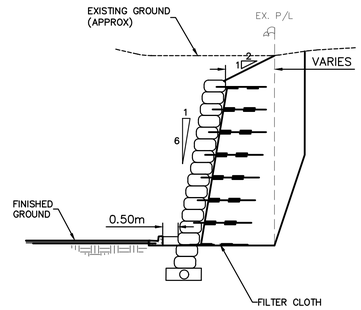
FILL SLOPE ALONG NORTH ℙ
SCALE: N.T.S.



TYPICAL WALL SECTION ALONG WEST ℙ
SCALE: N.T.S.

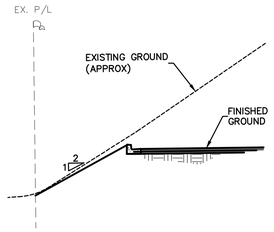


TYPICAL WALL SECTION ALONG SOUTH ℙ
SCALE: N.T.S.

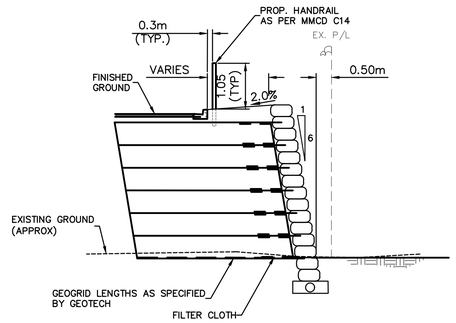


TYPICAL WALL SECTION ALONG EAST ℙ (SOUTH)
SCALE: N.T.S.

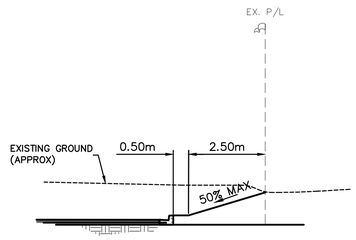
SEE GEOTECHNICAL DRAWINGS FOR FURTHER WALL DETAILS



TEMPORARY SLOPE ALONG SOUTH ℙ
SCALE: N.T.S.



TYPICAL WALL SECTION ALONG EAST ℙ (NORTH)
SCALE: N.T.S.



TYPICAL WALL SECTION ALONG EAST ℙ (NO WALL)
SCALE: N.T.S.

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PROJECT:
ALPHA LANDFILL
8576, 8594, 8620 & 8644 RIVER ROAD, DELTA

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — C.A. BARKER
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TITLE: **GRADING DETAILS**

DESIGN: KM CHECK: CB
DRAWN: KM APPR: CB
A & M FILE: **16-222**

PROJECT NO. **BP 014378**
SCALE : HORZ. 1:250 VERT. N/A
DRAWING DATE: **OCTOBER, 2019**
DRAWING NO. **.**
A & M DRAWING NO. **16-222 - 10**
SHEET NO. **10**
REV. **3**

ATTACHMENT B
Technical Letter

APLIN MARTIN
ENGINEERING ARCHITECTURE PLANNING SURVEYING

March 5, 2020

Our File: 16-222

Wesgroup Properties
Suite 910 – 1055 Dunsmuir Street
Vancouver, BC V7X 1L3

Attention: Sunny Sandher

Dear Mr. Sandher:

Re: Onsite Stormwater Runoff Quality Control Measures for 8576, 8594, 8620 & 8644 River Road, Delta

This memo outlines the proposed onsite stormwater runoff quality control measures taken for the development of the Alpha Landfill site at the address noted above, to a large-scale industrial development with a loading bay along the west length of the building and a parking lot along the east length of the building. The remainder of the site incorporates drive aisles, smaller parking spaces, and some landscaping areas.

As part of the initial onsite preload works, two culverts were installed at the northwest corner of the site crossing River Road into the Fraser River. One of these two culverts was used as a carrier pipe for dredging sand from the Fraser River to acquire preload material while the other was used as a drainage culvert to discharge runoff from the site during these dredging works. The culvert used for dredging is to be removed following completion of the preload works while the drainage culvert is proposed to remain as a permanent offsite discharge point for the site in the post-development condition.

As no infiltration is permitted onsite, due to the potential for increased leachate into the environment, and onsite detention was not a practical option as the required detention would be significant due to the municipal system's capacity issues, it is much more cost effective to utilize the drainage culvert as a permanent outfall. As the stormwater discharge point is located in an environmentally sensitive portion of the Fraser River, and the post-development condition involves heavy truck traffic which typically can result in oils and grit making their way into the storm sewer network, a mechanical filtration unit (CDS unit) is proposed as part of the onsite storm sewer design. All stormwater runoff from the site will run through the CDS unit before discharging into the Fraser River. This CDS unit, sized by Rainwater Management (please find attached their Sizing Estimate Package), allows for 88% total suspended solid (TSS) removal of 50 micron or larger particles for up to 98% of total annual rainfall. The CDS unit also separates floatables and oil from the water within the unit. The sediment, oil, or other floatables captured by the CDS unit are removed as part of the regular maintenance program for the system.

The primary drainage strategy is a traditional collection and conveyance system with flows piped around the perimeter of the building to the proposed mechanical filtration unit. Upon flowing through the CDS unit, discharge from the site will be free of oils and will have adequately low TSS. In the event of significant rain events, in which the storm peak flow surpasses the unit's treatment flow, an internal diversion weir directs the excess flow around the treatment chamber and over an internal bypass weir. This mechanism ensures that any sediment, oils, or other floatables trapped in the system are not flushed out of the system during significant rain events.

If you have any questions or would like to discuss anything further, please call the undersigned at 604-678-9434.

Yours truly,

APLIN & MARTIN CONSULTANTS LTD.

Prepared by:

Kalvin Morrison, ENV SP
Engineering Designer

Reviewed by:

Cory Barker, P.Eng
Project Manager, Associate

KM:cb

Enclosure

cc: Cory Barker

2020-03-05 - Stormwater Runoff Letter

To: Aplin Martin
From: Rainwater Management
Date: 4-Mar-20

Project City: Delta
Designation: OGS
Revision: 0

Re: **Alpha Landfill**
8576-8644 River Rd
Sizing Estimate Package

Engineering Information:

1) Removal Target: 80 % removal of the 50 micron and larger particles.

Drainage Area (ha)	Runoff Coefficient	RWM Model	Net Annual TSS Removal Estimate
8.00	0.95	3035-6	88%

Design Parameters:

1) The system for this project has been designed to remove 80 % TSS annually based on a 50 um and larger particle.

2) The sediment influent concentration is assumed to be constant over the full range of flows resulting in more accurate predicted removal efficiencies.

3) The peak flows will be conveyed through the unit without re-suspending the previously trapped pollutants. The sediment storage sump is separate from the high flow area.

Technology Summary:

This system is a true hydrodynamic (swirl concentrator) oil/grit separator that combines screening and enhanced gravity settling to remove floating, neutrally buoyant and non-buoyant solids from stormwater runoff. The non-blocking screen captures 100 % of the pollutants equal to the screen aperture size (2400 microns and larger). All non-buoyant solids are directed to a sump that separates the captured pollutants from the treatment flow path to prevent the larger storm events from re-suspending previously trapped material. The floatable debris and oil/grease are trapped upstream of the baffle for easy removal.

The system can be installed as a bend structure, can accommodate multiple inlets, and does not require an elevation difference between the inlet and outlet pipes.

Maintenance is a key to any oil/grit separator system for proper long-term effectiveness. The system allows for unobstructed access without confined space requirements. Rainwater Management is available to train a maintenance crew or to provide regular inspection/maintenance services.

Following is a sizing table and general drawing for your review. Please feel free to contact me for further information or clarification.

Kind Regards,

Mariusz Kaluski, AScT.

502-1952 Kingsway Ave, Port Coquitlam, BC V3C 6C2 p: 604-347-8758 f: 604-676-2601
e: mariusz@rainwatermanagement.ca

rainwater MANAGEMENT

RWM ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION
BASED ON THE RATIONAL RAINFALL METHOD
BASED ON A PARTICLE SIZE OF 50 MICRONS AND LARGER
Alpha Landfill

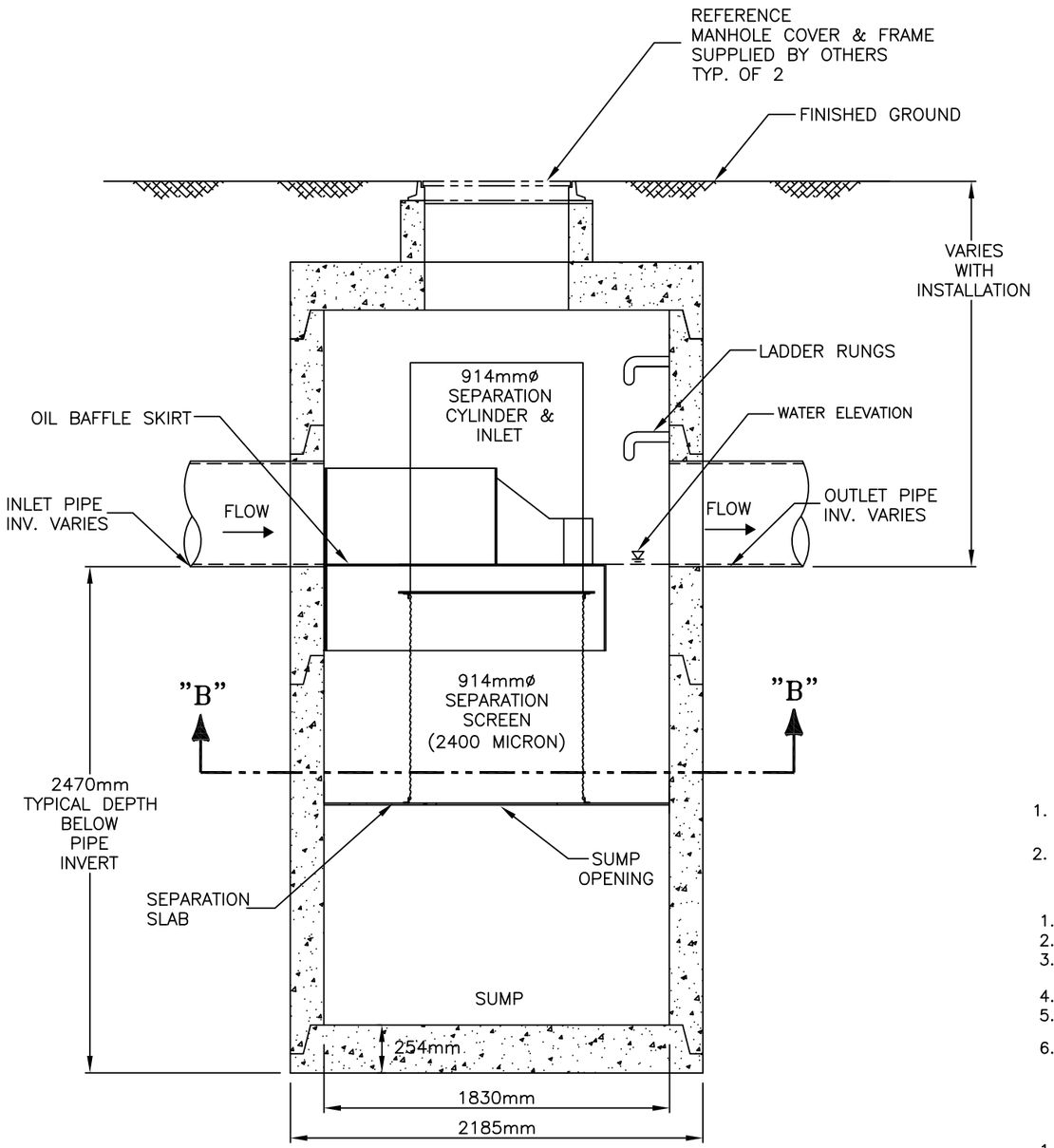
Area: 8.00 ha
Runoff C: 0.95

Rainfall Station* # 17
(*closest rainfall station to site)

RWM Model: 3035-6

Rainfall Intensity[1] (mm/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	% Rainfall Volume Treated	Total Flowrate (l/s)	Removal Efficiency[2] (%)	Incremental Removal (%)
0.5	10.4%	10.4%	10.4%	10.6	99.0	10.3
1.0	14.0%	24.3%	14.0%	21.1	96.7	13.5
1.5	14.3%	38.6%	14.3%	31.7	94.4	13.5
2.0	12.7%	51.4%	12.7%	42.3	92.1	11.7
2.5	11.2%	62.6%	11.2%	52.8	89.7	10.1
3.0	9.2%	71.8%	9.2%	63.4	87.4	8.0
4.0	11.6%	83.3%	11.6%	84.5	82.7	9.6
5.0	8.0%	91.4%	8.0%	105.6	78.1	6.3
6.0	4.0%	95.4%	3.4%	126.8	65.9	2.6
7.0	2.4%	97.7%	1.7%	147.9	56.5	1.4
8.0	1.0%	98.8%	0.7%	169.0	49.4	0.5
9.0	0.4%	99.2%	0.2%	190.2	43.9	0.2
10.0	0.4%	99.5%	0.2%	211.3	39.5	0.1
11.0	0.1%	99.6%	0.1%	232.4	35.9	0.0
12.0	0.1%	99.8%	0.1%	253.5	32.9	0.0
15.0	0.2%	99.9%	0.1%	316.9	26.4	0.0
20.0	0.1%	100.0%	0.0%	422.6	19.8	0.0
						87.9
					Predicted % Annual Rainfall Treated =	97.7%
					Predicted Net Annual Load Removal Efficiency =	**87.9%**

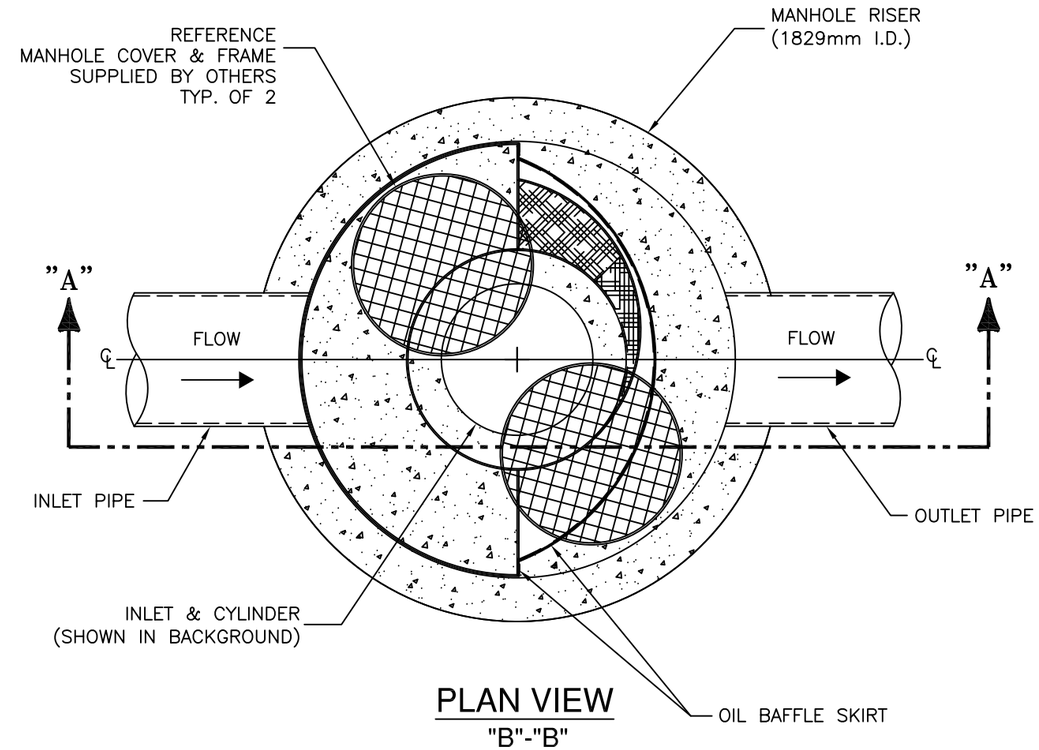
1 - Based on 37 years of Hourly Rainfall Data From Canadian Rainfal Station 1107873, Kwantlen Park, BC
2- Removal Efficiency based on constant sediment influent concentration at all flow rates



ELEVATION VIEW

"A"-"A"

NOT TO SCALE



PLAN VIEW

"B"-"B"

NOT TO SCALE

DESIGN NOTES

1. THE STANDARD RWM3035 CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE, PLEASE CONTACT RAINWATER MANAGEMENT. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.
2. THE UNIT CAN HANDLE MULTIPLE INLET PIPES AND CAN ACCOMODATE INLET PIPES AT AND ANGLE TO THE OUTLET.

GENERAL NOTES

1. RAINWATER MANAGEMENT TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. ALL DIMENSIONS ARE SHOWN IN MILLIMETERS.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR RAINWATER MANAGEMENT PRODUCTS REPRESENTATIVE. www.rainwatermanagement.ca
4. WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE AND CASTINGS SHALL MEET LOAD RATINGS AS REQUIRED, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION.
6. MANHOLE MANUFACTURED TO ASTM 478 SPECIFICATIONS.

INSTALLATION NOTES

1. ANY SUB–BASE, BACKFILL DEPTH, AND/OR ANTI–FLOTATION PROVISIONS ARE SITE–SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY THE ENGINEER OF RECORD.
2. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE MANHOLE STRUCTURE (LIFTING CLUTCHES PROVIDED). HEAVIEST LIFT TO PLAN FOR IS 7500kg.
3. CONTRACTOR TO ADD GASKETS OR JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS, AND ASSEMBLE STRUCTURE.
4. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES, MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
5. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

SITE SPECIFIC DATA REQUIREMENTS FOR RWM3035

STRUCTURE ID		PIPE DATA:	I.E.	MATERIAL	DIAMETER	ANIT-FLOTATION BALLAST	WIDTH	HEIGHT
WATER QUALITY FLOW RATE (L/S)	*	INLET PIPE 1	*	*	*		*	*
PEAK FLOW RATE (L/S)	*	INLET PIPE 2	*	*	*	NOTES / SPECIAL REQUIREMENTS		
RETURN PERIOD OF PEAK FLOW (YRS)	*	OUTLET PIPE	*	*	*			
SCREEN APERTURE (2400)	*	RIM ELEVATION			*	* PER ENGINEER OF RECORD		

rainwater MANAGEMENT
www.rainwatermanagement.ca
TEL : 604–944–9265

RWM3035 INLINE UNIT STANDARD DETAIL

Plotted: