
APPENDICES

Appendix A1

EAC Table of Conditions

SCHEDULE B
TABLE OF CONDITIONS

This table lists the conditions that the Holder of an Environmental Assessment Certificate (EAC) for the Vancouver Airport Fuel Delivery Project (Project) must fulfill following receipt of the Project's EAC. Although the Holder is responsible for conditions at all times, the Holder may retain 'contractors' or 'operators' to assist with the performance of certain conditions.

In this Schedule:

'authorization' includes a permit, license, approval or other authorization issued by a government allowing a person to carry out an activity that would otherwise be contrary to law;

'contractor' means a person contracted by the Holder to undertake work associated with the construction of Project components;

'operator' means a person contracted by the Holder to manage the operation of the Project components; and

'subcontractor' means a person working on the Project under contract with the contractor, including a person working on the Project under contract with a subcontractor.

A reference to a standard, code, or enactment in these conditions is a reference to that standard, code, or enactment as amended from time to time, and, if the standard, code, or enactment is superseded or replaced by a standard, code, or enactment published or enacted by the same organization as the original, is a reference to the subsequent standard, code, or practice.

Note: The Project has been assessed under the *Environmental Assessment Act*, S.B.C. 2002, c. 43, and a screening level environmental assessment of the Project was commenced under the *Canadian Environmental Assessment Act*, S.C. 1992, c. 37, and completed under the *Canadian Environmental Assessment Act, 2012*, S.C. 2012, c. 19, as if the earlier Act had not been repealed. To avoid uncertainty and duplication, the BC Environmental Assessment Office and Vancouver Fraser Port Authority, as federal authority in relation to the Project, undertook a coordinated environmental assessment.

Number	Condition	Timing	Source	Responsible Agency for Compliance
Responsible Environmental Management – Construction				
1	<p>The Holder must develop and implement a Construction Environmental Management Plan (CEMP) in accordance with Chapter 9 of the Application. The CEMP must include the following:</p> <ul style="list-style-type: none"> a. Accidents or Malfunctions Management Plan; b. Air Quality and Dust Control Management Plan; c. Archaeological Management Plan; d. Contaminated Sites Management Plan; e. Fuels, Chemicals and Materials Storage and Handling Plan; f. Noise Management Plan; g. Spill Prevention and Emergency Response Plan; h. Surface Water Quality/Fisheries Protection and Sediment Control Plan; i. Vegetation and Wildlife Management Plan; and j. Waste Management Plan. <p>The Holder may implement two CEMPs. One for early or advance pre-construction works including geotechnical investigations, site preparation and preloading, if required, and one for major construction works.</p> <p>The CEMP must describe measures to verify that construction activities will comply with the EAC, regulatory approvals, applicable legislation and applicable industry best management practices.</p> <p>The Holder must obtain approval of the final CEMP from Environmental Assessment Office (EAO) before commencement of construction of the Project.</p> <p>Municipalities, government agencies, and First Nations involved in the environmental assessment for the Project must be provided copies of the draft and final CEMP plans, unless they indicate otherwise.</p>	<p>Pre-Construction - prepared 60 days before construction starts (30 days for any pre-construction early works)</p> <p>Construction - implemented throughout</p>	<p>Application - Chapter 9</p>	<p>EAO/FLNR/MoE</p>
2	<p>The Holder must develop and implement a Traffic Management Plan (TMP) in accordance with Chapter 9 of the Application. The TMP must:</p> <ul style="list-style-type: none"> a. Follow the "Traffic Control Manual for Work on Roadways" (Ministry of Transportation and Infrastructure (MOTI) 1999) where Project activities occur on arterial highways as defined by the 	<p>Pre-Construction - prepared 60 days before construction starts</p> <p>Construction - implemented throughout</p>	<p>Application - Chapter 9</p>	<p>EAO</p>

Number	Condition	Timing	Source	Responsible Agency for Compliance
	<p><i>Transportation and Infrastructure Act</i> and the City of Richmond's General Traffic Control Guidelines for City of Richmond Roadways where Project activities occur on roads within the City of Richmond's jurisdiction; and</p> <p>b. Include a communications strategy to inform stakeholders, including the public and government agencies, about construction progress and identify methods for providing feedback on issues and concerns.</p> <p>The TMP must describe measures to verify that construction activities will comply with the EAC, regulatory approvals, applicable legislation and applicable industry best management practices.</p> <p>The draft TMP must be provided to EAO, the Vancouver Fraser Port Authority, the Ministry of Transportation and Infrastructure, and the City of Richmond for review and comment. The Holder must obtain approval of the final TMP from EAO before commencement of construction of the Project.</p>			
3	<p>The Holder must require that each contractor deliver an environmental orientation training session to all of their construction site personnel and sub-contractor site personnel as a pre-requisite to on-site work. The training session must include:</p> <p>a. An overview of the CEMP;</p> <p>b. Roles and responsibilities of Project personnel and relevant contact information;</p> <p>c. Site-specific environmental issues, regulatory requirements, environmental protection and mitigation measures;</p> <p>d. The applicable Workplace Hazardous Materials Information System; and</p> <p>e. Responsibilities, protocols, and relevant contact information in response to an accidental spill or other type of environmental emergency, including information specified by relevant standards, codes, or enactments.</p>	Pre-Construction and Construction - delivered before construction starts and to personnel hired during construction	Application - Chapter 9	EAO
Number	Condition	Timing	Source	Responsible Agency for Compliance
4	The Holder must require each contractor to retain the services of an Environmental Monitor, with demonstrated experience and knowledge of environmental monitoring for construction projects in BC,	Pre-Construction - hired before construction starts	Application - Chapter 9	EAO

Number	Condition	Timing	Source	Responsible Agency for Compliance
	<p>throughout the construction phase. The Environmental Monitor must be given authority to stop work, and be responsible for ensuring compliance with:</p> <ul style="list-style-type: none"> a. The terms and conditions of the EAC; b. The avoidance or protection measures described in the CEMP permits, or c. Any authorizations or other regulatory requirements. 	Construction - implemented throughout		
5	<p>The Environmental Monitor must report on contractors' and subcontractors' compliance with the terms and conditions of the EAC, the avoidance or protection measures described in the CEMP, any authorizations and other regulatory requirements. Monitoring reports must be submitted to the Holder or Environmental Manager.</p>	<p>Construction - implemented throughout Reports provided monthly</p>	Application - Chapter 9	EAO
6	<p>The Holder must retain the services of an experienced and qualified Environmental Manager with demonstrated experience and knowledge of environmental monitoring for construction projects in BC to oversee the implementation of the CEMP and contractors' and subcontractor's environmental performance as described in Chapter 9 of the Application. The Environmental Manager must perform the following tasks:</p> <ul style="list-style-type: none"> a. Review monitoring reports submitted by the contractors' Environmental Monitors; and b. Complete monthly on-site audits and reports, as a minimum, with more frequent audits and reports scheduled depending on the work activity, consistent with the CEMP. 	Construction Reports compiled monthly	Application - Chapter 9	EAO
7	<p>The Holder must produce reports summarizing:</p> <ul style="list-style-type: none"> a. Surveys referred to in Conditions 19, 21, 22, and 23; b. Archeological Impact Assessment referred to in condition 39; and c. Updates to the Richmond Heritage Inventory and Register and the Holder's assessment of whether these impact the Project. <p>The summary reports must provide a reasonably detailed overview of the work or survey. The Holder must provide copies of the summary report to EAO and any interested government agencies or First Nations, on request.</p>	<p>Construction - implemented throughout Reports available on request.</p>	Application - Chapter 9	EAO
Responsible Environmental Management – Operations				

Number	Condition	Timing	Source	Responsible Agency for Compliance
8	<p>The Holder must develop and implement an Operations Environmental Management Plan (OEMP) in accordance with Chapter 9 of the Application. The Holder must review and update the OEMP annually. The OEMP must include the following:</p> <ul style="list-style-type: none"> a. Accidents or Malfunctions Plan; b. Air Quality Management Plan; c. Waste Management Plan; d. Noise and Nuisance Management Plan; and e. Surface Water Quality Monitoring Plan. <p>The OEMP must verify that operations will comply with the EAC, regulatory approvals, applicable legislation and applicable industry best management practices.</p> <p>The Holder must obtain approval of the final OEMP from EAO prior to commencing operations.</p> <p>Municipalities, government agencies and First Nations involved in the environmental assessment for the Project must be provided copies of the draft and final plans, unless they indicate otherwise.</p>	<p>Pre-Operations - prepared 60 days before operations start</p> <p>Operations – annual reports and implemented throughout</p>	<p>Application - Chapter 9</p>	<p>EAO/FLNR/MoE</p>
Fisheries, Aquatics and Surface Water Quality				
9	<p>The Holder must:</p> <ul style="list-style-type: none"> a. Include a water sampling program in their CEMP Surface Water Quality / Fisheries Protection and Sediment Control Plan, designed in consultation with BC Ministry of Environment, that is consistent with BC Approved Water Quality Guidelines, <i>A Compendium of Working Water Quality Guidelines for British Columbia</i> (Ministry of Environment, 2006) and <i>Water Quality Assessment and Objectives for the Fraser River from Hope to Sturgeon and Roberts Banks</i> (Ministry of Environment), that identifies procedures for collecting and analyzing water samples, before and during construction, from surface water drainage ditches that have potential to be adversely affected by construction activities; b. Measure for pH, temperature, and biochemical oxygen demand, as well as relevant contaminants, including, but not necessarily limited to, total petroleum hydrocarbons, polycyclic aromatic hydrocarbons, total suspended solids, and dissolved and total metals concentrations; and c. Control the discharge water and surface run-off from the work area so it meets the applicable provincial and/or federal water quality guidelines or requirements. If these applicable guidelines or 	<p>Pre-Construction – water sampling plan to be prepared 60 days before construction starts</p> <p>Pre-Construction – sampling and implementation to begin before starting any work in and around the Fraser River and surface drainage ditches</p> <p>Construction: Implementation of plan and continued sampling and measurement throughout construction</p>	<p>Application - Section 5.2</p> <p>Agency/First Nations</p> <p>Comments</p>	<p>EAO/OGC/FLNR/MoE</p>

Number	Condition	Timing	Source	Responsible Agency for Compliance
	requirements are exceeded, the cause must be investigated and water control measures must be adjusted as necessary to correct the cause of the exceedance.			
10	Unless an authorization under section 8 or a permit under section 25 of the <i>Oil and Gas Activities Act</i> specifically exempts the Holder from this condition and establishes alternate equivalent or better standards, the Holder must adhere to the "Best Management Practices for Pile Driving and Related Operations" (BC Marine and Pile Driving Contractors Association 2003).	Construction - for activities and equipment related to pile-driving	Application - Section 5.2	EAO
11	The Holder must monitor underwater sound pressure levels generated by pile driving equipment. If the measured sound pressure levels exceed 30 kilopascals, at a distance of one metre (1 m) from the pile, or if the Environmental Monitor observes direct evidence of distressed, injured or dead fish associated with pile-driving activity, the Environmental Monitor must immediately suspend all in-river work generating high sound pressure levels, notify Fisheries and Oceans Canada (DFO), develop and obtain DFO approval for mitigation measures, and implement those measures when restarting the activity.	Construction - for activities and equipment related to underwater pile-driving	Application - Section 5.2	EAO/DFO
12	If cast-in-place rather than precast construction methods are used at the marine terminal, the Holder must use concrete-tight forms to isolate the concrete from the receiving river environment, and must take appropriate steps to ensure that uncured concrete, concrete fines or water that has been in contact with uncured concrete do not enter the receiving river environment.	Construction - implemented throughout terminal construction	Application - Section 5.2	EAO/FLNR/DFO
13	The Holder must adhere to the "Fraser River Estuary Management Program (FREMP) Dredge Management Guidelines" (FREMP 2005).	Construction and Operations – for activities associated with dredging	Application - Section 5.2	EAO/FLNR/DFO
14	All in-water river construction works must either be carried out from equipment located onshore and above the high water mark or from a barge that is spud-anchored or moored at the terminal berth so as to prevent grounding, or other disturbance, on the intertidal foreshore or sub tidal river bed.	Pre-Construction - before starting any in-water works	Application - Section 5.2	EAO/FLNR/DFO
15	The Holder must conduct all work in and around the Fraser River and surface water drainage ditches on Lulu Island according to the relevant BC Ministry of Environment Guidebook Chapters on Best Management Practices for Instream Works and the "Land Development Guidelines for the Protection of Aquatic Habitat" (Fisheries and Oceans Canada and Ministry of Environment, Lands and Parks 1992), unless an authorization under section 8 or a permit under section 25 of the <i>Oil and Gas Activities Act</i>	Pre-Construction - before starting any work in and around the Fraser River and surface drainage ditches	Application - Section 5.2	EAO/FLNR/DFO/OGC

Number	Condition	Timing	Source	Responsible Agency for Compliance
	specifically exempts the Holder from this condition and establishes alternate equivalent or better standards The Holder must conduct all work in and around surface water drainage ditches on Sea Island according to the "Environmental Construction Standards" from the Vancouver Airport Authority (1998).			
16	The Holder must develop and implement site-specific management plans for directional drilling of pipelines consistent with the guidelines in the "Planning Horizontal Directional Drilling for Pipeline Construction" (Canadian Association of Petroleum Producers 2004).	Pre-Construction - prepared 60 days before construction starts Pre-Construction - before starting any directional drilling works Construction	Application - Section 5.2	EAO/OGC
Fuels, Chemicals and Materials Storage and Handling				
17	The Fuels, Chemicals and Materials Storage and Handling Plan must adhere to relevant guidance in "A Field Guide to Fuel Handling, Transportation and Storage" (Ministry of Water, Land and Air Protection 2002). The Plan must apply to all construction activities and identify best management practices for: a. Equipment refuelling; b. Concrete materials use; and c. Painting, staining and chemical applications.	Pre-Construction - prepared 60 days before construction starts Construction - implemented throughout	Application - Section 9.4	EAO/MoE
Vegetation and Wildlife				
18	The Vegetation and Wildlife Management Plan must adhere to the following standards: a. "2012 Standard Specifications for Highway Construction" (MOTI 2011) for Project components located within provincial rights-of-way; b. "Master Municipal Construction Documents" for Project components located on property owned by the City of Richmond; and c. Vancouver Airport Authority's vegetation standards for Project components located on property under Airport jurisdiction.	Pre-Construction - prepared 60 days before construction starts Construction - implemented throughout	Application - Section 5.3	EAO/FLNR
19	The Holder must complete site-specific rare/at-risk plant surveys, to be conducted by a suitably qualified professional, according to the University of British Columbia's E-Flora BC rare plant survey protocols. If	Pre-Construction - before starting any clearing and	Application - Section 5.3	EAO/FLNR

Number	Condition	Timing	Source	Responsible Agency for Compliance
	avoidance of rare or at-risk plants is not practical, plants must be salvaged and relocated according to the "Guidelines for Translocation of Plant Species at Risk in British Columbia" (Ministry of Environment 2009).	grubbing activities in existing natural corridors		
20	The Holder must follow the "Best Management Practices Guidelines for Pacific Water Shrew in Urban and Rural Areas (Working Draft)" (Ministry of Environment 2010).	Pre-Construction - before starting any work in and around surface drainage ditches Construction	Agency/First Nations Comments	EAO/FLNR
21	The Holder must complete a bird nest survey, to be conducted by a suitably qualified professional, to verify that the Project complies with the <i>BC Wildlife Act</i> and Migratory Birds Regulations pursuant to the <i>Migratory Birds Convention Act</i> , 1994. The Holder must conduct vegetation clearing outside the general bird nesting season from April 1 to July 31 (or to September 15 where fledglings are still on the nest) unless otherwise specifically approved by the Ministry of Forests, Lands and Natural Resource Operations, or in a permit issued under section 25 of the <i>Oil and Gas Activities Act</i> . The Holder must report on the nest survey in their summary report(s).	Pre-Construction - survey to be completed before starting clearing work if clearing is required during nesting season	Agency/First Nations Comments	EAO/OGC/FLNR/MoE/CWS
22	The Holder must complete a raptor nest survey, to be conducted by a suitably qualified professional, to update the status of raptor nests and unless an authorization under section 8 or a permit under section 25 of the <i>Oil and Gas Activities Act</i> specifically exempts the Holder from this condition and establishes alternate equivalent or better standards, conduct construction activities in accordance with the "Best Management Practices for Raptor Conservation during Urban and Rural Land Development in British Columbia" (Ministry of Environment 2005). The Holder must report on the raptor nest survey in their summary report(s).	Pre-Construction – survey to be completed before starting construction in areas in which suitable habitat for raptors may occur. Construction – raptor monitoring as required.	Agency/First Nations Comments	EAO/OGC/FLNR/MoE/CWS
23	The Holder must complete an amphibian egg mass and/or adult field survey for northern red-legged frog and western toad, to be conducted by a suitably qualified professional. The amphibian survey must follow the "Best Management Practices for Amphibians and Reptiles in Urban and Rural Environments in British Columbia" (Ministry of Water Land and Air Protection 2004). The Holder must report on the amphibian egg mass and/or adult field survey for northern red-legged frog and western toad in their summary report(s)	Pre-Construction – before starting construction in areas in which suitable habitat for northern red-legged frog and western toad may occur	Agency/First Nations Comments	EAO/FLNR

Number	Condition	Timing	Source	Responsible Agency for Compliance
Air Quality				
24	The Air Quality and Dust Control Management Plan must be based on the "Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities" (Cheminfo Services Inc. 2005).	Pre-Construction - prepared 60 days before construction starts Construction - implemented throughout	Application - Section 5.4	EAO/MoE/OGC
25	The Holder must include as part of the contractual terms that contractors and subcontractors use non-road diesel engines for construction equipment that meet Tier 2 emissions standards, as defined by the U.S. Environmental Protection Agency (EPA). Preference must be given to proposals where at least 50 percent of non-road diesel engines employed by the person submitting the proposal and their team of potential subcontractors on the Project will meet Tier 4 emission standards.	Construction - Procurement stage for construction contractors	Application - Section 5.4	EAO
26	The Holder must identify and implement measures to reduce common air contaminants and greenhouse gas emissions at the marine terminal consistent with the "Northwest Ports Clean Air Strategy" (Port of Seattle, Port of Tacoma, and Port Metro Vancouver 2007) and subsequent updates to that strategy.	Operations - throughout	Application - Section 5.4	EAO
27	The Holder must design and construct the marine terminal to include infrastructure to facilitate the future use of shore power (i.e. power conduits).	Pre-Construction - during detailed design Construction	Agency/First Nations comments	EAO
28	The Holder must incorporate a pressure/vacuum venting system to control emissions from the fuel receiving tanks unless internal floating pans are used in the tanks.	Pre-Construction –design Construction Operations	Application - Chapter 17	EAO
Noise				
29	The Noise Management Plan must describe, and the Holder must implement, best management practices to mitigate the noise from construction and operation of equipment and vehicles. The Noise Management Plan must include measures to coordinate the timing of pile driving at the marine facility with activities Fraser Wharves Ltd to avoid exceedance of the City of Richmond's Noise Regulation Bylaw No. 8856.	Pre-Construction - prepared 60 days before construction starts Construction - implemented throughout	Application - Section 5.5	EAO/OGC/Local Bylaw Officers
30	The Holder must identify and implement procedures and timelines for providing advance notice to	Pre-Construction - prepared 60	Application -	EAO/OGC

Number	Condition	Timing	Source	Responsible Agency for Compliance
	potentially affected residences and businesses about pile-driving activities and responding to noise complaints.	days before construction starts Construction - implemented throughout	Section 5.5	
31	The Noise and Nuisance Management Plan must identify, and the Holder must implement, procedures for receiving and responding to noise complaints related to the operation of the marine terminal and the fuel receiving facility, including records management, which must be kept for a minimum of six months.	Pre-Operations - prepared 60 days before operations start Operations - implemented throughout	Agency/First Nations comments	EAO
Solid and Hazardous Waste				
32	The Holder must identify and implement strategies to minimize and manage construction waste in their Waste Management Plan in accordance with Metro Vancouver's code of practice for the building industry.	Pre-Construction - prepared 60 days before construction starts Construction - implemented throughout	Application - Section 9.4	EAO/MoE/FLNR
Contaminated Sites				
33	The Holder must write the Contaminated Sites Management Plan to be consistent with the BC Ministry of Environment's Technical and Administrative Guidance documents for contaminated sites.	Pre-Construction - prepared 60 days before construction starts Construction - implemented throughout for areas identified in the screening assessment as having medium to high risk of encountering contamination.	Application - Section 5.6	EAO
Social and Economic				
34	The Vegetation and Wildlife Management Plan must identify measures to protect street and trail trees.	Pre-Construction - prepared 60 days before construction starts Construction - implemented throughout	Application - Chapter 6	EAO

Number	Condition	Timing	Source	Responsible Agency for Compliance
35	If the City of Richmond develops the dike trail sections upstream and downstream of the marine terminal property, the Holder must work with the City of Richmond and adjacent landowners to provide a link to those upstream and downstream sections of the dike trail system that is compatible with the use of the site for marine terminal operations.	Pre-Construction - trail connectivity designed Pre-Operations - trail connectivity completed Operations – access to trail provided.	Agency/First Nations comments	EAO
36	With the exception of emergency lighting or spot lighting for vessels, the Holder must design area lighting for normal marine terminal and fuel receiving facility operations in a manner, such as directional or angled downward, which must minimize stray light outside of property boundaries.	Construction - Operations	Agency/First Nations comments	EAO/TC
37	The Holder must install visual screens on the east and south side of the fuel receiving facility before the start of operations, to reduce street level visual impacts from the fuel receiving facility.	Pre-Operations	Agency comments	EAO
Archaeological and Heritage				
38	The Archaeological Management Plan must be prepared and implemented by a BC Registered Professional Archaeologist.	Pre-Construction - prepared 60 days before construction starts Construction - implemented throughout	Application - Chapter 7	EAO/FLNR
39	<p>The Holder must:</p> <ul style="list-style-type: none"> a. Conduct an Archaeological Impact Assessment for the fuel receiving facility located on Vancouver Fraser Port Authority land, the pipeline exit point on Sea Island, and pipeline crossings of old slough channels; and b. Monitor site preparation and construction activities that will enter into native soils (i.e. non-fill) in locations rated as having high or moderate archaeological potential in the Holder's previously completed Archaeological Overview Assessment. <p>The monitoring procedures must adhere to those identified in the "British Columbia Archaeological Resource Management Handbook" and the "Archaeological Impact Assessment Guidelines" issued by the Ministry of Forests, Lands and Natural Resources Operations.</p>	<p>Construction - before starting ground disturbance works in these areas and in areas identified in the overview assessment as having high or moderate archaeological potential</p> <p>Construction – monitor construction activities</p>	Application - Chapter 7	EAO/FLNR/OGC

Number	Condition	Timing	Source	Responsible Agency for Compliance
	The Holder must invite relevant First Nations to participate in the Archaeological Impact Assessment at least four weeks before commencing the Archaeological Impact Assessment.			
40	The Holder must monitor updates to the Richmond Heritage Inventory and Register during construction.	Construction – monthly throughout	Application - Chapter 7	EAO
Accidents or Malfunctions				
41	The Holder must describe measures in the Accidents or Malfunctions Management Plan to restrict access to all construction sites.	Pre-Construction - prepared 60 days before construction starts Construction - implemented throughout	Application - Chapter 15	EAO/FLNR/OGC/MoE
Spill Prevention, Preparedness, and Emergency Response				
42	The Holder must include the following components in the design, construction, and operation of the marine terminal: a. Hydraulically-assisted and articulated fuel unloading arms with audible and visual emergency alarms, and automated and manual emergency shut-down capability; b. Real-time aviation fuel unloading monitoring; c. A rapid-deployment boat launch facility and boat (this vessel is in addition to the spill response vessel required under conditions 48 and 50); d. A structure immediately upriver (northeast) and downriver (southwest) of the terminal dock to protect berthed vessels from river debris, facilitate spill containment and recovery, and to locate booms; e. Reel-mounted river boom; f. Two skimmers ready for deployment; g. Drainage control system that includes an oil/water separator system, emergency valves, and oil-stop valves; and h. Secondary containment measures for all fuel handling areas.	Pre-Operations - during detailed design Construction Operations	Application - Chapter 17 Agency/First Nations comments	EAO/FLNR/DFO/MoE
43	The Holder must develop and implement an Oil Pollution Emergency Plan (OPEP). The OPEP must describe: a. Measures to contact First Nations, neighbouring properties, and stakeholders that may be potentially affected by spills;	Pre-Operations - consult and prepare 60 days before operations start Operations - implemented	Agency/First Nations Comments Application -	EAO//FLNR/DFO/ Corporation of Delta/ City of Richmond

Number	Condition	Timing	Source	Responsible Agency for Compliance
	<p>b. Measures to coordinate planning and response with First Nations and municipal, provincial, and federal agencies; and</p> <p>c. Environmentally sensitive areas that could potentially be affected in the event of a spill and describe the response measures that will be implemented to prevent and reduce the potential for spill contact.</p> <p>During development of the final OPEP, the Holder must consult the Corporation of Delta and City of Richmond fire and emergency departments to finalize notification requirements in the event of a spill in the river (e.g., immediate notification to the Irrigation Foreman) that could reach irrigation intake systems and include notification requirements in the OPEP acceptable to Delta and Richmond fire and emergency departments.</p>	throughout and updated annually	Chapters 16 and 17	
44	<p>The Holder must:</p> <p>a. Equip the fuel receiving facility and marine terminal with emergency spill response equipment as described in the final OPEP;</p> <p>b. Consult with Western Canada Marine Response Corporation (WCMRC) to identify any additional emergency spill response equipment to be stored at the marine terminal in addition to the Holder's requirements under the OPEP and <i>Canada Shipping Act</i>; and</p> <p>c. Annually inspect emergency response equipment to verify that it is in good working order.</p>	<p>Pre-Operations - in place before operations start</p> <p>Operations - implemented throughout and inspected annually</p>	Application - Chapter 17 Agency/First Nations Comments	EAO
45	<p>The Holder must maintain a real-time weather station at the marine terminal as part of an early warning system for operations staff to shut-down the cargo transfer and disconnect cargo unloading arms. The Holder must annually inspect the system to verify that it is in good working order.</p>	<p>Pre-Operations - in place before operations start</p> <p>Operations - implemented throughout and inspected annually</p>	Application - Chapter 17 Agency/First Nations Comments	EAO
46	<p>Through its terminal vessel acceptance program, the Holder must specify that all aviation fuel delivery vessels using the facility are:</p> <p>a. Double-hulled; and</p> <p>b. Insured for pollution liability at the prevailing industry standard coverage limits sufficient to insure the potential liability of the vessel owner and operator according to the applicable law for emergency spill response, clean-up, and environmental remediation and to compensate for loss by aboriginal food,</p>	<p>Pre-Operations - in place before operations start</p> <p>Operations - implemented throughout</p>	Application - Chapter 17 Agency/First Nations Comments	EAO

Number	Condition	Timing	Source	Responsible Agency for Compliance
	social, and ceremonial fishers licensed under the <i>Fisheries Act</i> caused by a spill of aviation fuel from the vessel.			
47	The Holder must maintain insurance coverage for liability of itself, its contractors, subcontractors, and operators during construction and operation of its facilities in accordance with the "Holder's Insurance Policy Summary (27 November 2012)". Without limiting the generality of the foregoing, the Holder must maintain pollution liability insurance that meets or exceeds the prevailing industry standard coverage limits sufficient to insure its potential liability, according to the applicable law, to compensate for emergency spill response, clean-up and environmental remediation and for loss by aboriginal food, social and ceremonial fishers licensed under the <i>Fisheries Act</i> caused by a spill of aviation fuel from the Holder's construction sites or operational facilities.	Construction Pre-Operations - in place before operations start Operations - implemented throughout	Agency/First Nations Comments	EAO
48	The Holder must arrange to have two dedicated spill response vessels available at or near the marine terminal during tanker arrival, berthing, and for the duration of aviation fuel unloading.	Operations - implemented throughout	Agency/First Nations Comments	EAO
49	The Holder must require all vessels berthed at the marine terminal to be surrounded by Kepner booming, or other booming that provides equal or better protection in relation to spills, before, and for the duration of, aviation fuel unloading. Booms must be inspected annually.	Pre-Operations - in place before operations start Operations - implemented throughout and inspected annually	Agency/First Nations Comments	EAO
50	The Holder must require a response vessel be deployed to Ladner Reach for pre-deployment of booming before aviation fuel unloading starts. The vessel, which is one of the two vessels described in condition 48, must remain on standby in Ladner Reach, or near the marine terminal, for the duration of aviation fuel unloading.	Operations - implemented throughout	Agency/First Nations Comments	EAO
51	The Holder must install spill response infrastructure (piles, anchor points, etc.) at the following locations on the Fraser River, in accordance with WCMRC recommendations, for rapid deployment of spill response equipment in the event of a spill: a. Sea Reach;	Pre-Operations - in place before operations start Operations - implemented throughout and inspected	Agency/First Nations Comments	EAO

Number	Condition	Timing	Source	Responsible Agency for Compliance
	<ul style="list-style-type: none"> b. North Steveston Harbour; c. Canoe Passage; and d. Ladner Reach. 	annually		
52	<p>The Holder must design, construct, and maintain the fuel receiving facility and pipeline system to provide for:</p> <ul style="list-style-type: none"> a. In-line inspection and cleaning; b. A flow monitoring system; c. Pressure sensors; and d. Automatic motorized valves to control the receiving and dispensing of product and designed to close when commanded by the automated emergency shut-down system and fire detection equipment. 	Pre-Construction –design Construction Operations	Application - Chapter 17	EAO/OGC
53	<p>The Holder must design, construct, and maintain the fuel receiving facility and pipeline system to provide for:</p> <ul style="list-style-type: none"> a. An automatic leak detection system for the transfer and delivery pipelines; and b. A cathodic protection system, or equivalent or better system, to inhibit corrosion of tank bottoms. <p>Design of these elements must be approved by a suitably qualified professional.</p>	Pre-Construction –design Construction Operations	Application - Chapter 17	EAO/OGC
54	<p>The Holder must design, equip, and maintain the fuel receiving facility with oil-stop valves, lift stations, or other control valves to provide protection against accidental fuel releases occurring within the tank containment area and all other fuel handling area from overwhelming the oil/water separator and entering the surrounding drainage ditches and waterways. Design must be certified by a suitably qualified professional.</p>	Pre-Construction –design Construction Operations	Application - Chapter 17	EAO
Fire Prevention, Preparedness and Emergency Response				
55	<p>The Holder must prepare and implement a Fire Safety Plan in consultation with the City of Richmond Fire Rescue, the Corporation of Delta Fire, Provincial Emergency Services, and the BC Oil and Gas Commission.</p>	<p>Pre-Operations - consult and prepare 60 days before operations start</p> <p>Operations - implemented throughout and updated annually</p>	Application - Chapter 18	EAO/OGC

Number	Condition	Timing	Source	Responsible Agency for Compliance
56	<p>The Holder must install, maintain and inspect firefighting systems at the fuel receiving facility sufficient to protect aviation fuel transfer areas and storage tanks, including:</p> <ul style="list-style-type: none"> a. A high-expansion foam fire protection system connected to a fixed foam storage and dispensing unit; b. Auxiliary firefighting equipment; c. Automated fire detection systems; and d. A perimeter fire hydrant system to provide access to water for tank deluge and firefighting. 	<p>Construction Operations - inspect and maintain annually</p>	<p>Application - Chapter 18</p>	<p>EAO</p>
57	<p>The Holder must install, maintain and inspect firefighting systems at the marine terminal sufficient to protect aviation fuel transfer areas, including:</p> <ul style="list-style-type: none"> a. Auxiliary firefighting equipment; b. Automated fire detection systems; and c. A fire hydrant system to provide access to water for firefighting. 	<p>Construction Operations - inspect and maintain annually</p>	<p>Application - Chapter 18</p>	<p>EAO</p>
58	<p>The Holder must test all fire prevention and response systems in accordance with applicable codes, guidelines, and best practices, and report the test results to the City of Richmond Fire Rescue, the Corporation of Delta Fire, Provincial Emergency Services, and the BC Oil and Gas Commission, upon request.</p>	<p>Pre-Operations - testing Operations - test, inspect and maintain annually</p>	<p>Application - Chapter 18</p>	<p>EAO/OGC</p>
Miscellaneous Conditions				
59	<p>During Project operations, the Holder must notify affected First Nations of the arrival and departure of a vessel delivering aviation fuel to the marine terminal at least 24 hours before the scheduled arrival and departure of that vessel in the South Arm of the Fraser River. The notice time may be reduced, from time to time, to the extent necessary to adjust to circumstances beyond the reasonable control of the Proponent related to the vessel's movement, but not reduced below 12 hours.</p> <p>For the purpose of this condition, an affected First Nation is one which had been consulted during the environmental assessment of the Project and to which DFO has issued a communal fishing license, Tsawwassen Harvest Documents, or other aboriginal community-based authorizations or commercial fishing license allowing members of an aboriginal community to fish on the South Arm of the Fraser River on the day of the arriving vessel. Specifics for notification procedures must be determined before the start of Project operations.</p>	<p>Pre-Operations – determine specifics for notification procedures Operations – implemented throughout</p>	<p>First Nations Comments</p>	<p>EAO</p>
60	<p>In the design of the terminal facilities, the Holder must follow the "Climate Change Adaptation Guidelines</p>	<p>Pre-Construction</p>	<p>Application -</p>	<p>EAO</p>

Number	Condition	Timing	Source	Responsible Agency for Compliance
	for Sea Dikes and Coastal Flood Hazard Land Use: Sea Dike Guidelines" (Ministry of Environment 2011) to account for potential increases in water levels due to global sea level rise and potential flooding during extreme freshet conditions.		Chapter 21 Agency/First Nations Comments	
61	The Holder must use the Project facilities only to unload, store, and deliver aviation kerosene fuel.	Operations	Application - Chapter 2 Agency/First Nations Comments	EAO
62	Before the start of Project operations, the Holder must complete an additional study to respond to information gaps identified by Environment Canada in its submission to the BC EAO dated November 13, 2012, to supplement the previous study by the Holder on the effects of a jet fuel spill on biofilm in the Fraser River Estuary (see VAFFC's Fraser River Delta Biofilm Sensitivity to Jet A Fuel Spill - Summary Report submitted to EAO on September 3, 2012). The Holder must consult Environment Canada and Vancouver Fraser Port Authority on the terms of reference for the additional study. Once the terms of reference are settled, the Holder must complete the additional study to the satisfaction of the Vancouver Fraser Port Authority.	Pre-Operations – complete additional study	Agency Comments	EAO/Vancouver Fraser Port Authority
63	The Holder must require that at least one escort tug accompany each aviation fuel cargo barge and at least two tugs accompany each aviation fuel tanker to the marine terminal from Sand Heads, or from the point at which River Pilots board the vessels, subject to any applicable requirements imposed by the Vancouver Fraser Port Authority on the Fraser River related to navigational assistance for tanker vessels on the Fraser River.	Operations	First Nations Comments	EAO
64	The Holder must retain copies of all plans, reports, and other records required by these conditions and any records relating to any surveys, studies, or assessments required by these conditions for at least five years from their production. The Holder must, on request, make such plans and records available to EAO, persons designated as inspectors under the <i>Environmental Assessment Act</i> , or the Vancouver Fraser Port Authority.	Throughout Construction and Operations		EAO/OGC/FLNR/ Vancouver Fraser Port Authority

Appendix A2

**PMV EA Decision Statement
General Conditions**

ATTACHMENT 1

Mitigations and Conditions

It is the opinion of the VFPA that potential adverse environmental effects associated with the proposed project can be mitigated through the application of the specific mitigations designed into the Project as identified in the *Environmental Assessment Certificate Application for the Vancouver Airport Fuel Delivery Project (the Application)*, the *Certified Project Description* and the *Vancouver Airport Fuel Delivery Project Assessment Report and Screening Report (the EAR)* and through the application of the Conditions in *Schedule B – Table of Conditions* as appended to this decision document.

In addition, the following general conditions shall apply:

General Conditions

The following conditions should be incorporated into the Construction Environmental Management Plan (CEMP) for the Project.

1. All work associated with this project must comply with the requirements of the *Fisheries Act*, and all other applicable laws, legislation, and best management practices. Note that Section 36(3) of the federal *Fisheries Act* prohibits the discharge of deleterious substances to waters frequented by fish including indirectly as by storm sewer. Due diligence is required at all times to prevent such discharges and adherence to these conditions does not provide relief from on-going responsibilities in this regard.
2. All works shall be carried out in such a manner so as to avoid any adverse effects on fish or fish habitat. In the event of any adverse effects on fish or fish habitat, the works may be in contravention of Section 35 of the *Fisheries Act*. Fisheries and Oceans Canada (DFO) has advised that it reserves the right to require the immediate alteration or suspension of operations if such contravention occurs and that the Proponent will be required to undertake, at his or her own expense, any remedial works deemed necessary by DFO.
3. All work associated with the project involving the use of concrete, cement, mortars and other Portland cement or lime-containing construction materials must be conducted in a manner that prevents sediments, debris, concrete (cured or uncured), and concrete fines from being deposited into any aquatic environment, either directly or indirectly. Water that has contacted uncured or partly cured concrete or Portland cement or lime-containing construction materials, such as the water that may be used for exposed aggregate wash-off, wet curing, equipment and truck washing, etc. must be prevented from entering any aquatic environment. Containment facilities should be provided at the site for the wash-down water from concrete delivery trucks, concrete pumping equipment, and other tools and equipment as required.
4. Sediment or sediment-laden waters or other deleterious substances shall not be permitted to enter the aquatic environment during the proposed works. All works and activities shall be carried out in a manner that prevents induced sedimentation

of foreshore and near shore areas and induced turbidity of local waters, and the release of sediment, sediment-laden waters, and turbid waters to the aquatic environment. All works shall be in compliance with the following water quality criteria:

- a. 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 NFR above the background values.
 - b. When background is greater than 50 NTU or 100 mg/L NFR, induced turbidity should not exceed the background values by more than 10% of the background value.
 - c. For the purposes of this letter, background is defined as the level at an appropriate adjacent reference site that is not directly or indirectly affected by works at the site in any way.
5. All equipment working on the project site must be regularly inspected to ensure that it is in good mechanical condition and free from visible evidence of fuel, oil, coolant, solvents or hydraulic leaks. Equipment that is found to be other than in good condition should be removed from the job site immediately.
 6. To avoid possible contravention of the *Migratory Birds Convention Act* and the *BC Wildlife Act* project-related activities with the potential to harm birds and/or their active nests and eggs should be avoided during the general bird breeding season of March 15th to August 15th. If potentially harmful activities (such as tree removal) must be undertaken during this period, due diligence should be exercised to avoid harm to birds, their eggs and nests, and possible contravention of legislation. Note that the nests of some species of birds are protected under the *BC Wildlife Act* regardless of the time of year or whether they are occupied or not. It is recommended that qualified environmental professionals be retained to assist in developing and undertaking appropriate bird nest surveys immediately before, during and after the general bird breeding season.
 7. Effluents of all types must not be discharged from this site to streams or storm sewers.
 8. Any soils excavated from the site during the proposed works must be handled in a manner that prevents their release into an aquatic environment, either directly or indirectly as silt in storm runoff. Excavations must not be dewatered unless an acceptable dewatering plan is in place.
 9. A construction soil and groundwater management plan must be in place before construction is started, which should include soil and groundwater management procedures to address any environmental contamination that may be encountered.
 10. Any soils excavated from the site that are not suitable for backfill must be disposed of at appropriate off-site facilities in accordance with applicable legislation, guidelines and best management practices. Suspect materials should be treated as contaminated or they should be stockpiled until their environmental quality has been determined.
 11. Materials brought onto the property for use as backfill or for site preparation must be from sources known to be clean and free of environmental contamination.

12. Debris and waste materials generated during the works shall be appropriately contained, collected, and disposed of at appropriate upland locations in accordance with all applicable legislation, guidelines, and best management practices. In this regard it should be noted that burning of a wide range of materials, including creosote treated wood, is restricted or prohibited.
13. An appropriate spill prevention, containment, and clean-up contingency plan for hydrocarbon products (e.g., fuel, oil, hydraulic fluid, etc.) and other deleterious substances must be put in place prior to work commencing. Appropriate spill containment and clean-up supplies should be kept available on site whenever the subject works are underway, and personnel working on the project should know the spill clean-up plan and how to deploy the spill response materials.
14. Dust and air emissions associated with construction shall be minimized to the greatest practical extent.
15. A plan must be developed and implemented that will mitigate problematic noise and nuisance arising from project construction. Every reasonable effort should be made to minimize the impact of construction related noise on the surrounding community and environment.
16. During construction, for heavy duty diesel powered road licensed vehicles, every effort should be made to use a model year 2007 or newer. For diesel powered non-road or off-road equipment, every effort should be made to use Tier 3 equipment or better.
17. A qualified environmental monitor shall conduct environmental monitoring and reporting during construction on the effectiveness of mitigations and compliance with regulatory Permits, Approvals and Authorizations. Monitoring activities will be guided by the CEMP.
18. Monitoring for cultural artifacts must be conducted during site preparation and excavations that will enter into native non-fill soils. If archaeological resources are encountered, excavations must cease immediately and the BC Archaeology Branch and/or an individual with appropriate archaeological qualifications must be contacted.

ATTACHMENT 2

Vancouver Airport Fuel Delivery Project Table of Conditions



VANCOUVER AIRPORT FUEL DELIVERY PROJECT

CEMP ACCIDENTS OR MALFUNCTIONS MANAGEMENT PLAN

Prepared for:

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VAFFC6773
VERSION 2

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LIST OF ACRONYMS

BC	British Columbia
BMPs	Best Management Practices
CEMP	Construction Environmental Management Plan
DFO	Fisheries and Oceans Canada
EA	Environmental Assessment
EAC	Environmental Assessment Certificate
EAO	Environmental Assessment Office
EMBC	Emergency Management BC
EMP	Environmental Management Plan
EWP	Environmental Work Plan
MSDS	Material Safety Data Sheet
PPE	Personal Protective Equipment
PMV	Port Metro Vancouver
QEP	Qualified Environmental Professional
VAFFC	Vancouver Airport Fuel Facilities Corporation
VFPA	Vancouver Fraser Port Authority
YVR	Vancouver International Airport

DISTRIBUTION LIST

The following individuals/firms have received this document:

Name	Firm	Hardcopies	CDs	Email	FTP
Adrian Pollard	FSM Management Group Inc	-	-	✓	-
Mark McCaskill	FSM Management Group Inc	-	-	✓	-
Angus Johnston	Hatfield Consultants	-	-	✓	-
Andrew Taylor	Port Metro Vancouver	-	-	-	-
Carolina Eliasson	Port Metro Vancouver	-	-	-	-

AMENDMENT RECORD

This report has been issued and amended as follows:

Issue	Description	Date	Approved by	
1	First version of CEMP Accidents or Malfunctions Management Plan	20150428		
2	Second version of CEMP Accidents or Malfunctions Management Plan	20150506		
			Garth Taylor Project Director	Angus Johnston Project Manager

1.0 INTRODUCTION

This Accidents or Malfunctions Management Plan (the Plan) describes construction-related activities for the Vancouver Airport Fuel Delivery Project (the Project) with the potential to pose an imminent or potential threat to environmental resources and/or the safety of the workers and public. It outlines the methods for mitigating adverse effects to terrestrial and aquatic environments and improving the safety of the workers and public, and the monitoring and reporting requirements.

The Plan is based on the recommended mitigation measures, standards and Best Management Practices (BMPs) presented in Vancouver Airport Fuel Facility Corporation's (VAFFCs) application for a Project Environmental Assessment Certificate (EAC), and has been prepared in compliance with the conditions to the EAC and Vancouver Fraser Port Authority's (VFPA trading as Port Metro Vancouver (PMV)) Environmental Assessment Decision Statement, and relevant legislation.

The focus for this version of the Plan is development of the fuel receiving facility and pipeline sections located on PMV land. The Plan will be further developed as detailed engineering progresses and to address the construction of other Project components.

2.0 OBJECTIVES AND SCOPE

The purpose of the Plan is to identify potential accidents or malfunctions that may reasonably occur in connection with Project construction. This includes potential environmental hazards and the need for environmental management, mitigation measures and/or emergency response. Accidents or malfunctions are defined as those events which may be caused by human error, wildlife, and may result in adverse environmental and human health effects. The Plan outlines measures to control worker exposure to health and safety hazards, as well as emergency response procedures in the event of a health and safety-related incident.

The key objectives of the Plan include the following:

- Provide guidance to contractors in the preparation of activity-specific Environmental Work Plans (EWPs) and in their implementation of site/activity-specific accidents or malfunctions management protocols, monitoring and reporting requirements;
- Identify construction activities with the potential to result in an accident or malfunction;
- Provide a comprehensive list of BMPs and mitigation measures related to accidents or malfunctions;
- Reduce the effects of an emergency incident on the environment;
- Verify compliance with all relevant legislation and regulations; and
- Describe the monitoring and reporting requirements for verifying that BMPs and mitigation measures are being implemented as intended and are effective.

The EWPs shall be prepared by the contractor and shall outline the methods to be used to control accidents or malfunctions, and meet applicable regulatory requirements and standards.

A detailed Construction Site Safety Manual (the Manual) shall be prepared for the Project by the contractor based on final design and construction materials and methods. The Manual shall provide an overview of occupational health and safety related to the Project. The Manual shall be prepared in accordance with BMPs and relevant legislation and shall be designed to prevent injuries and occupational diseases from occurring during construction. The Manual shall be readily available on site (e.g., posted on the site office bulletin board and carried in the Site Safety Manager's on-site vehicle), provided to every worker during orientation, referred to in routine safety meetings, and printed in quantities for free handout.

3.0 POTENTIAL ACCIDENTS OR MALFUNCTIONS

Potential reasonably foreseeable accidents or malfunctions associated with the development of the fuel receiving facility and associated piping include:

- Contact with hazardous materials, particulates, fumes and other airborne pollutants;
- Physical trauma from working in or near heavy mobile equipment, vehicles, equipment, and excavations, including cuts, scrapes, punctures, pinching, crushing, amputation, and hearing damage;
- Falling from heights, slipping and tripping;
- Repetitive motion stress, lifting stress, eye strain;
- Allergic and anaphylactic reactions to insect bites, chemicals, foods, etc.;
- Electrocution;
- Accidental spills of deleterious materials, including fuels (refer to CEMP Appendix A9);
- Accidental Fire (refer to CEMP Appendix A9);
- Motor and/or construction vehicle accidents;
- Utility disruption during excavations;
- Road failures;
- Erosion and sediment control failures; and
- Construction equipment malfunctions.

The magnitude of the impact as a result of these accidents or malfunctions would depend on the frequency and/or severity of the event as well as emergency response time and effectiveness. However, most accidents or malfunctions can be avoided with proper system controls and monitoring.

The most common emergency response on construction sites is to various types of spills. The greatest risk of spills during construction will be from petroleum products such as fuels, hydraulic fluids and other such hydrocarbons (usually flammable). Spill response procedures are outlined in the Spill Prevention and Emergency Response Plan (refer to CEMP Appendix A9).

4.0 REGULATORY CONTEXT

All Project-related activities shall be undertaken in compliance with applicable municipal, provincial and federal legislation, regulations, standards and guidelines. Key legislation relating to accidents or malfunctions management includes the following:

- BC Fish Protection Act;
- Canadian Environmental Protection Act;
- Canada Hazardous Products Act;
- Canadian Standards Association (CSA) Z731-03 – Emergency Preparedness and Response;
- Canada Occupational Safety and Health Regulations, S.O.R. 86-304;
- Canada Transport Act, S.C. 1996, c.10;
- City of Richmond Fire Protection and Life Safety Bylaw No. 8306, 2008;
- National Fire Code;
- Environmental Management Act (EMA), Hazardous Waste Regulation, Waste Discharge Regulation and Spill Reporting Regulation;
- Fire Services Act and BC Fire Code Regulation;
- Fisheries Act;
- Safety Standards Act;
- Transport of Dangerous Goods (TDG) Act and Regulations;
- Water Act;
- Waste Management Act;
- Wildfire Act and Wildfire Regulation; and
- Workers Compensation Act, Occupational Health and Safety Regulation, Workplace Hazardous Materials Information System (WHIMS) and Material Safety Data Sheets (MSDS).

5.0 BEST MANAGEMENT PRACTICES AND GUIDELINES

The following BMPs and environmental guidelines shall be followed for all works with the potential to pose an imminent or potential threat to environmental resources or to the safety of the workers and public:

- A Field Guide to Fuel Handling, Transportation and Storage (BC MOWLA, 2002);
- BC Approved Water Quality Guidelines (BC MOE, 2010);
- British Columbia Hazardous Material Response Plan (BC MOE, 2007);

- British Columbia Inland Oil Spill Response Plan (BC MOE, 2007);
- Develop with Care 2014: Environmental Guidelines for Urban and Rural Land Development in British Columbia (BC MOE, 2014);
- Land Development Guidelines for the Protection of Aquatic Habitat (DFO and BC MOELP, 1993);
- Measures to Avoid Causing Harm to Fish and Fish Habitat (DFO, 2013);
- Standards and Best Practices for Instream Works (BC MOWLA, 2004); and
- 2012 Emergency Response Guidebook. CANUTEC (Transport Canada, 2012).

6.0 MITIGATION MEASURES

All works shall be conducted according to relevant legislation, BMPs and mitigation measures outlined in this document. Training of construction personnel is also required so that construction crews understand the sensitivity of particular works. Accidents or malfunctions management measures shall be implemented to mitigate impacts to surrounding environment, as well as for workers and the general public.

The following mitigation measures are recommended for all works with the potential to result in accidents or malfunctions:

6.1 GENERAL

- All work activities shall be in accordance with the contractor's Construction Site Safety Manual, and the CEMP Traffic Management Plan (CEMP Appendix A14), and Spill Prevention and Emergency Response Plan (CEMP Appendix A9);
- Project personnel shall be trained in environmental awareness, spill containment, emergency/spill response and reporting procedures. An environmental reporting and emergency contact list is also provided in the Spill Prevention and Emergency Response Plan (CEMP Appendix A9);
- All hazardous substances shall be properly labelled, stored and contained. Material Safety Data Sheet (MSDS) for each substance shall be available in an easily accessible location;
- All equipment and machinery shall be maintained in good working order, free of leaks, excess oil and grease;
- All construction activities shall occur within the proposed work sites, lay-down area and work locations; and
- Project contact lists with up-to-date contact numbers and emergency/spill response procedures shall be posted at site office(s) and accessible to all personnel.

6.2 ACCIDENTAL SPILLS OF DELETERIOUS MATERIALS

Project works have the potential to result in accidental spills of deleterious materials. In the event of a fuel, oil or spill of other deleterious material, the steps outlined in the Project Spill Prevention and Emergency Response Plan (CEMP Appendix A9) shall be followed.

6.3 ACCIDENTAL FIRE

Project works have the potential to result in fire risks as a result of electrical sparking, welding activities, overheating from friction, and working during high fire risk periods. In the event of an accidental fire on site, the steps outlined in the Spill Prevention and Emergency Response Plan (CEMP Appendix A9) shall be followed.

6.4 EQUIPMENT AND MACHINERY ACCIDENTS

Fixed and mobile equipment shall be used throughout the pre-construction early works. To minimize the potential for an accident or malfunction as a result of machinery and equipment use, the following mitigation measures are recommended:

- Traffic control measures will be implemented as necessary to ensure the safety of all road users and construction personnel and decrease the probability of vehicle collisions;
- Speed limits shall be enforced on site;
- The Contractor shall maintain the common public access road to a standard that allows visitors full access to all public areas without impedance from construction activities;
- In the event of a fuel, oil or spill of other hazardous materials as a result of an equipment malfunction or collision, the steps outlined in the Spill Prevention and Emergency Response Plan (CEMP Appendix A9) shall be followed to secure the site prior to containment and clean-up of the spill; and
- Traffic incidents shall be handled in accordance with the requirements contained in the Project Traffic Management Plan (CEMP Appendix A14). A traffic incident includes motor vehicle accidents, emergency road repairs, disabled vehicles, and debris on the road.

6.5 THIRD-PARTY DAMAGE

To minimize the potential for accidents or malfunctions as a result of third-party access to the site, the following mitigation measures are recommended:

- Access to the Project sites shall be restricted to authorized personnel only. All employees will be required to sign in and sign out on a daily basis. All visitors will be required to check in at the site office on arrival at the site and check out prior to leaving the site;
- All work areas shall be secured and monitored by the Contractor to minimize the potential for unauthorized entry;

- Suitable signage shall be erected to inform the public about the construction activities at all times during the construction works;
- Construction sites shall be secured in accordance with the contractor's Construction Site Safety Manual; and
- Security measures used on site may include the use of security fencing and gates, controlled access, video surveillance and security guards.

6.6 UTILITY DISRUPTION

- Excavations required for site preparation works shall employ standard techniques and protocols, including a review of current GIS information maintained by the City of Richmond;
- Underground water works systems, sanitary sewers, drainage and all other underground utilities shall be located and mapped on detailed design drawings to minimize the likelihood of unexpected disruption;
- Prior to the commencement of any groundworks, the Contractor shall consult "BC One Call" to determine the location of any below-ground facilities at the fuel receiving facility site;
- Project boundaries shall be properly marked to prevent encroachment into unsafe working areas; and
- In the event of a disruption to underground utilities, the City of Richmond and the relevant utility will be contacted immediately and emergency response procedures shall be followed, as outlined in the Spill Prevention and Emergency Response Plan (CEMP Appendix A9).

6.7 CONSTRUCTION SITE SAFETY MANUAL

A Construction Site Safety Manual shall be prepared by the Contractor and shall address site-specific construction safety measures for on-site workers and visitors. The Manual will include the following:

- Site location details;
- A list of anticipated hazards and a procedure to identify, assess, and minimize new unforeseen hazards as they arise;
- Management and safety supervision responsibilities;
- A comprehensive Health and Safety training program, including policies and procedures, for all personnel working on site;
- Appropriate safety training certifications and site orientation for every worker;
- Thorough posting and communication of Health and Safety policies and procedures;
- Full compliance with the health and safety requirements and standards of federal, provincial, regional, and municipal governments;

- An Emergency Response Plan prepared by or in consultation with the medical services provider, including mapped and described emergency routes and site location descriptions (GPS and UTM coordinates, etc.);
- Project contact information from the Spill Prevention and Emergency Response Plan (CEMP Appendix A9);
- Provision for site-wide emergency response drills at least once per year, the first to occur early in the Project when workers and work locations are numerous and areas covered are broad;
- Site orientation, direction and monitoring requirements for every known visitor, including the managers for VAFFC and all contractors, subcontractors, consultants, government inspectors, delivery personnel, administrative personnel, etc.;
- Details of the basic personal protective equipment (PPE) set to be worn by every worker or visitor on site, plus additional PPE specific to the activity, hazards, and weather, unless they are within a vehicle or physical barrier defining the administrative parking and office areas;
- Communication and access protocols, including telecommunication equipment, contact procedures, and provisions for working, walking, or driving alone or in contact with hazard;
- Details of mechanical hazard safeguards, including posted and verbal warnings, monitoring, access restrictions, sealed lockdowns of equipment, authorization of work by trained personnel only, etc.;
- Details of physical barriers and warning signs to keep unauthorized persons away from active and inactive hazardous areas; and
- Employee/management protocols for incident reporting, including investigation of the cause, removal the cause as far as possible, and prevention of reoccurrence, using appropriate methods and training;

7.0 MONITORING

Construction activities with the potential to result in accidents or malfunctions shall be monitored during construction by a Certified Construction Safety Officer (CSO) to verify conformance with Project approvals, applicable legislation, BMPs, mitigation measures and the objectives of this Plan and the detailed site/activity-specific EWPs. Every worker and every Contractor and subcontractor will be responsible to monitor and report potential hazards and observed unsafe acts and conditions to their own direct Supervisor and/or the Project Safety Manager.

The CSO designated by VAFFC shall monitor compliance with the Construction Site Safety Manual and WorkSafe BC requirements. The contractor's Environmental Monitor (EM) will periodically inspect fueling and other hazardous material storage areas for compliance with safe storage and handling requirements.

The EM will assess and document the following accidents or malfunctions management measures on a regular basis:

- Labelling, storage and containment of hazardous and non-hazardous materials on site;

- Spill response materials and equipment;
- Fire prevention and response materials and equipment;
- Posted emergency response procedures and emergency response readiness;
- Adherence to speed limits and construction boundaries on site;
- Documents and recordkeeping, including MSDS, training records, materials and vehicle and equipment maintenance records;
- Site safety and security measures being implemented;
- General site cleanliness and conditions; and
- Mitigation measures being implemented on site.

The EM will provide recommendations to Project personnel, as required to rectify any noted deficiencies. In the event that accident or malfunctions management becomes an ongoing issue, further mitigation measures may be implemented, at the discretion of VAFFCs Environmental Manager.

For works that have the potential to pose an immediate threat to human health and / or the environment, the contractor's Environmental Monitor and VAFFCs Environmental Manager shall have the authority to stop works until such time as impacts can be mitigated. Triggers that may result in a Stop Work Order include the failure to meet the requirements of any of the Project approvals, or other activities that pose an increased risk beyond those contemplated in the CEMP. The Environmental Manager will be available as required to provide strategic advice and/or measures to achieve the desired results for mitigating impacts.

8.0 REPORTING

The monthly environmental monitoring reports prepared by the EM shall include:

- A description of any spills or environmental incidents or emergencies on site;
- Status updates detailing any monitoring and testing conducted following an environmental incident;
- A description of construction activities and associated spill prevention and incident prevention measures that were implemented;
- Documented inspections of fire response equipment and emergency response readiness;
- A description of maintenance checks on existing containment structures and spill response equipment;
- A summary of any time lost due to accidents or equipment malfunctions;
- A summary of any work-related injury and illness treatments, identified specifically as on-site first aid or physician-ordered treatment;
- A description and photos that document any materials storage and handling management issues and corresponding mitigation measures implemented; and
- A status report regarding implementation of all specific mitigation plans.

8.1 ENVIRONMENTAL INCIDENT REPORTING

In the event of an environmental incident, the Contractor shall provide the EM, the Environmental Manager and VAFFC with an Environmental Incident Report as soon as practical (no later than 24 hours after the incident). Spills shall be reported to Emergency Management BC as required under the *Environmental Management Act* Spill Reporting Regulation and/or the *Transportation of Dangerous Goods Act*, in accordance with the Spill Prevention and Emergency Response Plan (CEMP Appendix A9).

The Construction Site Safety Manual will include incident reporting and analysis procedures to be outlined by the Contractor, including providing prompt feedback for immediate and effective use in eliminating hazards. Reportable data shall be submitted internally to VAFFC through the EM and the Project Safety Manager, and externally to government, e.g., WorkSafeBC, in accordance with legislation.

Analysis of reported data will recommend the appropriate response, which may include remedies such as additional safety training and/or revisions to safety procedures, equipment, or materials and methods. Numbers of incidents (numerators) for the overall Project shall be periodically compared with construction industry averages (denominators) for incident frequency.

9.0 REFERENCES

- BC Fire Code Regulation. BC Reg 263/2012.
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VANCOUVER AIRPORT FUEL DELIVERY PROJECT

CEMP AIR QUALITY AND DUST CONTROL MANAGEMENT PLAN

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LIST OF ACRONYMS

BMP	Best Management Practices
EAC	Environmental Assessment Certificate
EM	Environmental Monitor
EWP	Environmental Work Plan
MOE	Ministry of Environment
PMV	Port Metro Vancouver
VAFFC	Vancouver Airport Fuel Facilities Corporation
VFPA	Vancouver Fraser Port Authority

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Andrew Taylor	Port Metro Vancouver	-	-	-	-
Carolina Eliasson	Port Metro Vancouver	-	-	-	-

AMENDMENT RECORD

This report has been issued and amended as follows:

Issue	Description	Date	Approved by	
1	First version of CEMP Air Quality and Dust Control Management Plan	20150501		
2	Second version of CEMP Air Quality and Dust Control Management Plan	20150508		
			Garth Taylor Project Director	Angus Johnston Project Manager

1.0 INTRODUCTION

This Air Quality and Dust Control Management Plan (the Plan) describes construction-related activities for the Vancouver Airport Fuel Delivery Project (the Project) with the potential to impact air quality and/or generate dust. It outlines the methods for mitigating air quality and dust-related concerns, and the monitoring and reporting requirements.

The Plan is based on the recommended mitigation measures, standards and Best Management Practices (BMPs) presented in Vancouver Airport Fuel Facility Corporation's (VAFFCs) application for a Project Environmental Assessment Certificate (EAC), and has been prepared in compliance with the conditions to the EAC and Vancouver Fraser Port Authority's (VFPA doing business as Port Metro Vancouver (PMV)) Environmental Assessment Decision Statement, and relevant legislation.

The focus for this version of the Plan is development of the fuel receiving facility and pipeline sections located on PMV land. The Plan will be further developed as detailed engineering progresses and to address the construction of other Project components.

1.1 OBJECTIVES AND SCOPE

The key objectives of the Plan are to:

- Provide guidance to contractors in the preparation of site/activity-specific Environmental Work Plans (EWPs) and in their implementation of air quality and dust control management protocols, monitoring and reporting requirements;
- Identify Project construction activities that could generate fugitive dust emissions and other airborne emissions;
- Avoid or reduce the potential for adverse effects on human health, vegetation, wildlife and water quality associated with the generation of fugitive dust and other airborne emissions;
- Provide a comprehensive list of BMPs and mitigation measures related to fugitive dust emissions and other airborne emissions;
- Guide compliance with all relevant legislation and regulations; and
- Describe the monitoring and reporting requirements for verifying that BMPs and mitigation are being implemented as intended and are effective.

The EWPs shall be prepared by the construction Contractor and shall outline the methods to be used to maintain air quality and control dust and meet applicable regulatory requirements and standards.

2.0 POTENTIAL ENVIRONMENTAL IMPACTS

Air quality and dust management issues could potentially occur during site preparation, soil excavation, stockpiling, vehicle and equipment operations, transport of materials, and other Project construction activities producing deleterious air emissions and/or fugitive dust.

Activities that have the potential to create dust emissions include:

- Site clearing activities, including grubbing;
- Excavation, handling, and stockpiling of debris and soils;
- Material loading, transfer and unloading;
- Vehicular traffic on temporary unpaved roads;
- Wind erosion from soil stockpiles;
- Track-out from vehicles leaving the site;
- Ground densification works; and
- Most other site activities.

Potential sources of emissions to the atmosphere include:

- Exhaust from vehicles, and other machinery and equipment operations;
- Indirect emissions from the production of cement for use in concrete;
- Liberation of volatile compounds from soil during excavation; and
- Painting the fuel receiving tanks.

Air quality and dust-related issues are expected to be limited in duration to working hours, with the exception of exposed soils, which could potentially generate dust if left uncovered or under dry conditions, and limited to the extent of the site boundaries and major haul roads. Impacts are expected to be low provided that appropriate mitigation techniques are employed during the works.

3.0 REGULATORY CONTEXT

All Project-related activities shall be undertaken in compliance with applicable regional, provincial and federal legislation, regulations, standards and guidelines. Key provincial and federal legislation which may be applicable to Project activities includes:

- *BC Environmental Management Act* (SBC 2003, c. 53);
- *BC Public Health Act* (SBC 2008, c. 28);
- *BC Workers Compensation Act* – WorkSafeBC (RSBC 1996, c.492);
- Canadian Ambient Air Quality Standards (CAAQS) for Fine Particulate Matter and Ozone (CCME, 2013);
- Canadian *Environmental Protection Act* (SC 1999, c. 33);
- Greater Vancouver Regional District Air Quality Management By-law No. 1082, 2008; and
- Greater Vancouver Regional District Non-Road Diesel Engine Emission Regulation Bylaw No. 1161, 2012.

4.0 BEST MANAGEMENT PRACTICES AND GUIDELINES

The following BMPs and environmental guidelines shall be followed for all works with the potential to affect air quality and/or generate dust:

- Air Quality Guidelines for the Protection of Human Health and the Environment (CCME);
- BC Air Action Plan (BC Government, 2008);
- Best Practices for the Reduction of Air Emissions From Construction and Demolition Activities. (Cheminfo Services Ltd. for Environment Canada, Transboundary Issues Branch, March 2005);
- British Columbia Field Sampling Manual for Continuous Monitoring plus the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment and Biological Samples (BCMOWLAP, 2003);
- Develop with Care 2014: Environmental Guidelines for Urban and Rural Land Development in British Columbia (BC MOE, 2014);
- Guidance Document on Achievement Determination Canadian Ambient Air Quality Standards for Fine Particulate Matter and Ozone (CCME, 2012);
- National Ambient Air Quality Objectives (NAAQOs) (CCME, 1999); and
- Provincial Air Quality Objective Information Sheet: British Columbia Ambient Air Quality Objectives (BC MOE, 2014).

5.0 MITIGATION MEASURES

All works shall be conducted according to relevant legislation, BMPs and mitigation measures outlined in this document. Training of construction personnel is also required so that construction crews understand the sensitivity of particular works. Environmental air quality and dust control measures will be implemented to mitigate impacts to surrounding vegetation and wildlife, as well as for workers and the general public.

The following mitigation measures are recommended for all Project site works with the potential to generate fugitive dust and airborne emissions:

5.1 GENERAL

- Care shall be exercised whenever working with chemicals, materials, fuels, liquids, wastes, vehicles, machinery, or equipment that could emit vapours, fumes, particulates, or dusts to air;
- Dust emissions shall be controlled at the source where possible to contain and limit the release of particles to acceptable levels;
- Dust emissions (e.g., from access roads, handling of vegetation or soil debris, and dry soil storage piles) shall be controlled as necessary by application of water. Any water diversion for this purpose shall be in accordance with applicable legislation and required permits;

- No open burning shall occur on site unless permitted;
- Dust-generating activities shall be reduced during high wind conditions; and
- Low VOC content paints shall be used on the fuel receiving tanks to reduce the amount of VOCs released into the atmosphere during painting.

5.2 SITE PREPARATION

To minimize the potential impacts of site preparation works, the following mitigation measures are recommended:

- Clearing and grubbing shall be restricted to the immediate area required for the specific site works;
- Handling of soils shall be minimized where possible (e.g., by avoiding double handling of spoil);
- Disturbed soils will be compacted, where practical; and
- Surfaces of completed earthworks and/or bare areas shall be stabilized with vegetation, stones, geotextile, mulch or other erosion resistant cover.

5.3 MATERIAL EXCAVATION, HANDLING, STORAGE AND TRANSFER

Material excavated during site preparation works shall be transferred directly to loading trucks for disposal at the landfill/ sand/ soil disposal sites. Material not suitable for disposal may be temporarily stockpiled on site prior to removal from site to an approved disposal facility in accordance with applicable legislation, regulations, standards and guidelines. Dredged river sand shall be pumped directly to the site for use as backfill material. Granular materials to be used for the densification columns shall be imported to the site from certified suppliers. This backfill and granular material may be temporarily stored on site prior to infilling.

To minimize the potential impacts of material excavation, handling, storage and transfer, the following mitigation measures are recommended:

- Loading and unloading shall take place downwind of stockpiles where practical;
- Drop heights shall be minimized when loading soil onto haul trucks;
- Dry soil storage piles and long-term exposed surfaces shall be covered and/or wet down to prevent blowing dust and debris;
- Trucking loads shall be optimized and planned to minimize the length and number of required trips; and
- Mud and dirt track-out on the public road shall be monitored. Street cleaning (e.g., wet-broom cleaning and/or street sweeper) shall be conducted for paved roadways when necessary.

5.4 ROAD SURFACES

Mobile equipment travelling on unpaved roads on site has the potential to create fugitive dust emissions. To minimize the generation of fugitive dust, the following mitigation measures are recommended:

- Speed limits shall be imposed on unsealed roads to minimize dust generation on all unsealed surfaces;
- Water spray shall be used, when necessary, on access roads, temporary and permanent unsealed roads, lay-down areas, and during equipment movement for truck loading/unloading, site clearing, stockpiling materials, excavating etc.;
- The use of chemical dust suppressants such as calcium lignosulphate, sodium lignosulphate, or magnesium chloride shall not be permitted on site without the prior approval by the Environmental Manager and upon written approval by the Ministry of Environment (MoE); and
- Wheel wash facilities shall be installed, as required, at the entrance/exit to the work site.

5.5 MACHINERY, EQUIPMENT AND VEHICLES

Fixed and mobile equipment and machinery shall be used throughout the Project site works. To minimize the potential impacts of machinery and equipment, the following mitigation measures are recommended:

- Daily inspections of equipment (including exhaust systems) shall be conducted;
- On-site vehicle restrictions shall be implemented to limit dust generation (e.g., limit the speed of vehicles travelling on unpaved haul roads);
- All diesel and gasoline-powered vehicles and equipment shall be maintained to manufacturers' guidelines to maximize efficiency. A preventative maintenance program shall be implemented for all diesel and gasoline-powered equipment (e.g., 500 hours or sooner if required by manufacturer);
- All equipment shall be fit with standard emission control devices in compliance with federal, provincial, regional district, and municipal regulations and standards;
- Where practicable and when fuel quality permits, diesel particulate matter filters shall be used in construction equipment and vehicles;
- Heavy duty diesel powered road licensed vehicles used during construction shall be model year 2007 or newer where possible;
- Nonroad diesel engines used during construction shall meet U.S. Environmental Protection Agency Tier 2 Emissions Standards at a minimum. Every effort shall be made to use Tier 3 equipment or better where possible;
- Where practical, commercially available fuel additives, catalysts or oxidizers shall be used to increase the combustion efficiency of diesel engines in construction equipment and thereby reduce emissions of CO₂, SO₂ and NO_x;

- Ultra-low sulphur diesel shall be used in diesel powered stationary equipment (e.g., compressors, generators, etc.);
- Combustion engines shall be maintained and inspected regularly. Any parts showing excessive signs of wear or malfunction shall be promptly replaced. Electric equipment shall be used when possible;
- Equipment shall only be used for its intended purpose and within rated load capacities; and
- Vehicle and equipment idling time shall be restricted and minimized during construction in accordance with regional bylaws. Employees shall be required to turn off vehicles or heavy equipment when not in use. Idle reduction initiatives will be communicated and encouraged during site orientations and health and safety, tailboard and progress meetings.

6.0 MONITORING

Construction activities with the potential to affect air quality or create dust emissions shall be monitored full time by the contractor's Environmental Monitor (EM) to verify conformance with Project approvals, applicable legislation, BMPs, mitigation measures and the objectives of this Plan and the detailed site/activity-specific EWPs. Every worker and every Contractor and subcontractor shall be responsible to monitor and report potential hazards and observed unsafe acts and conditions to their own direct Supervisor and/or the Project Safety Manager.

The EM shall assess and document the following on a daily basis:

- Visible dust or odour generation on site;
- Surface conditions (moisture content and/or covering) of exposed stockpiles and soils;
- Surface conditions of public roadways;
- Idling time of inactive vehicles and equipment;
- Condition of equipment and detectable (sight, smell) air emissions; and
- Mitigation measures being implemented on site.

The EM will provide recommendations to Project personnel, as required to rectify any noted deficiencies. In the event that air quality or dust generation becomes an ongoing issue, further monitoring against the Provincial air quality objectives may be implemented, at the discretion of the Environmental Manager.

For works that have the potential to pose an immediate threat to air quality, the contractor's EM and VAFFCs Environmental Manager shall have the authority to stop works until such time as impacts can be mitigated. Triggers that may result in a Stop Work Order include the failure to meet the requirements of any of the Project approvals, or other activities that pose an increased risk beyond those contemplated in the CEMP. The Environmental Manager will be available as required to provide strategic advice and/or measures to achieve the desired results for mitigating impacts.

7.0 REPORTING

The monthly environmental monitoring reports prepared by the EM shall include:

- A description of site activities and associated air quality and dust control measures that were implemented;
- A description of maintenance checks on vehicles and equipment;
- A description and photos that document any air quality or dust management issues and corresponding mitigation measures implemented; and
- A status update regarding implementation of all specific mitigation plans, including air quality management and dust control plans.

Environmental personnel shall be responsible for submitting incident reports, should construction activities result in deleterious air emissions and/or excess fugitive dust emissions.

8.0 REFERENCES

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VANCOUVER AIRPORT FUEL DELIVERY PROJECT

CEMP ARCHAEOLOGICAL MANAGEMENT PLAN

Prepared for:

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Appendix A1	Archaeological Resource
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LIST OF ACRONYMS

AIA	Archaeological Impact Assessment
AMP	Archaeology Management Plan
AOA	Archaeological Overview Assessment
BC	British Columbia
BC EAA	British Columbia Environmental Assessment Act
BC HCA	British Columbia Heritage Conservation Act
CEMP	Construction Environmental Management Plan
CMT	Cultural Modified Tree
EAO	Environmental Assessment Office
FPPR	Forest Planning and Practices Regulation
FRPA	Forest and Range Practices Act
MFLNRO	Ministry of Forests, Lands and Natural Resource Operations
VAFFC	Vancouver Airport Fuel Facilities Corporation

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Angus Johnston	Hatfield Consultants	-	-	✓	-
Andrew Taylor	Port Metro Vancouver	-	-	-	-
Carolina Eliasson	Port Metro Vancouver	-	-	-	-

AMENDMENT RECORD

This report has been issued and amended as follows:

Issue	Description	Date	Approved by
1	First version of CEMP Archaeological Management Plan	20150501	
2	Second version of CEMP Archaeological Management Plan	20150511	
			Garth Taylor Project Director
			Angus Johnston Project Manager

1.0 INTRODUCTION

This Archaeological Management Plan (the Plan or AMP) describes how archaeological and heritage resources will be managed during construction of the Vancouver Airport Fuel Delivery Project (the Project). The Plan describes the procedures for managing these resources within the Project development areas previously identified during the environmental assessment review as having a moderate or high potential for encountering archaeological resources.

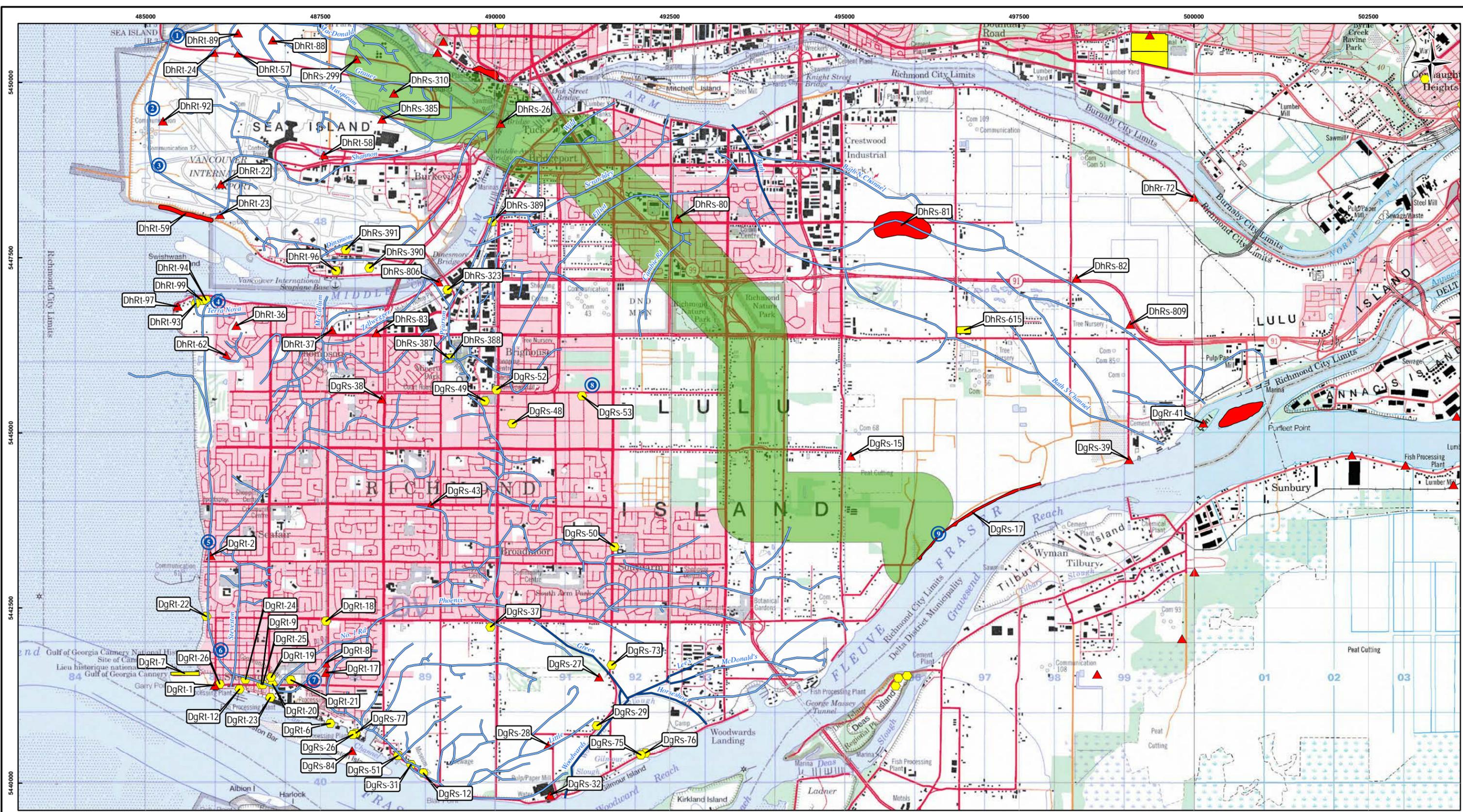
The focus for this version of the Plan is on conducting an archaeological impact assessment (AIA) for the development of the fuel receiving facility and pipeline sections located on PMV land. The Plan will be further developed as detailed engineering progresses and to address the construction of other Project components.

The AMP will be revised as necessary to include results of discussions with government agencies and First Nations communities, and to include any new archaeological and heritage resource discoveries that may occur in the Project development area (Figure 1). The main issues for consideration under archaeological and heritage resources management are:

- Potential loss of archaeological and heritage resources and information;
- Use of best practical design and management practices to identify, avoid and protect archaeological and heritage resources where possible, and mitigate where not possible;
- Ensuring all employees and contractors are aware of their legal requirements for archaeology and heritage protection; and
- Consultation on heritage mitigation concerns and options with the Archaeology Branch and with First Nations communities.

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Figure 1 AIA local study area.



Legend

- FN Traditional Places
- ▲ Archaeological Site
- Archaeological Site Boundary
- Historic Heritage Site
- Historic Heritage Site Boundary
- AIA Local Study Area

Sloughs

- Historic (1880)
- Existing

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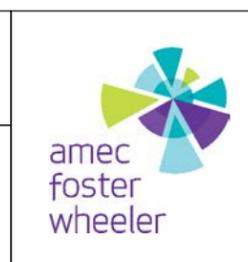
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PROJECT:	Vancouver Airport Fuel Delivery Project	PROJECT NO:	VE15400
TITLE:	AIA Local Study Area: Historic Sloughs, First Nations Traditional Places and Archaeological Sites	REVISION NO:	
		DATE:	April, 2015
		SHEET NO:	
		DRAWING NO:	Figure 1

2.0 OBJECTIVES AND SCOPE

The objective of the AMP is to provide measures for the avoidance and/or protection of potentially existing, or as yet undiscovered, archaeological and heritage resources in the Project development area.

Effort will be focused on areas identified during the archaeological overview assessment (AOA) (AMEC 2011) as having moderate to high potential for encountering archaeological remains (Table 1).

Table 1 Archaeological monitoring locations.

Archaeological Site	Development Location ¹	Monitoring Objectives
DgRs-17 – Known midden deposit located under and on the river side of the dyke.	Fuel Receiving Facility	Monitor ground disturbance activities for drainage, soil preparation, site utilities, drainage system, sprinkler system, pipeline, other associated disturbance in non-fill sediments to sterile fluvial deposits

¹ Revisions outside of Project study area boundary will result in notification of change to Heritage Inspection Permit.

The Project development area will be updated as necessary to include future assessment results for any additional Project facilities, and for any modifications of facilities already assessed.

3.0 POTENTIAL ARCHAEOLOGICAL IMPACTS

3.1 POTENTIAL SITE TYPES

Archaeological sites are defined according to the types of archaeological remains (i.e., artifacts and cultural features) present, and according to the types of traditional activities presumed to have taken place at the site. A particular site can be comprised of one or more of these types of archaeological remains, and generally speaking, it is expected that larger sites will be more complex than smaller ones.

The kinds of archaeological resources that can be expected in Fraser Delta environmental settings include:

- **Middens:** The most abundant archaeological remains in coastal settings, middens represent the physical remnants and refuse of ancient villages or seasonal resource-harvesting camps. Coastal middens typically consist of abundant shellfish remains in a matrix of charcoal-rich black loam, fire-altered rocks, ash, fish, bird, and mammal bones, artifacts, and cultural features such as fire-hearths or post-moulds. Middens in inland aquatic settings near the Fraser River or its associated distributaries will have similar constituents, but usually with fewer shellfish remains. Middens frequently were used as burial places by First Nations' people.
- **Artifact scatters:** These sites are usually comprised exclusively of stone artifacts, representing transitory occupation of riparian or inland environmental settings, oriented toward the exploitation of particular resources. The most common archaeological remains at such sites are chipped or ground stone tools, along with the waste products of stone-tool manufacture ("debitage"). Fire-altered rocks and localized spreads of charcoal and ash from cooking fires are sometimes present.

- **Burial Places:** Burial places are locations that were used by First Nations' people to inter their dead. Most frequently, they occur within middens, though were rarely interred at the same time as the midden itself was accumulating. In the period immediately prior to Contact with European traders, First Nations communities were disposing of their dead in above-ground settings, which leave few remains for the archaeological record. Between the time that midden burials were abandoned and the full adoption of surficial interment, a few Aboriginal communities in this area buried their dead in earthen mounds that usually covered a stone substructure.
- **Wetsites:** A specialized combination of environmental factors can produce a waterlogged archaeological deposit known as a wetsite. These sites only occur in fine-textured, permanently saturated sediments. They are renowned for exceptional preservation of ordinarily perishable artifacts, such as basketry, matting, cordage, and wooden implements (e.g., yew-wood wedges). Wetsites are normally associated with still-water environments such as sloughs or distributary channels along a river, and are often found near a villages or large seasonal encampments.
- **Fish Weirs:** These are wooden structures built to capture fish in marine environments or inland waters. Fish weirs are generally rare in the archaeological record, but several have been documented from the Fraser Delta area, including Lulu Island (Eldridge and Mackie 1993). In the field, fish weirs are defined by the presence of wooden stake remnants in backwater channels, sloughs, or on river foreshores.
- **Ceremonial/Spiritual Sites:** The *Stó:lō Nation Heritage Policy* (Stó:lō Nation 1995) identifies a class of cultural heritage sites that may or may not contain physical evidence of past land use, but are nevertheless of considerable importance to contemporary communities. In the territories of the Halkomelem-speaking peoples, they include (i) **Transformer sites**, which are “stone people” (e.g., prominent boulders) or places associated with the actions of the Transformer, *XeXá:ls*; (ii) **spirited places**, or those which are inhabited by spirits; (iii) **ceremonial sites**, places or locations which are important to past and present ceremonial life; and (iv) **cultural resource sites**, or places where materials used for ceremonials or spiritual activities are collected.
- **Trails:** These are routes that were used in pre-Contact or historic times to provide access to portages between waterways, or landward access to resource-procurement locations.
- **Historic Sites:** These sites are comprised of post-Contact remains, including artifacts, structures, and features of Euro-Canadian or Asian-Canadian manufacture, and denote settlement and land use in the historic period. In the Fraser Delta, historic sites are most likely to be associated with late-19th and early-20th century homesteading and agricultural enterprises.

Three types of archaeological sites have been identified within the Lulu Island - Sea Island project locality and potentially could be encountered in the lands that will be affected by Project works: (1) midden deposits; (2) scatters of stone artifacts, sometimes accompanied by fire-altered rocks; and (3) burial places. Table 2 summarizes information about where such archaeological resources may be encountered within or in proximity to Project works on the site. With the exception of DgRs-17, there are no known archaeological sites in close proximity to the Project site.

Table 2 Potential archaeological sites within the project facility development area.

Type	Examples of Similar Archaeological Sites	Environmental Setting(s)	Where Likely Encountered?	Potential
Midden deposit	DgRs-17; DgRt-2; DhRs-26	Natural levees beside Fraser River; inland, beside slough channels	Fuel storage site at South Arm	Moderate
Artifact scatter	DgRs-28; DhRs-80; DhRt-89	All environment types in project locality	South Arm foreshore; slough crossings	High
Burial place	DgRt-8; DhRs-299; DhRt-22	Midden deposits; traditional village or house sites	<i>Possibly</i> proposed fuel storage facility at South Arm	Low

3.2 POTENTIAL PROJECT IMPACTS

The overview of heritage resources suggests that prehistoric archaeological resources at the fuel receiving facility site could possibly be affected by the Project. The fuel receiving facility and associated piping will be situated on land that was essentially undisturbed bog habitat prior to its capping by several meters of fill in the past decade. Based on previous archaeological investigations (Carl 1974; Kenny 1975 and Ham 1987) there would seem to be only a slight chance that site excavations for the fuel storage facility would be deep enough to encounter native soils in which archaeological remains attributable to the *t'ektines* midden (i.e., DgRs-17) might be present.

Project activities with the potential to impact archaeological sites include:

- Ground alteration in the form of clearing;
- Ground leveling of original/parent sediments;
- Excavation of parent material (natural sediments) during removal of historic fill material;
- Placement of piles;
- Excavation of pipeline trenches; and
- Construction of lay-down locations, storage locations, and other temporary construction facilities.

4.0 REGULATORY CONTEXT

Legislation pertaining to archaeological resources includes the *Heritage Conservation Act (HCA)* (Government of BC, 1996), and the *BC Environmental Assessment Act (EAA)* (Government of BC, 2002). Archaeological resources are automatically protected under Section 13 of the *HCA*, which specifies that an individual (or corporation) must not “damage, excavate, dig in, or alter or remove any heritage object” (Government of BC, 1996) from an archaeological site, except in accordance with a permit issued by the Minister. Archaeological resources are:

- Archaeological sites occupied or used before 1846;

- Aboriginal rock art with historical or archaeological value;
- Burial places with historical or archaeological value;
- Heritage ship and aircraft wrecks; and
- Sites of unknown attribution that could have been occupied prior to 1846.

The *HCA* confers automatic protection upon archaeological sites that pre-date A.D. 1846, or undated sites that could pre-date 1846, regardless of whether they are recorded in the Provincial Heritage Register Database, and regardless of whether they are situated on Crown land or on fee-simple private property. Post-1846 historic remains can be protected by Ministerial order or Designation by an Order-in-Council, as well as by municipal designations. Section 36 of the *HCA* provides for penalties against violations of section 13; upon conviction of an individual, a fine up to \$50,000 can be imposed, or a term of imprisonment up to two years, or both. For corporations, a fine of up to \$1,000,000 could be imposed, and individuals acting on behalf of corporations may also be subject to the same penalties assessed against unaffiliated individuals.

Additional legislation includes the *Forest Act* (Government of BC, 1996) which defines a cultural heritage resource as “an object, a site, or the location of a traditional societal practice that is of historic, cultural, or archaeological significance to British Columbia, a community or an Aboriginal people.” Section 10 of the *Forest Planning and Practices Regulation (FPPR)* further refines the definition of a cultural heritage resource under the *BC Forest and Range Practices Act (FRPA)* (Government of BC, 2002). The *FPPR* states the following objective set by government:

to conserve, or, if necessary, protect cultural heritage resources that are (1) the focus of a traditional use, by an aboriginal people, and that are of continuing importance to that people; and (2) not regulated under the Heritage Conservation Act”; (Forest and Range Evaluation Program 2013).

Examples of cultural heritage resources include:

- Culturally modified trees (CMTs), trail blazes, traps, and traplines that postdate 1846 A.D. and are not protected under the *BC HCA*.

In addition, palaeontological finds are considered heritage resources and include:

- Fossil and fossil sites as defined by the Land Tenures Branch of the BC Ministry of Forests, Lands and Natural Resource Operations (MFLNRO).

5.0 BEST MANAGEMENT PRACTICES AND GUIDELINES

According to standard practice in BC, an AIA is the appropriate research study required to identify and evaluate archaeological resources within the lands that will be affected by the Project. As stated previously, the scope of the AIA is guided by site-specific evaluations of archaeological resource potential within the site. Table 3 summarizes the purpose and requirements of an AIA. Given the results of the previously conducted AOA (refer to Chapter 7 of the EAC Application) and the nature of the Project site, the AIA will take place during Project construction works (as required by the EAC conditions).

Table 3 Best practices for addressing archaeological mitigation measures.

Recommended Action	Purpose
Conduct an archaeological impact assessment	Regulatory compliance with <i>Heritage Conservation Act</i> Identification and evaluation of archaeological resources Provide site-specific recommendations for protecting and/or mitigating unavoidable impacts to archaeological resources

5.1 HERITAGE INSPECTION PERMIT

The AIA is expected to be conducted in the summer – fall of 2015 under a forthcoming Heritage Inspection Permit (Application Number #15A0119), to be issued by the Archaeology Branch in June 2015. The AIA will initially focus on the site located on PMV land. Further AIA work will be conducted within the Project development area as identified in the scope of the Heritage Inspection Permit (Figure 1).

5.2 HERITAGE INVESTIGATION AND SITE ALTERATION PERMITS

The AIA will be conducted concurrently with site activities. If archaeological sites protected under Section 9 or 13 of the BC *HCA* are identified, they cannot be altered or changed in any manner without a permit issued by the minister or designate.

If protected sites are identified and will be affected by the Project, avoidance through redesign is the recommended course of action. However, if redesign is not feasible, then mitigation (potentially including controlled scientific excavation) shall take place. The forthcoming Heritage Inspection Permit to be issued under Section 14 of the *BC HCA* will allow for archaeological investigation to recover information that might be lost as a result of land-altering activities within the site. However, depending upon the assessed significance of identified archaeological sites, a Heritage Investigation Permit issued under Section 14 of the *BC HCA* may be required and must be obtained to undertake archaeological investigations to recover information that might be lost as a result of land-altering activities within the site.

In addition, a Site Alteration Permit would be required under Section 12 of the *BC HCA* prior to affecting a protected site. A Site Alteration Permit is issued to a proponent and project archaeologist to authorize removal of residual archaeological deposits once an inspection and investigation are completed (Archaeology Branch, 1998).

All protected archaeological resources in BC are managed using the following guidelines:

- British Columbia Archaeological Impact Assessment Guidelines (Archaeology Branch, 1998a);
- British Columbia Archaeological Inventory Guidelines (Resource Inventory Committee, 2000); and
- Culturally Modified Trees of British Columbia: A Handbook for the Identification and Recording of Culturally Modified Trees (BC Ministry of Small Business, Tourism and Culture, 2001).

6.0 MITIGATION MEASURES

6.1 PROPOSED METHODS – DEEP TESTING

The AOA determined that industrial, residential, and transportation development has altered landscape integrity within the Project area, and that significant overburden lies atop native soils on the site. As such, the AIA shall coincide with excavation activities at locations previously identified as having moderate to high archaeological potential (refer to Table 2 Potential archaeological sites within the project facility development area). Ground-altering site activities shall be monitored with procedures adhering to those identified in the Archaeological Impact Assessment Guidelines (Archaeology Branch 1998a) and the British Columbia Archaeological Resource Management Handbook (Archaeology Branch 1998b).

Archaeologists shall be onsite to monitor excavations of peat-bearing sediments and the organic silt/clayey silt layer containing trace organics, and shall continue until deltaic sands have been reached within 1 m of the original peat layer or the organic silt layer. Where appropriate, sediments shall be stockpiled and screened, sorted, or raked until a representative sample (10%) has been examined.

Artifacts and other cultural materials (e.g., faunal remains, fire-broken rock) encountered during excavations or observed on the surface shall be recorded as to location, type and material. Artifacts and faunal remains recovered shall be collected and taken to Amec Foster Wheeler's Burnaby office for analysis and description. Samples of charcoal or archaeological sediments may be collected for radiocarbon dating or other analyses.

Emergency management procedures shall be implemented if ancestral remains or significant intact archaeological remains are encountered and construction activities on the site shall be temporarily halted. Should ancestral remains be encountered, the Archaeology Branch and relevant First Nation communities shall be contacted as soon as the discovery location is secured and/or stabilized. Recovery and disposition procedures shall follow the Archaeology Branch Found Human Remains Policy Statement (MFLNRO, 1999) as well as applicable First Nation protocols and guidelines.

Should other significant archaeological remains be encountered, and if the excavation footprint is safe to enter, systematic data recovery (see below) shall be employed. If the excavation footprint is unsafe to enter and human remains are not present, surveillance and collection of materials from machine excavations shall continue.

A chance-find protocol will also be employed (Appendix A1), should archaeological remains be observed in areas not identified as having moderate to high potential. The protocol shall involve the halting of excavations in the find location until an archaeologist can assess the site.

6.2 PROPOSED METHODS – SYSTEMATIC DATA RECOVERY

If significant intact archaeological remains are encountered, and the excavation area is safe to enter (e.g., compliant with ground disturbance legislation and local conditions) or can be made safe (e.g., with shoring or stepped according to ground disturbance legislation), then systematic data recovery may be employed. Depending on the observed or suspected extent of archaeological remains, excavation units measuring 1 m by 1 m, 1 by 50 cm, or 50 cm by 50 cm shall be laid out on exposed sediments and recorded as to their location. Tests shall be dug in arbitrary 5 cm or 10 cm levels or by stratigraphic layers using trowels or shovels. Sediments shall be screened through 6-mm mesh and recorded following procedures listed below.

7.0 MONITORING

Monitoring shall be undertaken to ensure that adverse Project impacts on archaeological sites which could not be predicted or evaluated prior to construction are addressed. Project actions that may unexpectedly expose and disturb recorded as well as previously unknown sites warrant at least periodic monitoring. In addition, monitoring shall be undertaken to assess the effectiveness of mitigation measures, as well as the magnitude, severity or duration of an impact (Archaeology Branch 1989)

The contractor's Environmental Monitor (EM) shall be responsible for ensuring that any identified heritage resource sites are avoided, protected, and monitored. Monitoring procedures to be followed during construction shall include the following:

- Monitoring of heritage resources shall refer to the Project plans and drawings updated by the heritage professional (refer to Appendix A1 Section 1.4.2);
- Identification, recording, removal, and reporting of artifacts or features from identified heritage resource sites shall be conducted under supervision of the heritage professional under Permit issued by the Archaeology Branch; and
- Exposure and identification of previously unidentified heritage resources shall automatically result in implementation of the Chance Find Procedure (CFP) (described in Appendix A1).

8.0 REPORTING

8.1 PROGRESS REPORTS

The heritage professional (permit holder) shall prepare progress reports to verify that Project environmental management personnel are informed about the status of heritage resource investigations. During construction, or as needed, the heritage professional shall submit progress reports during active periods of heritage resources investigation, monitoring, and data recovery. All reports shall be submitted to VAFFC's Project and Environmental Managers.

8.2 INTERIM REPORTS

If archaeological monitoring under a Site Alteration Permit is required, an Interim Report shall be submitted to the Archaeology Branch as one of the permit conditions. The report shall include the following information:

- A summary of construction activities within or near any archaeological site;
- Any non-compliant activities and subsequent work stoppages, mitigation actions, and/or rectifying measures;
- Unanticipated archaeological concerns and executed mitigation strategies; and
- Incident reports describing specific archaeological issues.

8.3 ARCHAEOLOGY PERMIT REPORT

The Archaeology Branch requires submission of a Permit Report for inspection, investigation, or alteration conducted under a BC HCA permit for heritage resources. The heritage professional (permit holder) shall submit a final report to the Archaeology Branch when all investigations for the given permit have been completed.

9.0 REFERENCES

Archaeology Branch, 1998a. British Columbia Archaeological Impact Assessment Guidelines, Ministry of Small Business, Tourism And Culture. Victoria, B.C.

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[MFLNRO] Ministry of Forests, Lands and Natural Resource Operations, 1999. Found Human Remains Policy Statement. Online: https://www.for.gov.bc.ca/archaeology/policies/found_human_remains.htm#policy_statement

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APPENDICES

Appendix A1

**Archaeological Resource
Chance Find Procedures**

A1.0 ARCHAEOLOGICAL RESOURCE CHANCE FIND PROCEDURE

A1.1 INTRODUCTION

The main issues for consideration under archaeological resource management are:

- Potential loss of archaeological resources and information during construction;
- Use of best project design and management practices to ensure archaeological resources are identified, avoided, or protected where possible, and mitigated where not;
- Ensuring all employees and contractors are aware of their legal requirements for archaeology and heritage protection; and
- Transparent consultation on archaeological mitigation concerns and options with the Archaeology Branch, and with First Nations communities.

A1.2 OBJECTIVE

The objective of the Chance Find Procedure (CFP) is to provide for the avoidance and/or protection of archaeological resources in the Project development area, whether already discovered, or potentially existing and as yet undiscovered.

A1.3 REGULATORY BACKGROUND

Legislation pertaining to archaeological resources includes the *Heritage Conservation Act (BC HCA)* (Government of BC, 1996), and the *BC Environmental Assessment Act (BC EAA)* (Government of BC, 2002). Archaeological resources are automatically protected under Section 13 of the *BC HCA*, which specifies that an individual (or corporation) must not “damage, excavate, dig in, or alter or remove any heritage object” from an archaeological site, except in accordance with a permit issued by the Minister (Government of BC, 1996).

Archaeological resources are:

- Archaeological sites occupied or used before 1846;
- Aboriginal rock art with historical or archaeological value;
- Burial places with historical or archaeological value;
- Heritage ship and aircraft wrecks; and
- Sites of unknown attribution that could have been occupied prior to 1846.

A1.4 MANAGEMENT FOR AS-YET-UNDISCOVERED ARCHAEOLOGICAL RESOURCES

As the Project develops, archaeological resources may be discovered through further assessment or through chance encounters.

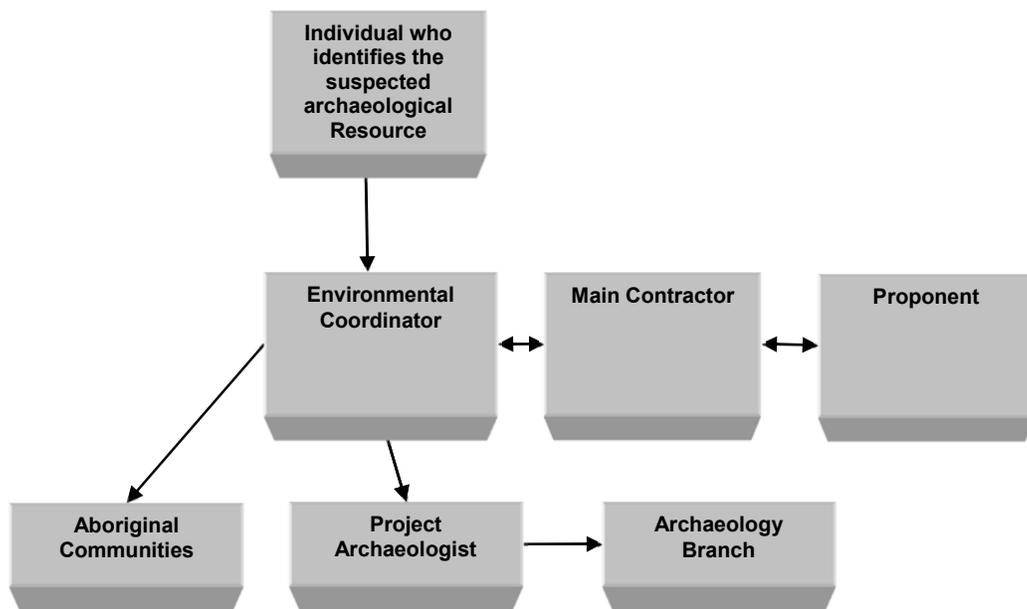
If the Project development area is modified to include locations not already assessed through the Archaeological Overview Assessment, a heritage professional (qualified archaeologist) will assess the new locations. If areas are determined to have moderate to high potential for archaeological or historic heritage resources, an archaeological impact assessment may be conducted.

Communication of any potential heritage resource discovery will follow the reporting structure shown in Figure A1 to ensure that all levels of management are made aware of the discovery.

Management for potential discoveries will include the following responsibilities:

- The proponent and the proponent’s heritage professional are responsible for obtaining permits, and advising on methods and procedures;
- Managers will ensure that all employees are informed of corporate heritage policies, commitments, procedures, and plans. Managers will be responsible for the performance of the people and facilities under their control; and
- Contractors, subcontractors, and visitors are required to adhere to legislative requirements, procedures, and policies identified by the proponent, such as the CFP.

Figure A1 Chain of communication for management of heritage resources.



The chain of communication for management of heritage resources will refer to the list of contacts shown in Table A1.

Table A1 Contact list for chance finds.

Organization/Title	Person	Phone	Email
Project Manager	TBD	TBD	TBD
Main Contractor	TBD	TBD	TBD
Environmental Monitor	TBD	TBD	TBD
Project Archaeologist	TBD	TBD	TBD
Aboriginal Community 1*	TBD	TBD	TBD
Aboriginal Community 2*	TBD	TBD	TBD
Aboriginal Community 3*	TBD	TBD	TBD

TBD = to be determined

*Identificatin of relevant aboriginal community dependant upon location of chance find.

A1.4.1 Types of Potential Heritage Resources Discoveries

The Project development area could contain protected archaeological resources such as:

- Isolated or small clusters of artifacts, such as stone (lithic) tools, tool fragments, and lithic flakes and debris associated with tool making, along with bone, antler, and wooden artifacts. Other items that may be identified are fire-cracked rocks from camps and cooking fires;
- Historic remains such as metal, glass, and ceramic fragments;
- Burial places; and
- Other types of artifacts or sites.

A1.4.2 Protection of Potential Archaeological Sites

Protection of potential archaeological sites that may be impacted by works onsite will be managed using the following procedures:

- A heritage professional will review all Project plans and drawings to ensure that construction areas have been assessed for archaeological potential;
- Project plans and drawings will be marked to identify any sites of archaeological sensitivity that require protection or monitoring;
- Changes to Project plans and drawings will be reviewed on an ongoing basis to ensure that all areas affected by the Project have undergone an archaeological overview assessment; and
- If new sites are discovered, all parties will be involved to determine the scope of further work or impact management.

A1.4.3 Monitoring of Potential Heritage Resources Sites

The EM will be responsible for ensuring that any identified heritage resource sites are avoided, protected, and monitored. Monitoring procedures to be followed during the life of the Project will include the following:

- Monitoring of archaeological resources will refer to the Project plans and drawings updated by the heritage professional (refer to Archaeological Overview Assessment report);
- Identification, recording, removal, and reporting of artifacts or features from identified archaeological sites will be conducted under supervision of the heritage professional under Permit issued by the Archaeology Branch; and
- Exposure and identification of previously unidentified archaeological resources will automatically result in implementation of the CFP (described below).

A1.5 CHANCE FIND PROCEDURE

If a suspected archaeological resource or site is found, the person who made the find will immediately report it to the EM (or to any other supervisory personnel if the EM is not present). The EM will immediately ensure protection of the site against further disturbance, including stopping work and having equipment moved away from the site. The environmental monitor will also immediately communicate the find following the chain of communications as shown in Figure A1, using the contacts listed in Table A1.

Any found artifact must not be removed from the site until proper procedures have been implemented by a professional archaeologist. Any inspection, investigation, or site alteration by a heritage professional will require permitting under the BC *HCA*, as described in Section AA1.3 (Regulatory Background).

The EM will implement subsequent measures of the CFP, as follows:

- An Archaeology Chance Find Recovery Form will be completed by the person who identified the potential heritage resources, or by the EM or construction manager. The completed form will be maintained on file in the Project's administrative office, and will contain the following basic information:
 - Date (when the find was encountered);
 - Observer (name of the person recording the information about the find);
 - Find location (detailed enough so that it can be located again; Global Positioning System (GPS) coordinates if possible);
 - Type of find (e.g., type of archaeological discovery: stone, bone, wood etc.);
 - Description of the obvious disturbance to the find (by equipment, etc.); and
 - Photographs.
- The EM will provide details and photographs of the suspected find to an archaeological professional, who will make a preliminary assessment of the find;

- If the find is deemed significant, the archaeological professional will conduct a site survey and further document the find. The archaeological professional will assess the significance of the find and its location, and recommend options for mitigation. The archaeological professional will submit recommended options to the appropriate government agency (Archaeology Branch, Proponent, Client,) and affected Aboriginal communities for review. The archaeological professional will determine agreement for mitigation in consultation with the appropriate government agency and affected Aboriginal communities;
- Should suspected human remains be discovered, procedures would follow the Archaeology Branch Policy Statement “Found Human Remains” (Archaeology Branch, 1999). Local law enforcement will also be informed in the event of found human remains; and
- Once the find is evaluated and mitigated to the satisfaction of the regulatory authorities and the site has been cleared, construction activities may recommence.

A1.5.1 Progress Reports

The archaeological professional (Heritage Inspection and/or Site Alteration permit holder) will prepare progress reports to ensure that Project environmental management personnel are informed about the status of archaeological resource investigations. During construction, or as needed, the archaeological professional will submit progress reports during active periods of archaeological investigation, monitoring, and data recovery. All reports will be submitted to the EM for distribution to the Project manager, Proponent and the Archaeology Branch.

A1.5.2 Interim Reports

If archaeological monitoring under a Site Alteration Permit is required, an Interim Report will be submitted to the Archaeology Branch as one of the permit conditions. The report will include the following information:

- A summary of construction activities within or near any archaeological site;
- Any non-compliant activities and subsequent work stoppages, mitigation actions, and/or rectifying measures;
- Unanticipated archaeological concerns and executed mitigation strategies; and
- Incident reports describing specific archaeological issues.

A1.5.3 Archaeology Permit Report

The Archaeology Branch requires submission of a Permit Report for inspection, investigation, or alteration conducted under a *BC HCA* permit for heritage resources. The archaeological professional (permit holder) will submit a final report to the Archaeology Branch when all investigations for the given permit have been completed.



VANCOUVER AIRPORT FUEL DELIVERY PROJECT

CEMP CONTAMINATED SITES MANAGEMENT PLAN

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LIST OF ACRONYMS

BMP	Best Management Practices
CCME	Canadian Council of Ministers of the Environment
CSR	Contaminated Sites Regulation
EAC	Environmental Assessment Certificate
EM	Environmental Monitor
EWP	Environmental Work Plan
HW	Hazardous Waste
<IL	Industrial Land Use Soil Standard
MOE	Ministry of Environment
PCOC	Potential Contaminants of Concern
PMV	Port Metro Vancouver
VAFFC	Vancouver Airport Fuel Facilities Corporation
VFPA	Vancouver Fraser Port Authority

DISTRIBUTION LIST

The following individuals/firms have received this document:

Name	Firm	Hardcopies	CDs	Email	FTP
Adrian Pollard	FSM Management Group Inc	-	-	✓	-
Mark McCaskill	FSM Management Group Inc	-	-	✓	-
Angus Johnston	Hatfield Consultants	-	-	✓	-
Andrew Taylor	Port Metro Vancouver	-	-	-	-
Carolina Eliasson	Port Metro Vancouver	-	-	-	-

AMENDMENT RECORD

This report has been issued and amended as follows:

Issue	Description	Date	Approved by	
1	First version of CEMP Contaminated Sites Management Plan	20150501		
2	Second version of CEMP Contaminated Sites Management Plan	20150508		
			Garth Taylor Project Director	Angus Johnston Project Manager

1.0 INTRODUCTION

This Contaminated Sites Management Plan (the Plan) has been prepared to address construction-related activities for the Vancouver Airport Fuel Delivery Project (the Project) with the potential for causing or encountering contamination. The Plan describes required and recommended procedures for characterizing and tracking materials excavated during the site works to their final disposal or end use point. This includes management strategies for specific contaminants that may be encountered and/or contamination that may occur as a result of site activities. Monitoring and reporting requirements are also described.

The Plan is based on the recommended mitigation measures, standards and Best Management Practices (BMPs) presented in Vancouver Airport Fuel Facility Corporation's (VAFFCs) application for a Project Environmental Assessment Certificate (EAC), and has been prepared in compliance with the conditions to the EAC and Vancouver Fraser Port Authority's (VFPA doing business as Port Metro Vancouver (PMV)) Environmental Assessment Decision Statement, and relevant legislation.

The focus for this version of the Plan is development of the fuel receiving facility and pipeline sections located on PMV land. The Plan will be further developed as detailed engineering progresses and to address the construction of other Project components.

2.0 OBJECTIVES AND SCOPE

The purpose of this Plan is to outline procedures for avoiding or minimizing the potential for contamination of soils as a result of site works, and to introduce strategies for management of any specific contaminants that may be encountered during soil disturbance and/or excavation.

Specific objectives of the Plan include the following:

- Provide guidance to contractors in the preparation of detailed site/activity-specific Environmental Work Plans (EWPs) and in their implementation of contaminated sites management protocols, monitoring and reporting requirements;
- Identify site activities with the potential to result in disturbance of contaminated soils or with the potential to cause contamination of soils and/or groundwater;
- Identify rapid, safe and effective responses to be implemented in the event of contamination of soils and/or groundwater during construction;
- Reduce the effects of any contaminated soils and/or groundwater on the environment;
- Identify roles and responsibilities, and emergency contacts;
- Provide a comprehensive list of BMPs and mitigation measures related to contaminated sites management; and
- Describe the monitoring and reporting requirements for verifying that BMPs and mitigation measures are being implemented as intended and are effective.

The Contractor shall prepare EWPs that outline measures for controlling the risk of contamination, roles and responsibilities, and emergency response and reporting procedures.

3.0 POTENTIAL ENVIRONMENTAL IMPACTS

Contamination of soil and/or groundwater on the site could potentially occur during soil excavations, stockpiling, vehicle and equipment operations, transport of materials, and other construction activities. Because of the historical industrial use of the site, the potential also exists for contaminants to be encountered during soil disturbance and/or excavation.

Activities that have the potential to result in contamination of soils and/or groundwater include:

- Site preparation activities, including clearing and grubbing;
- Excavation, handling, and storage of materials;
- Onsite movement of materials;
- Ground densification works; and
- Most other site activities.

Potential sources of contamination to soils and/or groundwater include:

- Accidental spills or leaks of hazardous substances, including hydrocarbons from vehicles, machinery and equipment;
- Disturbance of previously unidentified contaminated soils during excavations; and
- Discharge of contaminated surface water or groundwater to surface water drainage ditches, soils or groundwater.

Improper storage, use and/or handling of contaminated soil and waste materials having residual contaminated soil has the potential to:

- Pose threats to human health and safety; and
- Introduce deleterious substances and/or contaminants into previously uncontaminated areas (e.g., soils, surface waters, and/or groundwater).

Impacts are expected to be low provided that appropriate mitigation techniques are employed during Project works.

4.0 REGULATORY CONTEXT

Key environmental legislation and regulations relating to contaminated sites management includes the following:

- BC Contaminated Sites Regulation (BC Reg. 375/96, O.C. 1480/96 and M271/2004, including amendments up to BC Reg. 4/2014, January 31, 2014);

- *BC Environmental Management Act (EMA S.B.C. 2003, c.53);*
- *BC Fish Protection Act (S.B.C. 1997, c.21);*
- BC Hazardous Waste Regulation, B.C. Reg. 63/88, including amendments up to B.C. Reg. 63/2009;
- BC Spill Reporting Regulation (B.C. Reg. 263/90, includes amendments up to B.C. Reg. 376/2008, December 9, 2008);
- BC Waste Discharge Regulation (B.C. Reg. 320/2004, includes amendments up to B.C. Reg. 87/2012, April 20, 2012);
- *Canadian Environmental Protection Act (S.C. 1999, c. 33);*
- *Canada Hazardous Products Act (R.S.C., 1985, c. H-3);*
- City of Richmond Pollution Prevention and Clean-Up Bylaw No. 8475, 2009;
- *Fisheries Act (R.S.C., 1985, c. F-14);*
- *Public Health Act (S.B.C., 2008);*
- *Migratory Birds Convention Act (S.C. 1994, c.22);* and
- *Water Act (R.S.C., 1985, c. C-11).*

The site is currently occupied by ACME Landfill and Peat Ltd. and has been significantly altered from its natural state after many years of industrial development including peat mining, landfilling and dredged material stockpiling. Therefore the Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health (CCME, 1999) are applicable to the site. Should soil be removed from PMV land, the BC Contaminated Sites Regulation (CSR) industrial land use (IL) soil standards are likely to apply. The CSR soil standards are contained in Schedule 4 – Generic Numerical Soil Standards, Schedule 5 - Matrix Numerical Soil Standards, and Schedule 10 – Generic Numerical Soil and Water Standards (BC Reg. 375/96). Soils can also be classified as hazardous waste and the BC Hazardous Waste Regulation is applicable.

Groundwater encountered in excavations or surface water that contacts excavated materials shall be managed in accordance with the Groundwater Management Plan (CEMP Appendix A13), the Surface Water Quality, Fisheries Protection and Sediment Control Plan (CEMP Appendix A10) and other applicable CEMP Environmental Management Plans. In addition, any contaminated groundwater caused or found during the site works that is to be removed from the site shall be isolated and removed or remediated so that the concentrations of all substances in groundwater discharges are reduced below the relevant numerical water standards (i.e., CCME guidelines or CSR standards). Assessment, removal and/or remediation procedures for any contaminated groundwater encountered shall be incorporated in the contractor's EWPs.

5.0 BEST MANAGEMENT PRACTICES AND GUIDELINES

The following BMPs and guidelines shall be followed for all works where contaminated soils may be encountered and/or that may result in contamination of soil, groundwater or surface water:

- A User's Guide to Working In and Around Water; Understanding the Regulation under British Columbia's *Water Act* (BC MOE, May 2005; revised 2009);
- BC Approved Water Quality Guidelines (BC MOE.2010);
- Canadian Environmental Quality Guidelines (CCME) (CEQG, 1999; updated to 2001);
- Develop with Care 2014: Environmental Guidelines for Urban and Rural Land Development in British Columbia (BC MOE, 2014);
- Guidelines for Canadian Drinking Water Quality Summary Table, Federal-Provincial-Territorial Committee on Drinking Water of the Federal-Provincial-Territorial Committee on Health and the Environment (Health Canada, 2012);
- Land Development Guidelines for the Protection of Aquatic Habitat (DFO and MOELP, 1993);
- Measures to Avoid Causing Harm to Fish and Fish Habitat (DFO, 2013);
- Standards and Best Practices for Instream Works (BC MOWLA, March 2004);
- Technical Guidance 1, Site Characterization and Confirmation Testing (BC MOE, 2009);
- Technical Guidance 2, Statistical Criteria for Characterizing Volumes of Contaminated Material (BC MOE, 2009); and
- Technical Guidance 3, Environmental Quality Standards (BC MOE, 2009).

6.0 MITIGATION MEASURES

The first line of defense against soil and/or groundwater contamination is through prevention. When mitigation measures are properly implemented the magnitude of any impacts are expected to be low. All works shall be conducted according to relevant legislation, BMPs and mitigation measures outlined in this document. Training of construction personnel is also required so that site crews understand the sensitivity of particular works.

The following mitigation measures shall be implemented to reduce the potential for soil or groundwater contamination as a result of Project activities.

6.1 GENERAL

- Contractors shall have experience or shall receive appropriate training on how to recognize potentially contaminated soils or groundwater and what steps to follow to ensure that both contaminated material and worker health and safety are handled appropriately;

- Suspected contaminated soil in proposed excavations at the site shall be assessed for the presence of potential contaminants of concern (PCOCs) and, if present, delineated. Soils with PCOCs designated as Hazardous Waste (HW) and Waste shall be disposed of offsite at a Project-approved disposal facility authorized to accept such waste;
- When practical, soil shall be loaded directly into trucks as it is excavated for immediate transport to the adjacent Ecowaste site;
- To accommodate excavation of soil that is not pre-characterized or soil which cannot be transferred directly to the final disposal location, in consultation with the Project Environmental Management team, the Contractor shall prepare areas at the site for stockpiling of soils allowing for segregation into three classifications, as appropriate:
 - Suspect HW soil;
 - Suspect Waste soil; and
 - IL soil.
- In the event of a spill or leak of a hazardous substance during Project works, the Accidents or Malfunctions Management Plan (CEMP Appendix A3) and the Spill Prevention and Emergency Response Plan (CEMP Appendix A9) shall be followed.

6.2 EXCAVATION

Site preparation activities during site works shall include excavation of soils. To minimize the potential impacts of contamination during soil excavations, the following mitigation measures are recommended:

- Excavation planning information shall be prepared including a summary of the excavation scope and objectives for each area. This shall be developed in consultation with the Contractor, VAFFC and the Project Environmental Management team;
- Excavation drawings shall be prepared which show current grades, soil classification, excavation limits, and proposed final grades;
- Excavated soils shall be dewatered in accordance with the Groundwater Management Plan (CEMP Appendix A13). Discharge from dewatering shall not enter any drainage system or any watercourse without prior applicable authorizations. Water from excavations shall be discharged to land at the northeast of the Project site that has been deemed suitable for receiving such discharges;
- The contractor's Environmental Monitor (EM) shall be present during all excavation work on site. However, during excavation in pre-characterized areas, unless field observations indicate unexpected soil contamination in an area (e.g., odour, staining, non-aqueous phase liquid), the Contractor shall excavate to the mapped soil characterization boundaries with limited intervention from the EM;
- Excavation of soils shall be conducted as bulk excavations and if any soils excavated are in disagreement with the pre-characterization assessment results, the soils shall be segregated. Soil

shall be designated by the EM on a per truckload basis as known or suspect HW, Waste, or IL based on *in situ* data and/or field indicators (odour, staining, etc.);

- Excavated areas shall be documented on a weekly basis by on-site Project surveyors using reflectorless total station or equivalent equipment. Updated drawings shall be provided periodically to the Project Environmental Management team indicating where soil was excavated and samples were collected, if applicable;
- Delineation and posting of site boundaries shall be used to minimize the potential for cross-contamination outside of the work area. Any work area where soil contamination exists or is likely to exist shall be posted by the EM as restricted zone. The Contractor shall provide posting (signs and labels) for installation, and fence and flag area boundaries outside the work area. No traffic, equipment and personnel shall be permitted in these areas without prior permission from the EM;
- Decontamination may be compulsory to release personnel or equipment from areas containing soil contamination. The Contractor shall document decontamination work by identifying the equipment and work crews and shall have these records available for review by the EM or the Environmental Manager; and
- The estimated volumes of soil transported to the Ecowaste site and the stockpile areas shall be reconciled on a weekly basis.

6.3 STOCKPILE MANAGEMENT

Material excavated during site works which is not suitable for disposal at the neighbouring Ecowaste site shall be temporarily stockpiled on site prior to removal from site to an approved disposal facility in accordance with applicable legislation, regulations, standards and guidelines. Backfill material imported to the site from certified suppliers may also be temporarily stored on site prior to infilling.

To minimize the potential effects of stockpiling, the following mitigation measures are recommended:

- If it is necessary to temporarily stockpile soil adjacent to the excavation before loading into trucks, there will be clear communication between the on-site EM and the Contractor's operator and work site supervisor regarding the classification (HW, Waste, IL) of temporary stockpiles to prevent inadvertent mixing;
- Temporary stockpiles of HW or Waste soil must be laid down on a new 6 mil poly liner to prevent cross-contamination, and shall be managed to ensure slope stability. The HW and Waste soil stockpile area(s) shall be constructed with berms to prevent potentially contaminated soil or leachate from escaping the stockpile area.
- In addition, HW soil stockpiles shall be sited and operated in accordance with the BC Hazardous Waste Regulation (HWR) Sections 28, 29, and 30. At a minimum, a 30 mm polyvinyl chloride (PVC) liner material or equivalent is recommended. Liners must be protected to prevent tearing

due to equipment activity and appropriate drainage must be provided such that water/leachate does not pool on the liner around the stockpiles. All leachate shall be collected from HW and Waste stockpiles in accordance with the following sections and the Surface Water Quality, Fisheries Protection and Sediment Control Plan (CEMP Appendix A10);

- Liners and berms are not required for IL stockpile areas. However, these areas shall be managed in accordance with the Groundwater Management Plan (CEMP Appendix A13), the Surface Water Quality, Fisheries Protection and Sediment Control Plan (CEMP Appendix A10), and other appropriate plans to provide grading to direct surface water away from the soil stockpiles and collection of surface water at the stockpile areas;
- Provision shall be made to cover all stockpiles that are not actively being worked to prevent unnecessary water-logging of the soil or generation of leachate. Stockpiles are to be constructed as windrows within the stockpile areas. Any soil that becomes unsuitable for stockpiling, loading or transport due to a failure to maintain suitable excavation conditions or adequate stockpile covers, shall be stabilized;
- The EM shall monitor the stockpile areas to ensure that designated soil is placed and stored in the appropriate stockpiles; and
- A stockpile soil management form shall be completed to record the date, time, soil classification and destination stockpile identification for each load entering the stockpile area, as well as final disposal location for each load exiting the stockpile area.

6.4 IMPORTED MATERIAL MANAGEMENT PROCEDURES

Dredged river sand shall be pumped directly to the site for use as backfill material. Granular material for densification columns shall be imported to the site from certified suppliers. This backfill material may be temporarily stored on site prior to infilling. To minimize the potential effects of backfill material handling, storage and transfer, the following mitigation measures are recommended:

- Any imported fill material shall conform to the CCME Soil Quality Guidelines;
- Importation of backfill material from off-site sources shall be the responsibility of the Contractor, including approving the fill source, verification of the absence of contamination and of the material's geotechnical suitability for use at the site;
- Prior to the delivery of soils, aggregates or other fill to construction sites, contractors shall document the source and confirm the environmental quality of the soil through analytical testing if appropriate. In general, if the fill is obtained from a local virgin source, testing for contamination is not necessary, although the EM may choose to request a limited number of samples analyzed for metals concentrations for due diligence purposes. If the fill is obtained from a non-virgin source appropriate assessment shall be conducted to test the soil for appropriate PCOCs related to the source site; and

- The EM shall assist in the development of an appropriate imported backfill sampling plan once the source is known. It may be necessary to obtain a Soil Relocation Agreement as per CSR requirements in order to import fill from a non-virgin source.

6.5 UNEXPECTED CONTAMINATED MATERIALS

Due to the historical landfilling use on the site, the potential exists for unidentified contaminated materials to be encountered. To minimize the potential effects of unexpected contaminated materials, the following mitigation measures are recommended:

- Any contamination (i.e., exceeding CSR IL standards) encountered during excavations shall be managed through a combination of excavation and disposal (i.e., for soils), removal or treatment (i.e., for groundwater), and risk assessment (i.e., in the event contamination will be left in place);
- Potentially contaminated material shall be characterized based on ex situ stockpile samples as well as collecting confirmatory samples at the limits of excavations. This approach shall involve oversight by the on-site EM and extra handling of soil stockpiles by the Contractors during excavation work so that soils are identified and managed appropriately based on degree of contamination;
- Contamination shall be removed unless existing structures or geotechnical constraints prevent further excavation. Where contaminants are encountered that require excavation, excavated contaminated soils shall be segregated from non-contaminated soils and sent directly to an approved disposal facility. A Soil Relocation Agreement shall be obtained in accordance with CSR requirements, as required, to relocate any contaminated soils;
- Any suspected contaminated soils excavated at the site shall be isolated from imported or other non-contaminated soils and other materials present on site in a secure and designated area. They shall be placed on an impervious base and securely covered with protective plastic sheeting (polyethylene);
- The recommended frequency of confirmatory soil samples shall depend on the suspected quality of the soil being excavated. Sampling shall be conducted in accordance with relevant BC Ministry of Environment (BC MOE) guidance for HW and Waste soils;
- Detailed records of contaminant media, classification, volumes, disposal method, and disposal location shall be maintained;
- Due to the potential for environmental impacts from soil contamination, excavation work shall be managed to minimize contamination dispersion by conducting dust control measures, decontamination of equipment leaving established exclusion zones, and erosion and sediment control measures. Soil excavations and stockpiled materials shall be evaluated by the EM. The EM shall also document site observations and conduct confirmatory samples to document if excavations have removed all required contaminated soil; and

- Other material that may be encountered in excavations such as wood waste, concrete or metal, shall be managed with other demolition materials in accordance with the Waste Management Plan (CEMP Appendix A12).

6.6 OFF-SITE DISPOSAL

Material excavated from the site shall be disposed of at the neighbouring Ecowaste disposal site, where possible. To minimize the potential effects of off-site disposal, the following mitigation measures are recommended:

- Pre-characterized soil of known IL quality shall be transferred directly to the Ecowaste disposal location unless temporary storage in designated stockpile areas is required for staging purposes;
- HW soil shall be disposed in accordance with *Additional Procedures for HW Soil* section below and the Waste Management Plan (CEMP Appendix A12). Waste soil shall be disposed off-site at a Project-approved facility. Disposal of any material on agricultural land reserve land shall be prohibited; and
- The estimated volumes of soil transported to each off-site facility shall be reconciled on a weekly basis.

6.6.1 HW Soil Tracking and Off-site Disposal

- Known or suspect HW soil excavated by Contractors shall be subject to the management and tracking procedures outlined above as well as procedures outlined for HW materials in the Waste Management Plan (CEMP Appendix A12). Where there is apparent conflict between this Contaminated Sites Management Plan and the Waste Management Plan, the latter will apply;
- Any HW soil excavated at the site shall be registered under the provisions of the HWR. Registration is triggered when the soil becomes a waste (i.e., is excavated) and when the soil is confirmed to be a HW (i.e., based on analytical results). Registration shall be accomplished by submitting a completed Hazardous Waste Generator Registration Update (HWR, Schedule 5, Form 1b) no more than 30 days after the initial volume of HW soil is generated. Generator forms shall be completed by the EM and submitted to VAFFC for approval, sign off and submission to the MOE;
- Confirmed HW soil shall be disposed at an approved off-site facility that is permitted to accept such wastes using licensed transporters authorized to carry HW;
- Disposal facilities and transporters shall be approved by VAFFC and documentation and operations shall be in compliance with the HWR and VAFFC requirements. No Hazardous Waste transporter or off-site disposal facility can accept HW soil from the site unless the appropriate Project representative has signed off on the use of the designated HW disposal facility;
- Each load of HW soil transported to an off-site disposal facility must be manifested in accordance with HWR Section 46. The EM shall be responsible for completing and signing the manifest forms on behalf of VAFFC (generator); and

- The EM shall retain appropriate copies of the manifest forms for VAFFC records and for distribution to BC MOE, if required. Remaining copies of the manifest shall be given to the driver for the transport firm (carrier) who shall then hand the manifests off to the disposal facility's representative upon delivery. The disposal facility shall return the generator's matching copy to the attention of the EM on behalf of VAFFC, as well as sending a copy to the BC MOE, if required.

6.7 WATER MANAGEMENT

Richmond's groundwater situation means that excavations for construction will require pumping of groundwater. Contractors who excavate or otherwise expose suspected contaminated soils should assume that underlying contaminated groundwater might also be present and should be managed in accordance with the Groundwater Management Plan (CEMP Appendix A13). To minimize the potential impacts of dewatering, the mitigation measures recommended in the Groundwater Management Plan shall be followed for groundwater that is pumped or otherwise encountered during excavation work. The Surface Water Quality, Fisheries Protection and Sediment Control Plan (CEMP Appendix A10) shall be followed for the management of surface water that contacts the work areas (e.g., excavation areas, haul routes and stockpile areas).

7.0 MONITORING

Construction activities with the potential to result in contamination of soil and/or groundwater shall be monitored full time during construction by the EM, to verify conformance with Project approvals, applicable legislation, BMPs, mitigation measures and the objectives of this Plan and the detailed/activity specific EWPs. Monitoring for potentially contaminated soils and/or groundwater shall be the responsibility of every worker and shall be covered during training.

To verify the suitability of imported soil and management of exported soil the contractor shall monitor imported and excavated soil on an ongoing basis, observing visual and olfactory indicators of contamination. The EM shall periodically monitor soil by similar methods when on site. Some indicators of contamination include:

- Unusual odour, soil colour and texture that may indicate the presence of contaminants in the soil;
- Staining - typically stained soils are darker and may have a "wet" appearance, but should not be confused with naturally occurring organic soils. Stained soils may have a distinct oily feel. Typically, staining is accompanied by odours;
- Buried debris or artifacts; such as chemical containers, steel drums, automotive parts, cleaning rags, tanks, barrels, bottles, timbers, boxes or other containers that may have contained or are associated with hazardous materials; and
- Spent abrasives, batteries and metal filings.

If such evidence is encountered, contractors should contact the EM, who shall coordinate with VAFFC and direct the contractor to further action or Stop Work. After consultation with the EM and VAFFC any

suspected soils shall be managed as per the suspect contaminated materials monitoring and mitigation procedures in Section 6.5 of this plan.

The EM shall also assess and document the following contaminated sites management measures on a regular basis:

- Volumes of material excavated from the Project site;
- Testing of excavated material, if required;
- Segregation of contaminated material from non-contaminated material;
- Spill response materials and equipment;
- Posted emergency response procedures and emergency response readiness;
- Documents and recordkeeping, including materials manifests;
- General site cleanliness and conditions; and
- Mitigation measures being implemented on site.

The contractor may be required to have imported and exported soil sampled for selected contaminants at the discretion of the EM prior to use onsite or off-site disposal. Soils shall be sampled in accordance with the sampling procedures described in Technical Guidance on Contaminated Sites 1: Site Characterization and Confirmation Testing (BC MOE, 2009), or some other method acceptable to the EM and BC MOE. The EM shall provide recommendations to Project personnel, as required to rectify any noted deficiencies. In the event that contaminated sites management becomes an ongoing issue, further mitigation measures may be implemented, at the discretion of VAFFCs Environmental Manager.

For works that have the potential to pose an immediate threat to soil and/or groundwater, the contractor's EM and VAFFC's Environmental Manager shall have the authority to stop works until such time as impacts can be mitigated. Triggers that may result in a Stop Work Order include the failure to meet the requirements of any of the Project approvals, or other activities that pose an increased risk beyond those contemplated in the CEMP. The Environmental Manager shall be available as required to provide strategic advice and/or measures to achieve the desired results for mitigating impacts.

8.0 REPORTING

The monthly environmental monitoring reports prepared by the EM shall include:

- A description of any spills or environmental incidents or emergencies on site;
- A summary of any monitoring and testing conducted following an environmental incident or upon discovery of contaminated materials;
- A description of construction activities, material excavated and associated mitigation measures that were implemented;

- Documented inspections of emergency response readiness;
- A description and photos that document any contaminated sites management issues and corresponding mitigation measures implemented; and
- A status report regarding implementation of all contaminated sites mitigation plans.

All personnel at the Project site shall have a responsibility to report all environmental concerns or incidents, regardless of magnitude. In the event of any of the following, the Contractor shall immediately report to the EM, the Environmental Manager and the VAFFC Project Manager:

- Discovery of any suspected contaminated soils or groundwater;
- Emergency incidents and non-conformance with the Spill Prevention and Emergency Response Plan (CEMP Appendix A9); and
- Environmental incidents reportable under the *Environmental Management Act*.

In the event of an environmental incident, the Contractor must provide the EM, the Environmental Manager and the VAFFC Project Manager with an Environmental Incident Report as soon as practical (no later than 24 hours after the incident).

9.0 REFERENCES

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VANCOUVER AIRPORT FUEL DELIVERY PROJECT

CEMP FUELS, CHEMICALS AND MATERIALS STORAGE AND HANDLING PLAN

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LIST OF ACRONYMS

BMP	Best Management Practices
CSA	Canadian Standards Association
CSR	Contaminated Sites Regulation
EAC	Environmental Assessment Certificate
EM	Environmental Monitor
EWP	Environmental Work Plan
MSDS	Materials Safety Data Sheets
MOE	Ministry of Environment
PMV	Port Metro Vancouver
PPE	Personal Protective Equipment
VAFFC	Vancouver Airport Fuel Facilities Corporation
VFPA	Vancouver Fraser Port Authority
WHMIS	Workplace Hazardous Materials Information System

DISTRIBUTION LIST

The following individuals/firms have received this document:

Name	Firm	Hardcopies	CDs	Email	FTP
Adrian Pollard	FSM Management Group Inc	-	-	✓	-
Mark McCaskill	FSM Management Group Inc	-	-	✓	-
Angus Johnston	Hatfield Consultants	-	-	✓	-
Andrew Taylor	Port Metro Vancouver	-	-	-	-
Carolina Eliasson	Port Metro Vancouver	-	-	-	-

AMENDMENT RECORD

This report has been issued and amended as follows:

Issue	Description	Date	Approved by	
1	First version of CEMP Fuels, Chemicals and Materials Storage and Handling Plan	20150501		
2	Second version of CEMP Fuels, Chemicals and Materials Storage and Handling Plan	20150508		
			Garth Taylor Project Director	Angus Johnston Project Manager

1.0 INTRODUCTION

This Fuels, Chemicals and Materials Storage and Handling Plan (the Plan) describes construction-related activities and materials for the Vancouver Airport Fuel Delivery Project (Project) with the potential to result in spills or risks to human health and the environment. Information is provided on the recommended processes for handling, storage, transportation and final disposal of these materials. Monitoring and reporting requirements are also described.

The Plan is based on the recommended mitigation measures, standards and Best Management Practices (BMPs) presented in Vancouver Airport Fuel Facility Corporation's (VAFFCs) application for a Project Environmental Assessment Certificate (EAC), and has been prepared in compliance with the conditions to the EAC and Vancouver Fraser Port Authority's (VFPA trading as Port Metro Vancouver (PMV)) Environmental Assessment Decision Statement, and relevant legislation.

The focus for this version of the Plan is development of the fuel receiving facility and pipeline sections located on PMV land. The Plan will be further developed as detailed engineering progresses and to address the construction of other Project components.

1.1 OBJECTIVES AND SCOPE

The purpose of the Plan is to describe the typical strategies for managing fuels, chemicals and other materials, and controlling spills or risks to human health and the environment in the vicinity of the Project site.

The key objectives of the Plan are to:

- Provide guidance to contractors in the preparation of detailed site/activity-specific Environmental Work Plans (EWPs) and in their implementation of site specific fuels, chemicals and related materials storage, handling, transportation and disposal management protocols, monitoring and reporting requirements;
- Identify activities that could result in spills or risks to human health and the environment;
- Reduce the effects on human health, vegetation, wildlife and water quality associated with fuel, chemical and material storage, handling, transport and disposal;
- Provide a comprehensive list of BMPs and mitigation measures related to fuels, chemicals and materials storage and handling;
- Verify compliance with all relevant legislation and regulations; and
- Describe the monitoring and reporting requirements for verifying that BMPs and mitigation are being implemented as intended and are effective.

The EWPs shall be prepared by the construction Contractor and shall outline the methods to be used to reduce the potential for spills or risks to human health and the environment as a result of fuels, chemicals and related materials storage and handling. Implementation of this Plan and the EWPs will minimize the potential for adverse effects to a variety of resources as a result of fuels, chemicals and other materials on site.

1.2 POTENTIAL ENVIRONMENTAL IMPACTS

Hazardous and potentially hazardous fuels, chemicals and other materials shall be required on site. The following are typical hazardous or dangerous substances expected on the Project site:

- Fuel (e.g., gasoline, diesel, propane);
- Batteries;
- Hydraulic oils, greases and lubricants;
- Industrial cleaners;
- Concrete for tank foundations; and
- Paint and other chemicals required for tank finishing.

Most products are expected to be consumed on-site, but some (e.g., batteries) may require disposal after use. Hazardous substances other than those listed above may also be required on site, including but not limited to pesticides and herbicides. However mechanical control of invasive species will take priority over pesticide and herbicide use.

Improper storage, use and/or handling of fuels, chemicals and other hazardous materials have the potential to:

- Pose threats to human health and safety;
- Introduce deleterious substances and/or contaminants into previously uncontaminated soils, vegetated areas, surface waters, and/or groundwater;
- Cause changes to ecosystems through improper storage or disposal of hazardous or solid waste; and
- Pose threats to wildlife through creating attractants and habituation or accidental poisoning.

2.0 REGULATORY CONTEXT

All site activities shall be undertaken in compliance with applicable municipal, provincial and federal legislation, regulations, standards and guidelines. Key legislation and regulations that apply to fuels, chemicals and materials storage and handling include:

- BC Contaminated Sites Regulation (BC CSR, BC Reg. 375/96, O.C. 1480/96 and M271/2004, including amendments up to BC Reg. 4/2014, January 31, 2014);
- BC *Environmental Management Act* (SBC 2003, c. 53), Hazardous Waste Regulation, Spill Reporting Regulation, and Ambient Water Quality Guidelines for the Protection of Aquatic Life;
- BC *Fire Code and Fire Services Act* (RSBC 1996, c. 144);
- BC *Fish Protection Act* (SBC 1997, c. 21);

- BC *Public Health Act* (SBC 2008, c. 28);
- BC *Transport of Dangerous Goods Act* (RSBC 1996, c. 458);
- BC *Water Act* (RSBC 1996, c. 483);
- BC *Worker's Compensation Act* (RSBC 1996, c. 492), Occupational Health and Safety Regulation, and WHMIS;
- Canadian *Environmental Protection Act* (SC 1999, c. 33), Export and Import of Hazardous Waste Regulations;
- Canada *Hazardous Products Act* (R.S.C. 1985, c. H-3);
- Canadian Standards Association (CSA) Z731-03 – Emergency Preparedness and Response;
- Canada *Transportation of Dangerous Goods Act* (SC 1992, c. 34) and Transport of Dangerous Goods Regulation;
- City of Richmond Fire Protection and Life Safety Bylaw No. 8306;
- Fisheries Act. RSC 1985, c. F-14, <http://laws-lois.justice.gc.ca/PDF/F-14.pdf>, retrieved on 2015-04-20.
- *Hazardous Products Act* (R.S.C. 1985, c. H-3) and Controlled Products Regulation; and
- National Fire Code.

2.1 PERMITS

It is anticipated that no environmental permits relating to fuels, chemicals and materials storage will be required.

3.0 BEST MANAGEMENT PRACTICES AND GUIDELINES

The following BMPS and guidelines shall be followed for all works relating to the management of fuels, chemicals and associated materials:

- A Field Guide to Fuel Handling, Transportation and Storage (BC Ministry of Water, Land and Air Protection, 2002);
- British Columbia Hazardous Material Response Plan (BC Ministry of Environment, 2007);
- British Columbia Inland Oil Spill Response Plan (BC Ministry of Environment, 2007b);
- Develop with Care 2012: Environmental Best Management Practices for Urban and Rural Land Development in British Columbia (BC Ministry of Environment, 2012);
- Emergency Response Guidebook (CANUTEC, Transport Canada, 2012);

- Environmental Code of Practice for Aboveground Storage Tank Systems Containing Petroleum Products (Canadian Council of Ministers of Environment, 2003);
- Environmental Management Practices for Ready Mixed Concrete Operations in Canada (Canadian Ready Mixed Concrete Association, 2007);
- Hazardous Waste Legislation Guide (BC Ministry of Environment, 2005);
- Land Development Guidelines for the Protection of Aquatic Habitat. Department of Fisheries and Oceans and BC Ministry of Environment, Lands and Parks, 1993; and
- Measures to Avoid Causing Harm to Fish and Fish Habitat, Department of Fisheries and Oceans, 2013. Online resource: <http://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures/index-eng.html>.

4.0 MITIGATION MEASURES

All site activities shall be undertaken in compliance with applicable municipal, provincial and federal legislation, regulations, standards and guidelines. Training of construction personnel is also required so that construction crews understand the sensitivity of particular works. Fuels, chemicals and materials storage and handling management measures will be implemented to mitigate impacts to human health and/or the environment.

The following mitigation measures are recommended to reduce the potential for accidental spills and releases of waste materials to the environment:

4.1 GENERAL

- All substances transported, handled, used, stored or disposed of shall be identified as being hazardous or non-hazardous to human health or the environment;
- Hazardous substances shall be classified and labeled according to requirements as specified under the *Controlled Products Regulations*, the *Transportation of Dangerous Goods Regulations*, and other legislation as appropriate (e.g., pesticides under the *Pest Control Products Act*);
- All containers with hazardous materials shall be labelled in accordance all relevant acts and regulations and shall comply with requirements of Workplace Hazardous Materials Information System (WHMIS) including, labeling and provision of Material Safety Data Sheets (MSDS). A catalogue of MSDS shall be maintained at appropriate areas on site at all times, from the commencement of construction activities. This catalogue shall be reviewed regularly and shall be updated as necessary whenever a new hazardous material comes to or is encountered at the site;
- All substances shall be clearly labeled to indicate the product identifier, safe handling instructions, and the MSDS availability;
- MSDS shall be required for each product prior to delivery on-site, for products that require MSDS information;

- All hazardous materials shall be transported, labeled, stored, used and disposed of in accordance with all regulatory requirements, and workers handling hazardous materials shall be appropriately trained in their handling, storage and use;
- On-site personnel shall be properly trained, with current certificates and licenses, as appropriate, in the transportation and handling of dangerous goods in accordance with the Transportation of Dangerous Goods Regulation and, for controlled substances, in accordance with Occupational Health and Safety Regulation and WHMIS standards;
- On-site hazardous materials and waste management systems shall be reviewed during training and site orientation/tailgate training activities;
- Hazardous wastes shall be segregated. Wastes contaminated with flammable liquid and wastes contaminated with oil shall not be mixed;
- Waste rags and sorbents shall be carefully stored in vented containers;
- All spills and releases of hazardous substances or incidents related to hazardous substances shall be reported to the Environmental Monitor and the relevant regulatory agencies according to the procedures outlined in the Accidents or Malfunctions Management Plan (CEMP Appendix A3);
- Contaminated soils resulting from spills or other accidents shall be excavated and removed from site, along with used spill kit materials. Contaminated materials shall be contained in a manner that prevents interaction with water and moisture accumulation, and disposed of at an approved facility in accordance with the Contaminated Sites Management Plan (CEMP Appendix A6); and
- Training and site orientation/tailgate training activities will include details of proper refueling and storage of petroleum-based products and a review of on-site hazardous materials and waste management systems;

4.2 STORAGE

Fuels, chemicals and related materials may be temporarily stored on site for use. Hazardous wastes shall be removed from site to an approved disposal facility in accordance with applicable legislation, regulations, standards and guidelines. To minimize the potential impacts of storage of potentially hazardous fuels, chemicals and materials, the following mitigation measures are recommended:

- All oil, chemicals and other hazardous materials shall be placed within a lockable metal cabinet or plastic spill containment tray with 125% capacity, in a manner that eliminates any associated risk of the product (i.e., fire, oxidation, explosion, reactivity, poisoning, etc.);
- Fuel storage facilities shall include secondary containment capable of containing 110% of the volume of the largest tank. Containment areas shall be designed so that containment shall remain effective in all weather conditions. Precipitation shall be prevented from accumulating within fuel containment areas. Secondary containment facilities shall not be used for storage purposes;

- Container materials and the hazardous materials shall be made of compatible materials. The container material must not react with the hazardous substance. Only containers that are in good condition shall be used;
- Storage areas shall be appropriate for the containers, and designed to adequately and safely store a sufficient quantity of the hazardous material over a prescribed period of time and prevent contamination of the environment;
- Incompatible substances or substances which may result in chemical reactions shall be stored away from each other within storage areas;
- All necessary equipment to clean and mitigate spills, including fire prevention equipment, shall be stored in or near the storage area;
- Smoking shall be prohibited in all hazardous substances storage areas;
- All fuel storage tanks shall be CSA approved and shall comply with the statutory regulations and recommended practices described in *A Field Guide to Fuel Handling, Transportation and Storage* (BC Ministry of Water, Land and Air Protection 2002) and the BC Fire Code;
- Fuel and chemical storage locations shall be inspected daily for leaks, spills, and obvious abnormal conditions. Any leakage shall be repaired immediately;
- Tanks shall be physically protected from collision;
- Mobile fuel storage trucks shall be parked on impermeable surfaces at night;
- Fuel storage shall occur at least 30 m from watercourses or surface water drainage ditches; and
- Manifests shall be maintained on site by the Contractor to track the volume of hazardous materials stored on the site and hazardous wastes removed from the site.

4.3 FUEL HANDLING AND DISPENSING

Fixed and mobile equipment will be used throughout Project construction. To minimize the potential impacts of refueling activities, the following mitigation measures are recommended:

- Hazardous substances shall be handled and used in accordance with information in their respective Materials Safety Data Sheet (MSDS) (and in accordance with regulatory requirements as appropriate);
- Appropriate PPE shall be made available and worn by employees involved in hazardous substance handling operations;
- Smoking shall be prohibited in and around explosive, oxidizing, reactive or flammable hazardous materials handling areas;
- Fire-fighting equipment shall be kept at oxidizing, reactive or flammable hazardous substance handling areas;

- All fuel dispensers shall be designed to meet the statutory regulations and recommended practices described in *A Field Guide to Fuel Handling, Transportation and Storage* (BC Ministry of Water, Land and Air Protection 2002) and the BC Fire Code (Office of Housing and Construction Standards, 2012);
- Fuel dispensing locations and equipment shall be inspected regularly. Any leakage shall be repaired immediately;
- All operators shall stay with the fuel nozzle while refueling. Ignition shall be turned off while the vehicle is being refueled. The operator shall immediately shut off the source if a spill occurs;
- Fuel dispensing shall occur at least 30 m from watercourses or surface water drainage ditches;
- Employees shall use extreme caution if the container of a product being handled ruptures and starts giving off gases/odours. If the material's properties are unknown, the area shall be evacuated until the MSDS can be referenced to confirm the management of hazards for that substance; and
- All servicing and refueling areas shall be kept tidy, with materials stored appropriately in accordance with all Environmental laws and guidelines.

4.4 EQUIPMENT OPERATION

Fixed and mobile equipment shall be used throughout Project construction. To minimize the potential impacts of fuels, chemicals and related materials used in equipment, the following mitigation measures are recommended:

- All equipment used on site shall be maintained in good operating condition, free of leaks and excess oil and grease;
- All equipment used on site shall be inspected daily. Equipment maintenance will be conducted at appropriate intervals to assess belts and hoses, fluid levels, and to identify mechanical defects or worn materials as applicable to each piece of machinery;
- Any continually leaking equipment shall be removed from the site. The Environmental Monitor (EM) shall have the authority to order the removal of any such equipment from site; and
- All equipment and drip trays shall be inspected after heavy rainfall to check that containment is not comprised.

4.5 TRANSPORT

Hazardous substances may be transported to and from the site. To minimize the potential impacts of hazardous materials transport, the following mitigation measures are recommended:

- Fuel shall be transported in containers and vehicles appropriate to comply with the Federal Transportation of Dangerous Goods Act and the Provincial Transport of Dangerous Goods Act hazard classification;

- Containers for the transportation of fuel shall be labelled to communicate the hazard the material represents, made of a material that is compatible with the transported fuel, and in good condition;
- Vehicles for the transportation of fuels shall be labelled to communicate the hazard the material represents. Hazardous materials shall be transported by appropriately licensed transporters;
- Fuels shall be transported separately from other hazardous or non-compatible materials;
- Transport containers shall be properly secured and sufficiently spaced to allow safe access and handling of containers;
- All necessary equipment to clean and mitigate spills, including fire prevention equipment, shall be kept in or near the vehicle; and
- Employees shall be prohibited from smoking in and around fuel transport containers and vehicles.

4.6 CONCRETE PLACEMENT AND STORAGE

The following mitigation measures are recommended for all concrete placement works:

- Cementitious materials (grout bags, mortar, storage silos, cement trucks, etc.) shall be stored a minimum of 30 m from any open watercourse. All cementitious materials shall be stored such that they are protected from contact with rainwater, machinery, and other sources that may cause leaks or leaching of product;
- Mixing of concrete shall be prohibited within 30 m of a watercourse;
- Small concrete mixers shall be placed on top of an impermeable surface such as tarps or polyethylene sheeting;
- Concrete materials cast in place shall remain inside formed structures until adequate curing time has been reached;
- Cementitious materials sediments, debris, fines, wash, or contact water shall not be discharged to environmentally sensitive areas, including any place within 30 m of a watercourse, or in a manner that materials may leach into a watercourse;
- During rainfall or shortly after a pour, uncured concrete shall be covered with polyethylene sheeting or tarps to protect it from the rain;
- Plywood forms shall be stored appropriately between use in a manner that prevents the leaching of uncured cementitious materials to the environment;
- All waste concrete/cementitious materials shall be removed to an approved off-site facility for proper disposal or re-use;
- Any water that contacts uncured or partly cured concrete shall be isolated and held in an area or container impermeable to groundwater until water quality is within CCME Water Quality Guidelines for pH, TSS and NTU;

- If concrete spills to the ground, it shall be allowed to harden, then broken into rubble and discarded at a landfill or concrete recycler; and
- All spills of sediments, debris, cementitious fines, wash or contact water to water shall be reported to the EM in accordance with the Spill Prevention and Emergency Response Plan (CEMP Appendix A9).

4.7 CONCRETE WATER MANAGEMENT

Concrete washout shall occur in designated areas only, as determined in consultation with the EM, or off site. The following mitigation measures are recommended for washing concrete trucks onsite and the disposal of wash water:

- All works involving the use of concrete, cement, mortars, and other Portland cement or lime-containing construction materials shall not deposit, directly or indirectly, sediments, debris, cementitious fines, wash or contact water into or about any watercourse;
- Raw or uncured waste concrete and grouts shall be disposed of in a manner that will not affect a watercourse. Excess uncured concrete and grout mixtures shall be stored in an impermeable container, a minimum of 30 m from an open watercourse and in an area isolated from rain. Materials shall be disposed off-site at an approved facility once the mixture has cured (approximately 72 hours);
- Containment facilities shall be provided that allow for wash-down water produced from concrete delivery trucks, concrete pumping equipment, exposed aggregate surfaces, and other tools and equipment to be trapped on site and reused (i.e., flat ground, a minimum of 30 m from any surface water feature);
- Any discharged wastewater that is not reused shall be treated to meet CCME water quality guideline values (e.g., settling water basin system) prior to discharge to ground in the receiving environment;
- Potentially high pH water emanating from areas where pours and other concrete or grouting works are recent or ongoing shall be contained and tested as required. The concrete affected water shall be either treated prior to release to ground or removed for off-site disposal at an approved facility; and
- Discharge of concrete truck wash water directly to ground shall be prohibited. Chutes shall be washed into a bucket, and water shall be poured back into the truck. If this is not possible, wash water shall be collected into a polyethylene lined box and allowed to cure. Once hardened, material shall be placed in a drum and transported to an approved off-site disposal location.

4.8 SPILL RESPONSE

Project works have the potential to result in accidental spills of fuels, chemicals or other deleterious materials. In the event of a fuel, chemical or spill of other deleterious material, the steps outlined in the Project Spill Prevention and Emergency Response Plan (CEMP Appendix A9) shall be followed.

5.0 MONITORING

Site activities with the potential to result in spills or risks to human health and/or the environment shall be monitored full time during construction by the contractor's EM, to verify conformance with Project approvals, applicable legislation, BMPs, mitigation measures and the objectives of this Plan and the detailed EWPs. Monitoring for environmental hazards will be the responsibility of every worker and will be covered during training.

The EM will assess and document the following on a regular basis:

- Labelling, storage and containment of hazardous substances on site;
- Spill response materials and equipment, posted spill response procedures and spill response readiness;
- Documents and recordkeeping, including MSDS, WHMIS records, training records, and hazardous materials and hazardous wastes manifests;
- Condition of machinery and equipment;
- General site cleanliness and conditions; and
- Mitigation measures being implemented on site.

The EM will provide recommendations to Project personnel, as required to rectify any noted deficiencies. In the event that fuels, chemicals and materials storage and handling becomes an ongoing issue, further mitigation measures may be implemented, at the discretion of VAFFCs Environmental Manager.

For works that have the potential to pose an immediate threat to human health and / or the environment, the EM and VAFFCs Environmental Manager shall have the authority to stop works until such time as impacts can be mitigated. Triggers that may result in a Stop Work Order include the failure to meet the requirements of any of the Project approvals, or other activities that pose an increased risk beyond those contemplated in the CEMP. The Environmental Manager will be available as required to provide strategic advice and/or measures to achieve the desired results for mitigating impacts.

6.0 REPORTING

The monthly environmental monitoring reports prepared by the EM shall include:

- A description of construction activities and associated fuels, chemicals and materials handling and storage measures that were implemented;
- A description of maintenance checks on existing containment structures and spill response equipment;
- A description and photos that document any storage and handling management issues and corresponding mitigation measures implemented; and

- Monthly reports shall include a status report regarding implementation of all specific mitigation plans, including spill response plans.

Environmental personnel shall be responsible for submitting incident reports, should construction activities result in spills or risks to human health and the environment.

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VANCOUVER AIRPORT FUEL DELIVERY PROJECT

CEMP NOISE MANAGEMENT PLAN

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VERSION 2

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LIST OF ACRONYMS

BMP	Best Management Practices
dB	Decibels
EAC	Environmental Assessment Certificate
EM	Environmental Monitor
EWP	Environmental Work Plan
MOE	Ministry of Environment
PMV	Port Metro Vancouver
VAFFC	Vancouver Airport Fuel Facilities Corporation
VFPA	Vancouver Fraser Port Authority
BMP	Best Management Practices

DISTRIBUTION LIST

The following individuals/firms have received this document:

Name	Firm	Hardcopies	CDs	Email	FTP
Adrian Pollard	FSM Management Group Inc	-	-	✓	-
Mark McCaskill	FSM Management Group Inc	-	-	✓	-
Angus Johnston	Hatfield Consultants	-	-	✓	-
Andrew Taylor	Port Metro Vancouver	-	-	-	-
Carolina Eliasson	Port Metro Vancouver	-	-	-	-

AMENDMENT RECORD

This report has been issued and amended as follows:

Issue	Description	Date	Approved by
1	First version of CEMP Noise Management Plan	20150501	
2	Second version of CEMP Noise Management Plan	20150507	
			Garth Taylor Project Director
			Angus Johnston Project Manager

1.0 INTRODUCTION

This Noise Management Plan (the Plan) describes construction-related activities for the Vancouver Airport Fuel Delivery Project (the Project) with the potential to generate noise emissions. It outlines the methods for mitigating noise emissions, and the monitoring and reporting requirements.

The Plan is based on the recommended mitigation measures, standards and Best Management Practices (BMPs) presented in Vancouver Airport Fuel Facility Corporation's (VAFFCs) application for a Project Environmental Assessment Certificate (EAC), and has been prepared in compliance with the conditions to the EAC and Vancouver Fraser Port Authority's (VFPA trading as Port Metro Vancouver (PMV)) Environmental Assessment Decision Statement, and relevant legislation.

The focus for this version of the Plan is development of the fuel receiving facility and pipeline sections located on PMV land. The Plan will be further developed as detailed engineering progresses and to address the construction of other Project components.

2.0 OBJECTIVES AND SCOPE

The key objectives of the Plan include the following:

- Provide guidance to contractors in the preparation of detailed site/activity-specific Environmental Work Plans (EWPs) and in their implementation of site specific noise management protocols, monitoring and reporting requirements;
- Identify construction activities that could generate noise emissions;
- Reduce effects on human health and wildlife associated with the generation of noise emissions;
- Provide a comprehensive list of BMPs and mitigation measures related to noise emissions;
- Verify compliance with all relevant legislation and regulations; and
- Describe the monitoring and reporting requirements for verifying that BMPs and mitigation are being implemented as intended and are effective.

The EWPs shall be prepared by the Contractor and shall outline the methods to be used to minimize noise disturbance to people and wildlife, and meet applicable regulatory requirements and standards.

3.0 POTENTIAL ENVIRONMENTAL IMPACTS

Project works at the fuel receiving facility site will produce noise, with limited practical means of noise control. While the fuel receiving facility site is not in close proximity to any noise sensitive receptors, noise management issues on the site could potentially occur during the following construction activities:

- Site preparation activities, including grubbing;
- Soil excavation, loading, stockpiling and infilling;
- Hauling and transfer of material;
- Mobile equipment and traffic on site;
- Equipment operation, including pumps;

- Pile driving activities;
- Tank construction; and
- Other activities that may result in the generation of noise emissions.

4.0 REGULATORY CONTEXT

All site activities shall be undertaken in compliance with applicable municipal, provincial and federal legislation, regulations, standards and guidelines. Key provincial and federal legislation which may be applicable to Project activities includes:

- BC Environmental Management Act (SBC 2003, c. 53);
- BC Public Health Act (SBC 2008, c. 28);
- BC Workers Compensation Act – WorkSafeBC (RSBC 1996, c.492);
- Canada Occupational Health and Safety Regulations;
- City of Richmond Noise Regulation Bylaw No. 8856; and
- WorkSafeBC Occupational Health and Safety Regulation.

The City of Richmond Noise Regulation Bylaw permits objectionable and disturbing noises made by construction activity. Noise levels must not exceed 85 dBA when measured at a distance of 15.2 m (50 feet) from the source of the sound between:

- Between 7:00 am and 8:00 pm, Monday through Friday that is not a holiday;
- Between 10:00 am and 8:00 pm, on a Saturday that is not a holiday; and
- Between 10:00 am and 6:00 pm, on a Sunday or holiday.

4.1 PERMITS

It is not anticipated that any permits relating to noise emissions will be required during the site works.

5.0 BEST MANAGEMENT PRACTICES AND GUIDELINES

The following BMPs and environmental guidelines shall be followed for all works with the potential to generate noise emissions:

- British Columbia Noise Control Best Practices Guideline (BC Oil and Gas Committee 2009); and
- Develop with Care 2014: Environmental Guidelines for Urban and Rural Land Development in British Columbia (BC Ministry of Environment, 2014).

6.0 MITIGATION MEASURES

All works shall be conducted according to relevant legislation, BMPs and mitigation measures outlined in this document. Training of construction personnel is also required so that construction crews understand the sensitivity of particular works. Noise control measures will be implemented to mitigate impacts to wildlife and human health, including workers and the general public.

The following mitigation measures shall be implemented to reduce noise emissions resulting from site activities:

6.1 GENERAL

- Noise emissions shall be managed to comply with the City of Richmond Noise Regulation Bylaw No. 8856 (unless otherwise permitted through exemption) and the WorkSafe BC Occupational Health and Safety Regulations (BC Reg. 296/97);
- Sensitive human and wildlife sound receptors shall be identified, where applicable;
- Noise-generating activities shall be restricted to daytime hours when the environment is least sensitive to noise, unless otherwise permitted;
- Works shall be planned efficiently to minimize the duration and extent of noise disturbance to avoid wildlife disturbance or displacement (for example, coordination and scheduling of activities; appropriate location of noisy equipment; selection of less noisy equipment where possible). Work sites shall be planned to minimize the need for the reversing of trucks and other equipment and in this way reduce the frequency of backup alarms;
- Where possible, noisy equipment shall be stationed as far away as possible from sensitive noise receivers or amplifiers (e.g., workers, offices, water bodies). Topsoil piles and other construction material shall be placed strategically or stored around noise sources to reduce the hazard to receivers;
- Noisy stationary equipment (e.g., compressors, pumps, etc.) shall be located and/or oriented so as to take advantage of any inherent noise shielding available from the natural terrain, or other large objects (e.g., equipment, buildings, material piles, etc.) and to reduce noise emissions from the site;
- In areas where personnel may be exposed to noise levels of 85 dBA or greater, hearing protection (e.g., ear plugs, ear muffs) shall be required and shall be readily available on-site;
- Preservation of existing external hedgerows and site topography shall provide acoustic as well as visual screening;
- Internal haul roads and access roads shall have as low a gradient as possible to reduce engine/brake noise from heavy vehicles; and
- Engine speed limits shall be enforced that are consistent with minimum noise generation on the work site.

6.2 EQUIPMENT AND VEHICLES

Fixed and mobile equipment shall be used throughout. To minimize the potential impacts of machinery and equipment, the following mitigation measures are recommended:

- Equipment shall be kept in good working order and properly muffled, if applicable;
- All gas or diesel-powered equipment shall be fitted with intake (if appropriate) and exhaust silencers (i.e., mufflers) that meet or exceed manufacturers' recommendations for optimal attenuation;
- Air-powered equipment shall be fitted with mufflers on the compressed air ports as per manufacturer's recommendations;

- Electrically powered equipment shall be used in place of diesel or pneumatically powered equipment wherever possible;
- Vehicle and equipment idling time shall be restricted and minimized during construction in accordance with municipal bylaws;
- The use of engine brakes shall be limited where possible;
- Where feasible, quieter processes and machinery (including tires) shall be selected. When purchasing or renting equipment, manufacturer descriptions pertaining to noise shall be used as a key selection criteria;
- Machinery and equipment shall only be operated within specification and capacity (e.g., machines shall not be overloaded);
- High noise machinery (such as generators, pumps, etc.) may be retro-fitted with damping materials or contained within enclosures and/ or noise barriers. Temporary barriers/ enclosures (e.g., plywood with sound absorbing materials) shall be considered around stationary equipment that operates at noise levels of greater than 85 dBA. To be effective, such barriers shall be made wider and higher than the noise source, where possible;
- Sensitivity adjustments shall be applied to vehicle backup alarms as recommended by the International Standards Organization 1996-1:2003 standard (ISO 2003). Where practical, the sound level of backup alarms shall be adjusted to the minimum level consistent with WorkSafe B.C. requirements of being audible above the ambient noise level; and
- Regular maintenance on all equipment shall be carried out, including lubrication and replacement of worn parts, especially exhaust systems.

6.3 PILE-DRIVING

- Driving of piles shall be initiated using a vibratory hammer, followed by diesel or drop hammer to finish to the required depth; and
- Timing of pile-driving activities shall be coordinated with activities at Fraser Wharves Ltd. to avoid exceedance of the City of Richmond’s Noise Regulation Bylaw No. 8856.

6.4 COMMUNICATION WITH THE PUBLIC

Noise emissions from the site have the potential to disrupt local residents and/or communities. A Communications Plan has been developed by VAFFC that details how communication and notification will be carried out for the construction of the Fuel Receiving Facility. It targets the general public, nearby residents and businesses, and various government agencies and authorities. The Communications Plan summarizes how VAFFC intends to meet the notification and consultation requirements of PMV.

To minimize nuisance/annoyance from noise emissions, the following mitigation measures are recommended:

- Potentially affected residents/communities shall be informed of noisy, disruptive activities (including pile-driving) well in advance of construction;

- Procedures for notifying potentially affected residents/communities of changes in the estimated start and/or completion dates for the various phases of construction shall be put in place; and
- Procedures shall be put in place for receiving and responding to noise complaints. Records of any complaints shall be kept for a minimum of six months.

7.0 MONITORING

Site activities with the potential to generate noise emissions shall be monitored by the contractor's Environmental Monitor (EM). Monitoring shall verify conformance with Project approvals, applicable legislation, BMPs, mitigation measures, the objectives of this Plan and the detailed EWPs.

The EM will assess and document the following on a daily basis:

- Sources of noise generation on site;
- Use of silencers, mufflers and other noise abatement measures;
- Idling time of inactive vehicles and equipment;
- Condition of equipment and audible noise emissions; and
- Mitigation measures being implemented on site.

The EM will provide recommendations to Project personnel, as required to rectify any noted deficiencies. In the event that noise generation becomes an ongoing issue, further noise monitoring against the City of Richmond Noise Regulation Bylaw may be implemented, at the discretion of the Environmental Manager.

For works that have the potential to generate noise emissions in excess of threshold limit values, the EM and VAFFCs Environmental Manager shall have the authority to stop works until such time as impacts can be mitigated. Triggers that may result in a Stop Work Order include the failure to meet the requirements of any of the Project approvals, or other activities that pose an increased risk beyond those contemplated in the CEMP. The Environmental Manager will be available as required to provide strategic advice and/or measures to achieve the desired results for mitigating impacts.

8.0 REPORTING

The monthly environmental monitoring reports prepared by the EM shall include:

- A description of construction activities and associated noise control measures that were implemented;
- A description of maintenance checks on vehicles and equipment;
- A description and photos that document any noise management issues and corresponding mitigation measures implemented;
- A summary of any noise monitoring conducted; and
- A status update regarding implementation of all specific mitigation plans, including noise management and noise control plans.

Environmental personnel shall be responsible for submitting incident reports, should construction activities result in excessive noise emissions.

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VANCOUVER AIRPORT FUEL DELIVERY PROJECT

CEMP SPILL PREVENTION AND EMERGENCY RESPONSE PLAN

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LIST OF ACRONYMS

BMP	Best Management Practices
EAC	Environmental Assessment Certificate
EM	Environmental Monitor
EMA	Environmental Management Act
EMBC	Emergency Management BC
EWP	Environmental Work Plan
MOE	Ministry of Environment
PPE	Personal Protective Equipment
PMV	Port Metro Vancouver
VAFFC	Vancouver Airport Fuel Facilities Corporation
VFPA	Vancouver Fraser Port Authority

DISTRIBUTION LIST

The following individuals/firms have received this document:

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Andrew Taylor	Port Metro Vancouver	-	-	-	-
Carolina Eliasson	Port Metro Vancouver	-	-	-	-

AMENDMENT RECORD

This report has been issued and amended as follows:

Issue	Description	Date	Approved by	
1	First version of CEMP Spill Prevention and Emergency Response Plan	20150501		
2	Second version of CEMP Spill Prevention and Emergency Response Plan	20150508		
			Garth Taylor Project Director	Angus Johnston Project Manager

1.0 INTRODUCTION

This Spill Prevention and Emergency Response Plan (the Plan) describes construction-related activities for the Vancouver Airport Fuel Delivery Project (the Project) and outlines the potential environmental emergency related to the loss of hydrocarbon-based or other hazardous or deleterious materials that could arise during construction. The Plan includes details of pre-emergency preparedness and planning, emergency organization and responsibilities, incident reporting, and emergency response procedures.

The Plan is based on the recommended mitigation measures, standards and Best Management Practices (BMPs) presented in Vancouver Airport Fuel Facility Corporation's (VAFFCs) application for a Project Environmental Assessment Certificate (EAC), and has been prepared in compliance with the conditions to the EAC and Vancouver Fraser Port Authority's (VFPA trading as Port Metro Vancouver (PMV)) Environmental Assessment Decision Statement, and relevant legislation.

The focus for this version of the Plan is development of the fuel receiving facility and pipeline sections located on PMV land. The Plan will be further developed as detailed engineering progresses and to address the construction of other Project components.

2.0 OBJECTIVES AND SCOPE

The purpose of the Plan is to outline procedures during site works for minimizing the potential for spill and emergency related incidents and to outline procedures for responding to situations that pose an imminent or potential threat to terrestrial and aquatic environments and/or the safety of the workers and public.

The key objectives of the Plan include the following:

- Provide guidance to Contractors in the preparation of site/activity-specific Environmental Work Plans (EWPs) and in their implementation of spill prevention and emergency response management protocols, monitoring and reporting requirements;
- Identify construction activities with the potential to result in an environmental emergency related to the loss of hydrocarbon-based or other hazardous or deleterious materials;
- Identify rapid, safe and effective responses to be implemented in the event of a fire, a spill, or other environmental incident during construction;
- Reduce the effects of an emergency incident on the environment;
- Identify roles and responsibilities, and emergency contacts;
- Provide a comprehensive list of BMPs and mitigation measures related to environmental incidents, including spill prevention and containment procedures; and
- Describe the monitoring and reporting requirements for verifying that BMPs and mitigation measures are being implemented as intended and are effective.

The EWPs will be prepared by the Contractor to outline measures for controlling the risk of environmental emergencies on site, spill containment procedures, roles and responsibilities, and emergency response

and reporting procedures. An environmental reporting and emergency contact list was also be provided in the EWPs.

A separate Construction Site Safety Manual will be developed by the Contractor for VAFFC approval. The Construction Site Safety Manual shall outline measures to control worker risk to health and safety, as well as emergency response procedures in the event of a health and safety-related incident.

3.0 POTENTIAL ENVIRONMENTAL IMPACTS

Hydrocarbons and other hazardous and deleterious materials will be used during site works . Potential environmental emergencies include:

- Spills or leaks of hazardous substances, including hydrocarbons, paints, chemicals and cementitious materials;
- Fire resulting from the presence of open flames on site; electrical sparking, welding, overheating from friction, and working during dry weather;
- Encroachment into sensitive areas;
- Disturbance of wildlife, including nesting birds or their nests;
- Habituation of wildlife to human encounters;
- Disturbance of an archaeological site during ground disturbance works in parent materials;
- Road failures due to inadequate design or construction practices, material failure or heavy storm events;
- Erosion and sediment control failures due to heavy storm events, inadequate planning, installation and/or maintenance;
- Motor and/or construction vehicle/equipment accidents; and
- Construction equipment malfunctions.

The magnitude of impact would depend on the frequency and severity of the emergency as well as the emergency response time. However, most emergencies can be avoided with proper system controls and monitoring.

3.1 HAZARDOUS MATERIALS SPILLS

The greatest risk of spills will be from petroleum products such as fuels, hydraulic fluids and other such hydrocarbons (usually flammable). Spill size may vary, from small quantities (e.g., drips from equipment leaks and loose fittings, spills resulting from fueling overflow) to larger volumes (e.g., from machinery hydraulic line or fuel line ruptures).

The extent of damage, or impact caused by a spill is proportional to the quantity of material, the toxicity, the receiving environment, and the amount of time required to identify the spill and to respond. Contamination of land and/or water from spills can result in pollution of soil and groundwater.

4.0 REGULATORY CONTEXT

Key environmental legislation and regulations regulating the handling, storage, use and disposal of fuel, oil, chemicals and other hazardous substances include the following:

- BC *Emergency Program Act* and Emergency Program Management Regulation;
- BC *Environmental Management Act (EMA SBC, 2003, c.53)*, Hazardous Waste Regulation, Waste Discharge Regulation and Spill Reporting Regulation (MOE);
- BC *Fire Code* and *Fire Services Act*;
- BC *Fish Protection Act*;
- BC *Transportation Act*;
- *Canadian Environmental Protection Act* (Environment Canada, BC, 1999, c.33);
- *Canada Explosives Act*;
- *Canada Hazardous Products Act*;
- Canadian Standards Association (CSA) Z731-03 – Emergency Preparedness and Response;
- City of Richmond Pollution Prevention and Clean-Up Bylaw No. 8475;
- *Fisheries Act*;
- *Health Act* (SBC, 2008);
- *Migratory Birds Convention Act* (SC, 1994, c.22);
- *National Fire Code*;
- *Transport of Dangerous Goods (TDG) Act* (SC, 1992, c.34) and Regulations (Transport Canada);
- *Waste Management Act* (MOE);
- *Water Act* (MOE);
- *Wildfire Act* and Wildfire Regulation; and
- *Workers Compensation Act*, Occupational Health and Safety Regulation, Workplace Hazardous Materials Information System (WHIMS) and Material Safety Data Sheets (MSDS).

5.0 BEST MANAGEMENT PRACTICES AND GUIDELINES

The following Best Management Practices (BMPs) and guidelines shall be followed for all works with the potential to result in potential environmental emergencies:

- A Field Guide to Fuel Handling, Transportation and Storage (BC Ministry of Water, Land and Air Protection, 2002);
- BC Approved Water Quality Guidelines (BC Ministry of Environment, 2010. http://www.env.gov.bc.ca/wat/wq/wq_guidelines.html);

- BC Guidelines for Industry Emergency Response Plans (BC Ministry of Environment, 2002);
- British Columbia Hazardous Material Response Plan (BC Ministry of Environment, 2007);
- Develop with Care 2014: Environmental Guidelines for Urban and Rural Land Development in British Columbia (BC Ministry of Environment, 2014);
- Emergency Preparedness and Response (CAN/CSA Z731-03, R2014) (Canadian Standards Association, 2014);
- Flood Planning and Response Guide for British Columbia (Provincial Emergency Program, 1999);
- Land Development Guidelines for the Protection of Aquatic Habitat (Department of Fisheries and Oceans and BC Ministry of Environment, Lands and Parks, 1993);
- 2012 Emergency Response Guidebook. CANUTEC (Transport Canada, 2012); and
- Measures to Avoid Causing Harm to Fish and Fish Habitat (Fisheries and Oceans Canada, 2013).

6.0 MITIGATION MEASURES

Potential environmental emergencies may occur as a result of the use of hydrocarbons and other hazardous and deleterious materials. The first line of defense against environmental emergencies is through prevention. When mitigation measures are properly implemented the magnitude of any impacts is expected to be low. All works shall be conducted according to relevant legislation, BMPs and mitigation measures outlined in this document. Training of construction personnel is also required so that construction crews understand the sensitivity of particular works.

The following mitigation measures are recommended to avoid or reduce the potential for spills and environmental emergencies as a result of Project activities:

6.1 GENERAL

- The Contractor shall identify all potentially hazardous materials on site, including fuels, oils, lubricants and other harmful substances. A spill response hazard assessment shall be provided for each hazardous product identified as a potential spill concern. Maps and plans showing the storage and handling locations of hazardous materials and waste, fuels, chemicals and gases shall be prepared. Initial response procedures shall be posted at hazardous materials and fuel storage and handling locations;
- Hazard identification shall include:
 - Detailed information on the Contractor's activities and known hazards related to those activities;
 - An assessment of previously identified hazards as well as control measures, safeguards and/or barriers planned or implemented to address them; and
 - A First Aid Assessment for the site in compliance with WorkSafe BC (OHS Reg 3.16).
- Project personnel shall be trained in environmental awareness, spill containment, response and reporting procedures, according to the practices outlined in the Plan;

- The Contractors Environmental Monitor (EM) shall be available at all times that work is being conducted;
- There shall be a zero tolerance policy for the release of hazardous substances into the environment during construction;
- All hazardous substances shall be properly labelled, stored and contained;
- All work areas and machinery shall be tidy and free of excess oil, grease and leaks;
- An environmental reporting and emergency contact list with up-to-date contact numbers and emergency/spill response procedures shall be posted at site office(s) and accessible to all personnel;
- All equipment maintenance, fueling and controlled substance storage areas shall be located a minimum of 30 m from any open water source;
- Erosion and sediment control measures shall function as intended and shall be maintained and/or repaired as required;
- All animal attractants shall be properly contained to deter habituation by animals. Food and food wastes shall be stored in a manner that is not readily accessible to wildlife;
- Only personnel designated by VAFFC shall be authorized to communicate with external stakeholders and other interested parties during emergencies (e.g., First Nations, the public, media, regulators, and government agencies); and
- Works shall be stopped immediately in the event of a chance encounter with an archaeological site and the procedures outlined in the Archaeological Management Plan shall be implemented (refer to CEMP Appendix A5).

6.2 SPILL PREVENTION AND RESPONSE

Spill prevention and response procedures will vary based on the quantity, type and location of the substance and/or spill. Spills of flammable liquids, hydrocarbons and oils >100 L are reportable to Emergency Management BC (EMBC). Reportable volumes to EMBC under the *Environmental Management Act (EMA)* and/or the *Transportation of Dangerous Goods (TDG) Act* for various substances are discussed in Section 8.0, Reporting. Spills may result from ruptures or malfunctions of diesel or oil storage tanks used during construction, leaking equipment, and other sources.

Project works have the potential to result in accidental spills of deleterious materials. The following mitigation measures are recommended to reduce the potential for spills:

- Supervisory personnel, such as general foremen and construction managers, shall be trained in spill response methods. The appropriate spill contingency and response material shall be included on-site and specified in specific EWPs based on type and locations of works;
- The Contractor shall conduct all fuelling of equipment, including storage and handling of petroleum products (e.g. fuel, oil, lubricants), in an appropriate manner and in compliance with all applicable guidelines, legislation, and BMPs to eliminate the risk of spills to the environment;

- The Contractor shall be required to have appropriate site/activity-specific EWPs relating to spill prevention, containment and cleanup contingency plan for hydrocarbon products (e.g., fuel, oil, hydraulic fluid, lubricants), and all other deleterious substances that may be used in association with the Project development. This plan shall be put in place prior to works commencing;
- The Contractor shall be required to have all appropriate containment and clean up materials on site including the demonstrated expertise in deployment. Spill kits shall be properly stocked and located at all sites where hazardous substances are stored or in use;
- All equipment maintenance, fuelling and controlled substance storage areas shall be located a minimum of 30 m from any open water source; and
- Hazardous materials shall be stored on site and disposed of off-site according to all applicable regulations and guidelines.

6.2.1 Spill Response Procedures

Spill response procedures shall include:

6.2.1.1 For Spills \geq 5 L and Spills of Any Volume Reportable Under EMA

1. Making the areas safe:
 - Ensure personal, public, electrical and environmental safety;
 - Wear appropriate personal protective equipment (PPE);
 - Never rush in; always determine the product spilled before taking action;
 - Warn people in the immediate vicinity;
 - Be aware of wind direction; and
 - Ensure no ignition sources if spill is a flammable material.
2. Stopping the Flow (when possible and safe to do so):
 - Act quickly to reduce the risk of environmental impacts;
 - Close valves, shut off pumps, or plug holes and leaks;
 - Utilize all available resources to initially contain the spill (i.e., native soil, spill kits, excavators or any material, equipment or tool that can safely contribute to containment efforts); and
 - Stop the flow or the spill at its source.
3. Securing the Area:
 - Limit access to the spill area; and
 - Prevent unauthorized entry onto the site by securing and marking the area to limit exposure to pedestrians, including workers, and vehicle traffic.
4. Containing the Spill:

- Prevent spilled material from entering drainage structures;
- Use spill-absorbent material to contain the spill; or if that is not possible and the spill volume exceeds the capacity of the spill kit, use native soil, sandbags, straw bales, etc.;
- If necessary, use a dyke or any other method to prevent any discharge on-site;
- A temporary sump may be employed to contain or direct spilled liquids if groundwater is not present;
- Make every effort to minimize contamination; and
- Take soil or water samples for laboratory testing.

5. Notifying/Reporting:

- Notify the EM immediately (provide spill details);
- If a reportable spill has occurred the EM or Environmental Manager or a designate will call EMBC at 1-800-663-3456 (24 Hour);
- Any incident involving the spillage of oil or petroleum lubricating products into the marine environment shall be reported immediately to the Canadian Coast Guard. The incident shall also be reported to the 24-hour Spill Reporting Center of the Western Canada Marine Response Corporation;
- Inform VAFFC and PMV immediately of a hazardous materials spill;
- Provide necessary spill details to other external agencies as required;
- Complete an Environmental Incident Report; and
- For spills >100 L or reaching a watercourse, contact back-up commercial spill clean-up companies and local fire response teams.

6. Cleaning-Up:

- The EM and the Contractor will coordinate spill cleanup;
- Additional assistance on clean-up procedures and residue sampling will be available from the Environmental Manager, as required;
- Clean up the affected area, including confirmatory testing on the cleaned area;
- Remove the impact/debris; decontaminate any equipment or tools used in the cleanup;
- Dispose of waste materials at an approved disposal site in compliance with the BC *Environmental Management Act*, Hazardous Waste Regulation and BC *Waste Management Act*;
- Dispose of all material used in clean-up (e.g., used sorbents, oil containment materials, etc.) in accordance with the above regulatory requirements; and
- Treat and dispose of contaminated soil in compliance with the BC *Environmental Management Act*, Contaminated Sites Regulation and Hazardous Waste Regulation.

6.2.1.2 For Spills to Land < 5L that are Non-Reportable under EMA

For spills of any volume, notify the EM. The EM will monitor site clean-up of minor leaks and spills of oil, grease and hydraulic fluids that are greater than 1 L in size. Further guidance for clean-up may be provided by the Environmental Manager, as required. Remove contaminants by implementing the following measures:

- Remove the impact/debris; decontaminate any equipment or tools used in the cleanup;
- Clean up the affected area, including confirmatory testing on the cleaned area; and
- Dispose of waste materials at an approved disposal site.

6.2.2 Spills to Water

In the unlikely event of spills that were to enter adjacent watercourses, the following mitigation measures are recommended:

- The EM, the Environmental Manager, the VAFFC Project Manager and PMV shall be notified immediately;
- Aquatic booms shall be used to contain any fuels, oils or other surfactants at the source of the spill;
- The spill area shall be lined with absorbent padding to absorb contaminants from the water surface, as practical; and
- The steps outlined in Section 6.2 above shall be followed.

6.3 FIRE PREVENTION AND RESPONSE

Project works have the potential to result in fire risks as a result of electrical sparking, welding, overheating from friction, and working during dry weather conditions. The follow mitigation measures are recommended to reduce fire risks:

- At the start of Project works, the Contractor shall complete a comprehensive hazard identification to identify all potential fire hazards;
- The Contractor shall prepare site-specific work procedures for managing fire risks. These procedures shall cover:
 - Material storage locations and transfer areas;
 - Documented design review of fire, safety and protection systems for new and existing facilities and equipment; and
 - Processes to classify and assess new products brought to the Project site.
- Smoking shall be prohibited near dry fuel, fuel and hazardous and flammable materials;
- Cell phones shall not be used during refueling. The fuel nozzle will be attended at all times during refueling;
- No open burning shall be carried out on site without a permit;

- Firefighting equipment (e.g., fire extinguishers, fire blankets, shovels, ladders, water trucks, hand-tank pumps, etc.), respiratory equipment, first-aid, and medical transport services shall be provided by the Contractor as required. Fire-specific personal protective equipment shall be provided and stored as required by relevant regulatory requirements;
- Fire extinguishers shall be of suitable type and size and be located:
 - Within all fixed and mobile machinery;
 - At all buildings including offices;
 - Inside and outside of critical facilities (i.e., fuel storage); and
 - In other strategic locations around the Project site that are readily and easily accessible in the event of a fire.
- Procedures, schedules and notification for the testing, maintenance, and replacement of firefighting equipment (e.g., fire extinguishers) shall be established;
- Fire extinguishers shall be immediately replaced if removed during inspection, maintenance and servicing;
- Fire Response procedures shall include the following steps:
 - Immediate onsite notification via alarms, or emergency communication (i.e., two-way radio channel);
 - Shutdown of critical facilities, and hazardous material storages areas;
 - Containment and extinguishment of the fire, if safe to do so;
 - Evacuation of worksites and buildings occupants to identified muster areas; and
 - Notification of emergency responders (including fire department). A designated fire warden shall be responsible for initiating fire emergency system until the fire department arrives.

6.4 VEHICLE AND EQUIPMENT ACCIDENTS AND MALFUNCTIONS

Fixed and mobile equipment shall be used throughout the site works. To minimize the potential for an environmental emergency as a result of machinery and equipment use, the following mitigation measures are recommended:

- In the event of a fuel, oil or spill of other hazardous materials as a result of an equipment malfunction or collision, the steps outlined in Section 6.2 above shall be followed to secure the site prior to containment and clean-up of the spill; and
- Traffic incidents shall be handled in accordance with the requirements contained in the Traffic Management Plan (CEMP Appendix A13). A traffic incident includes, but is not limited to, motor vehicle accidents, emergency road repairs, disabled vehicles, and debris on the road.

6.5 EROSION AND SEDIMENT CONTROL FAILURE

Erosion and sediment control features will be constructed according to site-specific EWPs and will meet the requirements of the Surface Water Quality, Fisheries Protection and Sediment Control Plan (refer to CEMP Appendix A10). The following mitigation measures will be implemented to reduce the potential for environmental emergencies as a result of erosion and sediment control failure:

- Erosion control features must be inspected regularly to ensure that they are functioning as intended. Silt fences that have been knocked over, clogged with debris, compromised or that are not buried in the ground must be repaired as required; and
- In the event that contaminated or sediment-laden water escapes from a containment area, spill containment measures will be undertaken, as outlined in Section 6.2 above, to stop the flow, contain the spill and clean up the resultant debris. Site runoff shall be diverted away from the failed structure and the affected area. An emergency berm shall be established to trap the flow. The impact of the event shall be assessed, and remedial actions shall be implemented under the direction of the EM and the Environmental Manager.

6.6 SEVERE WEATHER AND FLOODING

The Contractor's EWPs shall outline procedures to minimize risks to personnel, equipment, and the environment in the event of storms, flooding or other severe weather events. Mitigation measures recommended include:

- Any observed drainage risk conditions shall be brought to the attention of the Project Manager to develop plans for resolving drainage issues before severe weather occurs;
- Incoming severe weather warnings shall be observed and responded to;
- Personnel, tools, equipment, and supplies shall be made as safe and secure as possible before the storm arrives;
- Exposed building sites shall be protected with tarpaulins or temporary sheeting;
- Construction activities that cause major soil disturbance shall be minimized during periods of high erosion potential events (e.g., high rainfall), where practical; and
- During and/or immediately after any major storm, the Contractor shall inspect all facilities and work sites for damage. The Contractor shall conduct repairs as required. Roads and work sites may require immediate repair or upgrading, such as culvert replacement or roadside ditching, during or immediately following a major storm and this work shall be done as soon as it is safe.

6.7 EARTHQUAKE RESPONSE

Richmond is located in a high risk earthquake zone that encompasses the Lower Mainland coast. Workers should familiarize themselves with earthquake preparedness measures. In the event of an earthquake, all gas, electricity and water sources shall be shut off and workers shall stay clear of hazardous material storage areas, trees, power poles, and other objects that may fall. Further details on earthquake preparedness and response may be found in the Contractor's Project Site Safety Manual.

6.8 EMERGENCY RESPONSE EQUIPMENT

Emergency response equipment shall be stored in clearly signed, easily accessible and identified locations. Emergency response equipment shall be appropriate to the situation and could include, but is not necessarily limited to:

- Emergency kits (e.g., spill kits, earthquake kits, first-aid etc.) and hazard specific personal protection equipment (e.g., flame resistant clothing, rubber gloves for electrical work, fall arrest harness, respirators, etc.);
- Emergency washing equipment at sites where a worker's eyes or skin may be exposed to harmful or corrosive substances, or other substances that may burn or irritate;
- Burn kits, at sites where potential exposure to electrical arcs is high or where thermal burns may be encountered;
- Fire alarm systems, gas detectors, and firefighting equipment for all Project construction sites;
- Emergency backup generators at critical facilities which require power to prevent injury to workers and impact to property and the environment (e.g., pumps, communications systems etc.);
- First aid equipment, attendants and supplies. Minimum levels of first aid equipment, first-aid attendants, supplies, services and facilities shall be established in accordance with WorkSafe BC guidelines; and
- Clean up materials and equipment.

Procedures and schedules for the maintenance and replacement of emergency equipment (e.g., fire extinguishers, ladders, emergency earthquake kit, etc.) shall also be provided.

6.9 SPILL AND EMERGENCY RESPONSE TRAINING

- All Project staff shall have the appropriate training and skills to perform their job in a safe manner, as outlined in the Project Site Safety Manual;
- An environmental component shall be included in the site orientation that outlines sensitive features of the site and works; proper storage, handling and use of controlled products; orientation to spill kit contents and their proper usage; and spill response procedures;
- Spill response procedures shall be displayed at hazardous materials storage facilities, fuel caches, and in Project vehicles, including a list of contacts outlining who to contact and the timeframe for notification; and
- Project personnel who regularly handle hazardous materials and waste shall be trained for product-specific hazards and mitigation measures, as well as clean-up and emergency response procedures.

6.10 ROADS

Roads shall be designed by a qualified Professional Engineer. In the event of a road failure, measures to minimize the release of sediment and sediment-laden water to surface water sources shall be taken as

required directed by the EM and Environmental Manager in accordance with the Surface Water Quality, Fisheries Protection and Sediment Control Plan (CEMP Appendix A10).

7.0 MONITORING

Construction activities with the potential to result in spills or environmental emergencies shall be monitored full time during construction by the Contractor's EM, to verify conformance with Project approvals, applicable legislation, BMPs, mitigation measures and the objectives of this Plan and the detailed site/activity-specific protection plans. Monitoring for environmental hazards will be the responsibility of every worker and will be covered during training.

The EM will assess and document the following spill prevention and emergency response measures on a regular basis:

- Volumes of waste generated on site;
- Labelling, storage and containment of hazardous and non-hazardous materials on site;
- Spill response materials and equipment;
- Fire prevention and response materials and equipment;
- Posted emergency response procedures and emergency response readiness;
- Documents and recordkeeping, including MSDS, training records, materials and hazardous wastes manifests;
- General site cleanliness and conditions; and
- Mitigation measures being implemented on site.

The EM will provide recommendations to Project personnel, as required to rectify any noted deficiencies. In the event that spill prevention and emergency response management becomes an ongoing issue, further mitigation measures may be implemented, at the discretion of VAFFC's Environmental Manager.

For works that have the potential to pose an immediate threat to human health and / or the environment, the EM and VAFFC's Environmental Manager shall have the authority to stop works until such time as impacts can be mitigated. Triggers that may result in a Stop Work Order include the failure to meet the requirements of any of the Project approvals, or other activities that pose an increased risk beyond those contemplated in the CEMP. The Environmental Manager will be available as required to provide strategic advice and/or measures to achieve the desired results for mitigating impacts.

8.0 REPORTING

The monthly environmental monitoring reports prepared by the EM shall include:

- A description of any spills or environmental incidents or emergencies on site;
- Status updates detailing any monitoring and testing conducted following an environmental incident;
- A description of construction activities and associated spill prevention and incident prevention measures that were implemented;

- Documented inspections of fire response equipment and emergency response readiness;
- A description of maintenance checks on existing containment structures and spill response equipment;
- A description and photos that document any materials storage and handling management issues and corresponding mitigation measures implemented; and
- Monthly reports shall include a status report regarding implementation of all specific spill prevention and emergency response mitigation plans.

All personnel at the Project site shall have a responsibility to report all environmental concerns or incidents, regardless of magnitude. In the event of any of the following, the Contractor shall immediately report to the EM and the VAFFC Project Manager:

- Emergency incidents and non-conformance with the Spill Prevention and Emergency Response Plan;
- Reportable safety incidents, under WorkSafe BC regulations; and
- Environmental incidents reportable under the *EMA*.

In the event of an environmental incident, the Contractor must provide the EM, the Environmental Manager and the VAFFC Project Manager with an Environmental Incident Report as soon as practical (no later than 24 hours after the incident).

8.1 AGENCY REPORTING

Spills reportable to EMBC under the *EMA* Spill Reporting Regulation and/or the *TDG Act*, are outlined in Table 1. In addition, spills of any volume to fish-bearing waters must be reported to Fisheries and Oceans Canada (DFO). The following information shall be provided in the event of a spill:

- Type and quantity of substance spilled;
- Location and time of the spill;
- Details of the area surrounding spill (possible sensitive habitats, weather, substrate type);
- Cause and effect of the spill;
- Details of actions taken to contain the spill;
- Details of possible anticipated actions;
- Name of agencies notified; and
- Name of agencies on the scene and times of arrival.

For any reportable spill, VAFFC, the EM and the Environmental Manager must be notified within 24 hours of the incident. Contact numbers for spill reporting can be found in Section 8.2. The EM must be notified of the spill for all spills of 1 L or greater and any actions taken to contain the spill. The EM should be on site for spill clean-up, where practicable. An environmental report will be filed with the Provincial government and regulatory agencies as required following clean-up of any reportable spill.

Table 1 Hazardous substances and quantities reportable to EMBC under the BC Environmental Management Act and/or the Transportation of Dangerous Goods Act.

No.	Substance Spilled	Specified Amount
1	Class 1, Explosives as defined in section 2.9 of the Federal Regulations	Any quantity that could pose a danger to public safety or 50 kg
2	Class 2.1, Flammable Gases, other than natural gas, as defined in section 2.14 (a) of the Federal Regulations	10 kg
3	Class 2.2 Non-Flammable and Non-Toxic Gases as defined in section 2.14 (b) of the Federal Regulations	10 kg
4	Class 2.3, Toxic Gases as defined in section 2.14 (c) of the Federal Regulations	5 kg
5	Class 3, Flammable Liquids as defined in section 2.18 of the Federal Regulations	100 L
6	Class 4, Flammable Solids as defined in section 2.20 of the Federal Regulations	25 kg
7	Class 5.1, Oxidizing Substances as defined in section 2.24 (a) of the Federal Regulations	50 kg or 50 L
8	Class 5.2, Organic Peroxides as defined in section 2.24 (b) of the Federal Regulations	1 kg or 1 L
9	Class 6.1, Toxic Substances as defined in section 2.27 (a) of the Federal Regulations	5 kg or 5 L
10	Class 6.2, Infectious Substances as defined in section 2.27 (b) of the Federal Regulations	1 kg or 1 L, or less if the waste poses a danger to public safety or the environment
11	Class 7, Radioactive Materials as defined in section 2.37 of the Federal Regulations	Any quantity that could pose a danger to public safety and an emission level greater than the emission level established in section 20 of the "Packaging and Transport of Nuclear Substances Regulations"
12	Class 8, Corrosives as defined in section 2.40 of the Federal Regulations	5 kg or 5 L
13	Class 9, Miscellaneous Products, Substances or Organisms as defined in section 2.43 of the Federal Regulations	25 kg or 25 L
14	Waste containing dioxin as defined in section 1 of the Hazardous Waste Regulation	1 kg or 1 L, or less if the waste poses a danger to public safety or the environment
15	Leachable toxic waste as defined in section 1 of the Hazardous Waste Regulation	25 kg or 25 L
16	Waste containing polycyclic aromatic hydrocarbons as defined in section 1 of the hazardous Waste Regulation	5 kg or 5 L
17	Waste asbestos as defined in section 1 of the Hazardous Waste Regulation	50 kg
18	Waste oil as defined in section 1 of the Hazardous Waste Regulation	100 L
19	Waste containing a pest control product as defined in section 1 of the Hazardous Waste Regulation	5 kg or 5 L
20	PCB Wastes as defined in section 1 of the Hazardous Waste Regulation	25 kg or 25 L
21	Waste containing tetrachloroethylene as defined in section 1 of the Hazardous Waste Regulation	50 kg or 50 L
22	Biomedical waste as defined in section 1 of the Hazardous Waste Regulation	1 kg or 1 L, or less if the waste poses a danger to public safety or the environment
23	A hazardous waste as defined in section 1 of the Hazardous Waste Regulation and not covered under items 1 – 22	25 kg or 25 L

Table 1 (Cont'd.)

No.	Substance Spilled	Specified Amount
24	A substance, not covered by items 1 to 23, that can cause pollution	200 kg or 200 L
25	Natural gas	10 kg, if there is a breakage in a pipeline or fitting operated above 100 psi that results in a sudden and uncontrolled release of natural gas

8.2 EMERGENCY CONTACTS

Contacts to be notified in the event of an incident or other emergency are listed in Table 2. **Phone 911 if an emergency poses an immediate threat to human health and safety.**

Table 2 Environmental emergency contact numbers.

Nature of Incident/Emergency	Department	Contact	Timeframe
All Incidents (Including Spills > 1 L)	Environmental Monitor	TBD	Immediately
All Reportable Incidents under any Environmental Law or Permit	Environmental Monitor	TBD	Immediately
	Environmental Manager – Angus Johnston	To be provided	within 24 hours
	VAFFC – Mark McCaskill	To be provided	within 24 hours
Reportable Spills under EMA	EMBC	1-800-663-3456	Immediately
Spills to Water > 100 L	EMBC	1-800-663-3456	Immediately
	Local Fire Department-Richmond Fire Rescue	911/ 604-278-5131	As Required
	Fisheries and Oceans Canada	1-866-845-6776	Immediately
Spills to Water <100 L Causing/Having Potential to Cause Serious Harm to Fish	Fisheries and Oceans Canada	1-866-845-6776	Within 24 hours
Spills to Marine Environment	Canadian Coast Guard	1-800-889-8852	Immediately
	Western Canada Marine Response Corporation	604-294-9116	Immediately
Spills of Dangerous Goods in Transport	EMBC	1-800-663-3456	Immediately
	RCMP	911	Immediately
	Canadian Transport Emergency Centre (CANUTEC)	613-996-6666 or *666 on a cell phone	Immediately
Spills of Dangerous Goods in Transport cont'd.	Employer/Person in Control of the Dangerous Goods	TBD	Immediately
	Shipper of the Dangerous Goods	TBD	Immediately
Motor Vehicle Accidents	RCMP	911 / 604-278-1212	Immediately
	Local Fire Department/ Richmond Fire-Rescue	911/ 604-278-5131	Immediately, as required
	Ambulance	911	Immediately, as required
Emergency Services	RCMP	911	Immediately, as required
	Richmond RCMP Detachment	604-278-1212	Immediately, as required
	Fire - Richmond Fire-Rescue	911 / 604-278-5131	Immediately, as required
	Ambulance	911	Immediately, as required
	Richmond Hospital	604-278-9711	Immediately, as required

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VANCOUVER AIRPORT FUEL DELIVERY PROJECT

CEMP SURFACE WATER QUALITY, FISHERIES PROTECTION AND SEDIMENT CONTROL PLAN

Prepared for:

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LIST OF ACRONYMS

BMP	Best Management Practices
BOD	Biochemical Oxygen Demand
CCME	Canadian Council of Ministers of the Environment
DO	Dissolved Oxygen
EAC	Environmental Assessment Certificate
EM	Environmental Monitor
EWP	Environmental Work Plan
MFLNRO	Ministry of Forests, Lands and Natural Resource Operations
MOE	Ministry of Environment
PMV	Port Metro Vancouver
PAH	Polycyclic Aromatic Hydrocarbons
TPH	Total Petroleum Hydrocarbons
TSS	Total Suspended Solids
VAFFC	Vancouver Airport Fuel Facilities Corporation
VFPA	Vancouver Fraser Port Authority

DISTRIBUTION LIST

The following individuals/firms have received this document:

Name	Firm	Hardcopies	CDs	Email	FTP
Adrian Pollard	FSM Management Group Inc	-	-	✓	-
Mark McCaskill	FSM Management Group Inc	-	-	✓	-
Angus Johnston	Hatfield Consultants	-	-	✓	-
Andrew Taylor	Port Metro Vancouver	-	-	-	-
Carolina Eliasson	Port Metro Vancouver	-	-	-	-

AMENDMENT RECORD

This report has been issued and amended as follows:

Issue	Description	Date	Approved by	
1	First version of CEMP Surface Water Quality, Fisheries Protection & Sediment Control Plan	20150501		
2	Second version of CEMP Surface Water Quality, Fisheries Protection & Sediment Control Plan	20150511	Garth Taylor Project Director	Angus Johnston Project Manager

1.0 INTRODUCTION

This Surface Water Quality, Fisheries Protection and Sediment Control Plan (the Plan) describes construction-related activities for the Vancouver Airport Fuel Delivery Project (Project) with the potential to impact water quality and/or fish or fish habitat. Recommended mitigation is provided for protecting surface water quality and/or fish or fish habitat, and controlling the release of sediments. Monitoring and reporting requirements are also described.

The Plan is based on the recommended mitigation measures, standards and Best Management Practices (BMPs) presented in Vancouver Airport Fuel Facility Corporation's (VAFFCs) application for a Project Environmental Assessment Certificate (EAC), and has been prepared in compliance with the conditions to the EAC and Vancouver Fraser Port Authority's (VFPA trading as Port Metro Vancouver (PMV)) Environmental Assessment Decision Statement, and relevant legislation.

The focus for this version of the Plan is development of the fuel receiving facility and pipeline sections located on PMV land. The Plan will be further developed as detailed engineering progresses and to address the construction of other Project components.

2.0 OBJECTIVES AND SCOPE

The purpose of the Plan is to describe the typical strategies for mitigating and managing surface water quality and controlling the release of sediments to watercourses in the vicinity of the Project construction site. Implementation of this Plan and the contractor Environmental Work Plans (EWPs) is expected to avoid or minimize the potential for adverse effects to surface water quality, fish and fish habitat.

The key objectives of the Plan include the following:

- Provide guidance to contractors in the preparation of activity-specific EWPs and in their implementation of site specific surface water quality, fisheries protection and sediment control protocols, monitoring and reporting requirements;
- Prevent or minimize erosion and the sedimentation of watercourses and/or surface water drainage ditches;
- Identify Project activities with a potential to result in effects to fish and fish habitat;
- Identify typical methods for placing, storing, transporting and/or disposing of materials to prevent the release of construction and excavation wastes, overburden, silt, soil or other substances deleterious to aquatic life into any watercourse;
- Identify typical methods for collecting, removing and disposing of sanitary wastewater;
- Develop guidance protocols for managing, regular monitoring, maintaining and repairing of surface water drainage, storm water drainage, and other erosion and sediment control measures to verify that these measures function effectively and as intended under all site conditions;
- Identify procedures for notification in the event of an environmental incident such as an imminent, impending or actual failure of a sediment control structure that could or is resulting in the discharge of deleterious materials to the receiving environment;

- Develop protocols to be followed in the event that the Environmental Monitor (EM) determines that the quality of the discharge water leaving the site exceeds, or has the potential to exceed, prescribed levels;
- Describe typical measures to manage water flow and discharge from the Project site in accordance with all relevant legislation and regulations;
- Provide a comprehensive list of BMPs and mitigation measures related to surface water quality management, fisheries protection and sediment control; and
- Describe the monitoring and reporting requirements for verifying that BMPs and mitigation measures are being implemented as intended and are effective.

3.0 POTENTIAL ENVIRONMENTAL IMPACTS

The fuel receiving facility site is in proximity to the South Arm of the Fraser River, which is the principle aquatic receptor within the general area. A network of surface drainage ditches exist on and adjacent to the fuel receiving facility site.

The release of sediment and other deleterious substances into fish-bearing waters and/or waters that flow directly into fish-bearing waters could potentially occur during site works, leading to water quality, and fish and fish habitat concerns. Flow alterations due to Project works could also lead to potential impacts to fish.

Activities that have the potential to cause adverse environmental impacts to water quality and fish and fish habitat include:

- Site preparation and clearing works, including soil excavation/disturbance and grading;
- Handling, transfer and storage of debris and soils;
- Vehicular traffic on temporary unpaved roads;
- Erosion of soil stockpiles; and
- Other activities that could potentially result in the introduction of deleterious substances into fish-bearing waters (e.g., accidental spills of petroleum-based products or concrete leachate).

4.0 REGULATORY CONTEXT

Key legislation and regulations that apply to surface water quality, fisheries protection and sediment control include:

- BC Contaminated Sites Regulation (BC CSR, BC Reg. 375/96, O.C. 1480/96 and M271/2004, including amendments up to BC Reg. 4/2014, January 31, 2014);
- *BC Environmental Management Act* (SBC 2003, c. 53);
- *BC Fish Protection Act* (SBC 1997, c. 21) and the Riparian Areas Regulation;
- *BC Water Act* (RSBC 1996, c. 483);
- *BC Wildlife Act* (RSBC 1996, C. 488);
- *Canadian Environmental Protection Act* (Environment Canada, B.C. 1999, c.33);
- *Canada Fisheries Act* (RSC 1985, c. F-14);
- *Canada Water Act* (R.S.C., 1985, c.C-11);
- *Canada Wildlife Act* (R.S.C. 1985, c. W-9);
- City of Richmond Pollution Prevention and Clean-Up Bylaw No. 8475;
- Species at Risk Act (SARA) (S.C. 2002, c. 29); and
- Environmental Assessment Certificate, Port Metro Vancouver Environmental Assessment Decision Statement and related conditions and assurances.

4.1 PERMITS AND APPROVALS

There will be no in-water works or works requiring a Section 9 *Water Act* Approval or Notification during the site works. Water use (e.g., for dust suppression, fire prevention) will be provided through the existing on-site connection. Therefore, an Approval from the Ministry of Forests Lands and Natural Resource Operations (MFLNRO) under Section 8 of the *Water Act* is not required.

Based on current design details and the location of site activities it is not anticipated that a Fisheries Act Authorization will be required.

5.0 BEST MANAGEMENT PRACTICES AND GUIDELINES

The following BMPs and guidelines shall be followed for all works with the potential to affect surface water quality, fish and fish habitat:

- A Field Guide to Fuel Handling, Transportation and Storage (BC Ministry of Water, Land and Air Protection, 2002);

- A Guidebook for British Columbia: Stormwater Planning. BC Ministry of Water, Land and Air Protection, 2002;
- Ambient Water Quality Criteria for pH: Technical Appendix. BC Ministry of Environment, 1991;
- Ambient Water Quality Guidelines (Criteria) for Turbidity, Suspended and Benthic Sediment: Overview Report. BC Ministry of Environment and Parks, 2001;
- Ambient Water Quality Guidelines for Sulphate: Overview Report. BC Ministry of Environment, 2000;
- A User's Guide to Working In and Around Water; Understanding the Regulation under British Columbia's *Water Act*. BC Ministry of Environment, May 2005; revised 2009;
- BC Approved Water Quality Guidelines (BC Ministry of Environment, online resource);
- British Columbia Field Sampling Manual for Continuous Monitoring and the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment and Biological Samples. 2003 Edition. Ministry of Water Land and Air Protection, 2003;
- Canadian Water Quality Guidelines for the Protection of Aquatic Life. Online resource: <http://cegg-rcqe.ccme.ca/en/index.html>;
- Develop with Care 2014: Environmental Guidelines for Urban and Rural Land Development in British Columbia (BC MOE, 2014);
- Fisheries Protection Policy Statement. Fisheries and Oceans Canada, 2013;
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- Riparian Management Area Guidebook. BC Ministry of Forests, 1995;
- Standards and Best Practices for Instream Works. BC Ministry of Water, Land and Air, March 2004; and
- Working Water Quality Guidelines for British Columbia. BC Ministry of Environment, 2015.

6.0 MITIGATION MEASURES

All works shall be conducted according to relevant legislation, BMPs and mitigation measures outlined in this document. Training of construction personnel is also required so that construction crews understand the sensitivity of particular works.

The following mitigation measures are recommended for all works with the potential to affect surface water quality, fish and fish habitat:

6.1 GENERAL

- Training shall be provided to on-site personnel on how to avoid or minimize impacts to surface water quality, fish and fish habitat prior to work;
- Workers shall be trained in fuel handling and spill protocols, including how to use the materials contained in aquatic spill kits as discussed in the Spill Prevention and Emergency Response Plan (CEMP Appendix A9);
- Sufficient filter cloth, rock, seed, drain rock, culverts, staking, matting, polyethylene and other materials used for erosion and sedimentation prevention or control shall be readily available on site throughout Project works;
- The surfaces of compacted, disturbed and exposed soils shall be roughened to increase infiltration into the ground and break up or slow down sheet flows;
- Clearing shall be conducted in stages where practicable to reduce the potential for erosion or mobilized sediments;
- Soil disturbance and compaction shall be minimized;
- Exposure time of unvegetated soils shall be minimized;
- Any barges delivering fill materials to the VAFFC marine terminal, shall be securely berthed at the dock or spud-anchored to prevent grounding. Covering shall be used to bridge any gaps between the bulkhead wall and the barge to prevent any stray material from entering the Fraser River;
- Measures shall be put in place to minimize mud tracking by site vehicles (e.g., sweeping/cleaning). Any mud, dirt and debris tracked along local roads and areas outside of the immediate work area, shall be cleaned-up in a timely manner;
- Care shall be taken to undertake the proper use, handling and storage of hazardous substances including fuels and oils, chemicals and other products as required;
- All temporary sanitary facilities for the construction period will be self-contained with no septic fields. Portable sanitary facilities shall be located a minimum of 30 m from any open watercourse, on flat ground, in an area that is protected from damage resulting from construction activities, vandalism, or environmental factors. Sanitary facilities will be regularly maintained by an approved operator for disposal (i.e., vac truck) off-site. The use of supplied washroom facilities is mandatory for all Project personnel;
- The contractor shall prepare a site-specific Erosion and Sediment Control EWP prior to any works commencing on site; and
- Concrete washout and disposal of wash water shall be managed in accordance with the Fuels, Chemicals and Materials Storage and Handling Plan (CEMP Appendix A7).

6.2 MACHINERY AND EQUIPMENT

Fixed and mobile equipment shall be used during site works. To avoid or minimize the potential impacts of machinery and equipment, the following mitigation measures are recommended:

- Stationary equipment (e.g., pumps, generators, etc.) shall be operated on top of a drip tray, and drip trays will have the capacity to contain any spills or leakage during set-up, operation and dismantling. Rainfall and hose connections/disconnections should be taken into consideration when determining the required capacity of drip trays. Total capacity of drip trays shall be a minimum of 125% of potential spill volume;
- All equipment and drip trays shall be inspected after heavy rainfall to check that containment has not been compromised;
- Refueling of mobile machinery shall be conducted a minimum of 30 m from any open waterbody, on level ground, or in accordance with the Fuels, Chemicals and Materials Storage and Handling Plan (CEMP Appendix A7);
- All maintenance activities of both mobile and stationary machinery shall be conducted on level ground and a minimum of 30 m from any open waterbody;
- Machines shall be maintained in a leak-free state, free of excess oil and grease;
- Spill kits, as listed in the Spill Prevention and Emergency Response Plan (CEMP Appendix A9) shall be present on site during all works;
- All accidental releases of hazardous material on water or land shall be reported to the contractor's Environmental Monitor (EM), VAFFC's Environmental Manager and Emergency Management BC within 24 hours, as outlined in the Spill Prevention and Emergency Response Plan (CEMP Appendix A9); and
- Construction equipment shall be cleaned prior to site arrival to prevent the spread of weeds and invasive plant species.

6.3 GRUBBING AND STRIPPING

Prior to site works commencing, work areas will be cleared and grubbed. To minimize the potential erosion and sedimentation impacts of any required vegetation removal, the mitigation measures outlined in the Vegetation and Wildlife Management Plan shall be followed (CEMP Appendix A11).

6.4 STOCKPILING AND SLOPE PROTECTION

Temporary stockpiles of excavated material or backfill may be stored onsite. To minimize the potential impacts of stockpiling, the following mitigation measures are recommended:

- Any erodible construction spoils/materials stockpiled onsite shall be placed so that erosion into drainage ditches or other open water is prevented;
- Soil stockpile areas and volumes shall be minimized, where possible, particularly during inclement weather;

- All stockpiles and exposed areas with side slopes greater than 1H:1V (45°) shall require erosion protection such as covering with tarpaulins and/or polyethylene sheeting. Tarpaulins and plastic sheeting shall be secured with stakes and staples, old tires, or rocks, and shall be bordered by silt fences;
- A silt fence shall be established around the toe of all stockpiles to prevent and contain sedimentation;
- Standard installation techniques shall be used to ensure that all silt fencing on the site is functional and durable (e.g., properly staked and entrenched a minimum 200 millimetres (mm) into the ground);
- Any runoff that does originate from stockpiled materials shall be collected and discharged to ground at the northeast of the Project site along with the discharges from excavation dewatering as outlined in the Groundwater Management Plan (CEMP Appendix A13); and
- Stockpiled materials shall be stored in a stable condition a minimum of 30 m away from open waterbodies.

6.5 RUNOFF INTERCEPTION AND CONTROL

The Contractor shall be responsible for maintaining adequate drainage from work areas, access roads, excavations, and soil fill areas, and for verifying that drainages are managed in accordance with the applicable BMPs as outlined in Section 5.0. To minimize the potential impacts of runoff from work areas, the following mitigation measures are recommended:

- An erosion assessment shall be conducted by the EM on all new and existing ditches to determine the need for additional erosion protection;
- Surface water shall be diverted around disturbed construction areas, stockpiles and lay down areas (e.g., by installing temporary curbs along road access points). Diversion should avoid significant alteration of pre-existing down slope drainage;
- Sediment traps shall be used where drainage ditches are required. Sediment traps are any structure constructed for the purpose of effectively removing suspended soil particles from the runoff;
- Silt fences shall be properly installed on the lower perimeter of slopes to contain waterborne movement of soils;
- All silt fences shall be constructed using acceptable materials:
 - Fence posts shall be a minimum of 90 cm long, constructed of hardwood with a 5 cm x 5 cm dimensional width, and be spaced a maximum of 3 m apart;
 - Geotextile fabric shall be NW GEO 140 NL geotextile or an alternative with specifications that are similar and acceptable to the EM.
- Silt fences and sediment traps shall be regularly inspected and maintained. New fences shall be installed when required;

- As necessary, check dams and/or gravel berms shall be installed at intervals along the length of ditches, to decelerate flow and facilitate sediment settling;
- Sediment and erosion control measures shall be left in place until all disturbed areas have been stabilized;
- Storm water arising on site shall be diverted overland and discharged to ground on the site as outlined in the Groundwater Management Plan (CEMP Appendix A13). Storm water arising on site shall not be discharged from the site without appropriate permits;
- All pumped groundwater (excavation dewatering effluent) shall be discharged through erosion and sediment control measures appropriate for the site and shall comply with CCME Water Quality Guidelines prior to being released to ground at designated discharge points at the northeast of the Project site as outlined in the Groundwater Management Plan (CEMP Appendix A13); and
- Watering of roads and exposed soils shall not result in the generation of sediment-laden water to open watercourses. Water application shall be monitored and controlled to provide adequate coverage while not saturating the surface of the unpaved road, or creating pooling or runoff.

6.6 CONTINGENCY PLANNING AND WORKING IN RAIN

Rainfall events can result in significant erosion due to the effects of water on exposed soils and the runoff generated. The EM shall be responsible for monitoring current weather predictions. In the event of predicted or actual heavy rainfall (e.g., >25 mm in 1 hour or >60 centimeters (cm) in 24 hours), the EM may issue a Stop Work Order if deemed necessary until the conditions improve or the situation has been rectified.

To minimize the potential impacts of heavy rainfall events, the following mitigation measures are recommended:

- Materials required to handle excess runoff following a storm event shall be stored onsite at all times; and
- In the event of a severe storm event that results in runoff that exceeds the capacity of the sediment control provisions all work on site shall be halted.

7.0 MONITORING

Construction activities with the potential to affect surface water quality and fish and fish habitat shall be monitored full time by the EM, to verify conformance with Project approvals, applicable legislation, BMPs, mitigation measures and the objectives of this Plan and the detailed EWPs. Works requiring monitoring shall include:

- Clearing and grubbing;
- Excavation;
- Stockpiling; and
- Loading and transport.

Prior to work activities commencing, the EM shall conduct a round of baseline water quality monitoring at the surface water drainage ditches in the vicinity of the site to determine background water quality. Water samples shall be collected in accordance with the procedures described in the British Columbia Field Sampling Manual for Continuous Monitoring plus the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment and Biological Samples (2003) and results shall be compared to BC Water Quality Guidelines.

Water quality monitoring shall be undertaken on a weekly basis during construction by the Environmental Monitor. Samples shall be analysed for pH, Temperature, conductivity, dissolved oxygen (DO), total suspended solids (TSS), biochemical oxygen demand (BOD), dissolved and total metals concentrations, total petroleum hydrocarbons (TPHs), and polycyclic aromatic hydrocarbons (PAHs).

Water quality monitoring may be undertaken as required by the EM depending on other factors, including weather, sensitivity of location and activities being conducted. Water quality effects associated with the works shall be systematically assessed at individual sites by comparing the water quality of affected water at a particular site to background.

Environmental monitoring activities shall also include:

- Inspections of surface water drainage ditches to identify signs of release of materials, soils or water to waterbodies, Indicators of potential contamination may include the presence of floating and suspended materials, oily sheens, discoloration, turbidity, unusual odours or foam;
- Site inspections to identify signs of erosion (i.e., rain drop erosion, sheet erosion, rill erosion, gully erosion and channel erosion);
- Site inspections to verify that erosion and sediment control measures have been installed, are effective, are maintained and are removed when there is no longer the potential for erosion; and
- Inspections to verify that adequate maintenance is being conducted of the contingency erosion and sediment control materials (e.g., mulch, straw wattles, sediment fencing, erosion control blankets, polyethylene sheeting, seeding materials, etc.) and to verify that adequate supplies are available onsite.

If evidence of discharge to waterbodies is encountered, contractors should immediately contact the EM, who will coordinate with VAFFC and direct the contractor to further action or Stop Work. After consultation with the EM and VAFFC any suspected discharges will be managed in accordance with the Spill Prevention and Emergency Response Plan (CEMP Appendix A9).

For works that have the potential to pose an immediate threat to surface water quality and/or fish and fish habitat, the EM and VAFFCs Environmental Manager shall have the authority to stop works until such time as impacts can be mitigated. Triggers that may result in a Stop Work Order include the failure to meet the requirements of any of the Project approvals, or other activities that pose an increased risk beyond those contemplated in the CEMP. The Environmental Manager will be available as required to provide strategic advice and/or measures to achieve the desired results for mitigating impacts.

8.0 REPORTING

The monthly environmental monitoring reports prepared by the EM shall include:

- A summary of any water quality monitoring conducted at the site;
- A description of construction activities and associated surface water quality, fisheries protection and erosion and sediment control measures that were implemented;
- Documented inspections of surface water drainage ditches;
- A description of maintenance checks on existing erosion and sediment control measures;
- A description and photos that document any erosion and sediment management issues and corresponding mitigation measures implemented;
- A status update regarding implementation of all specific mitigation plans, including sediment and erosion control and drainage plans.

Environmental personnel shall be responsible for submitting incident reports, should construction activities result in turbid or otherwise non-compliant waters being discharged to local waterbodies.

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VANCOUVER AIRPORT FUEL DELIVERY PROJECT

VEGETATION AND WILDLIFE MANAGEMENT PLAN

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VERSION 2

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Andrew Taylor	Port Metro Vancouver	-	-	-	-
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AMENDMENT RECORD

This report has been issued and amended as follows:

Issue	Description	Date	Approved by	
1	First version of CEMP Vegetation and Wildlife Management Plan	20150501		
2	Second version of CEMP Vegetation and Wildlife Management Plan	20150511		
			Garth Taylor Project Director	Angus Johnston Project Manager

1.0 INTRODUCTION

This Vegetation and Wildlife Management Plan (the Plan) describes construction-related activities for the Vancouver Airport Fuel Delivery Project (the Project) with the potential to impact vegetation and wildlife. It outlines the methods for preventing or minimizing the potential for adverse effects to vegetation and wildlife, and the monitoring and reporting requirements.

The Plan is based on the recommended mitigation measures, standards and Best Management Practices (BMPs) presented in Vancouver Airport Fuel Facility Corporation's (VAFFCs) application for a Project Environmental Assessment Certificate (EAC), and has been prepared in compliance with the conditions to the EAC and Vancouver Fraser Port Authority's (VFPA trading as Port Metro Vancouver (PMV)) Environmental Assessment Decision Statement, and relevant legislation.

The focus for this version of the Plan is development of the fuel receiving facility and pipeline sections located on PMV land. The Plan will be further developed as detailed engineering progresses and to address the construction of other Project components.

1.1 OBJECTIVES AND SCOPE

The key objectives of the Plan are to:

- Identify Project activities with a potential to result in adverse effects on vegetation and/or wildlife;
- Provide recommendations for avoiding or reducing the potential for adverse effects of Project activities on vegetation and/or wildlife;
- Provide guidance to contractors in the preparation of activity-specific Environmental Work Plans (EWP) and in their implementation of site specific vegetation and wildlife management protocols, monitoring and reporting requirements;
- Minimize unnecessary disturbance of any vegetation within the Project footprint;
- Outline measures for preventing the introduction and/or spread of invasive species during site works;
- Provide a comprehensive list of Best Management Practices (BMPs) and mitigation measures related to vegetation and wildlife;
- Guide compliance with all relevant legislation and regulations; and
- Describe the monitoring and reporting requirements for verifying that BMPs and mitigation are being implemented as intended and are effective.

The EWPs shall be prepared by the construction Contractor to outline the specific methods to be used to avoid or minimize the potential for adverse effects to vegetation and wildlife, and meet applicable regulatory requirements and standards.

2.0 POTENTIAL ENVIRONMENTAL EFFECTS

Vegetation and wildlife management issues on the Project site could potentially occur during clearing and grubbing, soil excavation, stockpiling, vehicle and equipment operations, transport of materials, and other site activities.

Potential effects on vegetation and wildlife include the following:

- Removal of native plant species;
- Direct loss of wildlife and/or wildlife habitat;
- Aquatic habitat degradation;
- Habitat fragmentation and loss of connectivity;
- Wildlife sensory disturbance;
- The unintended introduction or spreading of invasive plant species.

2.1 VEGETATION AND WILDLIFE SPECIES

The site for the fuel receiving facility and sections of pipeline has had considerable anthropogenic disturbance over many years and has been significantly altered from its natural state. While recognizing the historic industrial activities and current condition of the site, there are a number of vegetation and wildlife species that could potentially occur on and around the site and, in areas of suitable habitat on Lulu Island, there are some species which are provincially and/or federally designated as at-risk (e.g., Common nighthawk, barn swallow, Western toad, Northern red-legged frog, Pacific water shrew, beaverpond baskettail, autumn meadowhawk, yellow marsh marigold, Vancouver Island beggarstick, flowering quillwort).

In the unlikely event of the presence of at-risk vegetation and/or wildlife species on or adjacent to the site, and to minimize the potential impacts of site works, it is recommended that appropriate least-risk windows are followed where feasible and practical. Where least-risk windows cannot be followed, it is recommended that BMPs are implemented to mitigate the potential for disturbances to at-risk species.

BMPs to guide all Project works on site to avoid or mitigate potential impacts to all vegetation and wildlife are described in Section 4.0.

3.0 REGULATORY CONTEXT

All Project-related activities shall be undertaken in compliance with applicable provincial and federal legislation, regulations, standards and guidelines. Key provincial and federal legislation which may be applicable to vegetation and wildlife includes:

- *BC Community Charter* – Environment and Wildlife Regulation (B.C. Reg. 144/2004);
- *BC Environmental Land Use Act* (RSBC 1996, c. 117);
- *BC Environmental Management Act* (SBC 2003, c. 53);

- *BC Integrated Pest Management Act* (SBC 2003, c. 58);
- *BC Water Act* (RSBC 1996, c. 483);
- *BC Weed Control Act* (RSBC 1996, c. 487);
- *BC Wildlife Act* (RSBC 1996, c. 488);
- *Canadian Environmental Protection Act* (SC 1999, c. 33);
- *Canada Wildlife Act* (RSC 1985, c. W-9);
- *Fisheries Act* (RSC 1985, c.F-14);
- *Migratory Birds Convention Act, 1994* (SC 1994, c. 22), and *Migratory Birds Regulations*;
- *Pest Control Products Act* (SC 2002, c. 28);
- *Seeds Act* (RSC 1985, c. S-8);
- *Species at Risk Act (SARA)* (SC 2002, c. 29);
- *Wild Animal and Plant Protection and Regulation of International and Inter-Provincial Trade Act* (SC 1992, c. 52); and
- Environmental Assessment Certificate and related commitments and assurances.

3.1 PERMITS

Wildlife-related permits that may be required during Project works include:

- *Species at Risk Act* Salvage Permits for SARA-listed species; and
- *Wildlife Act* Wildlife Salvage Permits.

4.0 BEST MANAGEMENT PRACTICES AND GUIDELINES

The following BMPs and environmental guidelines are recommended to guide all Project works as they relate to vegetation and wildlife management:

- *Amphibians and Reptiles: Guidelines for Amphibian and Reptile Conservation during Urban and Rural Land Development in British Columbia (2014): A companion document to Develop with Care* (BC MOE, 2014). http://www.env.gov.bc.ca/wld/documents/bmp/HerptileBMP_complete.pdf;
- *Best Management Practices for Amphibians and Reptiles in Urban and Rural Environments in British Columbia* (BC MOWLAP, 2004);
- *Best Management Practices Guidelines for Pacific Water Shrew in Urban and Rural Areas (Working Draft)* (BC MOE, 2010);
- *Best Management Practices for Raptor Conservation during Urban and Rural Land Development in British Columbia* (BC MOE 2005);
- *Develop with Care 2014: Environmental Guidelines for Urban and Rural Land Development in British Columbia* (BC Ministry of Environment, 2014);

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http://www.env.gov.bc.ca/wld/documents/bmp/raptor_conservation_guidelines_2013.pdf;
- Guidelines for Translocation of Plant Species at Risk in British Columbia (BC MOE, 2009b);
- Invasive Alien Plant Program Reference Guide Part 1 (Range Branch, BC MOFR, 2010);
- Inventory Methods for Pond-Breeding Amphibians and Painted Turtle, Standards for Components of British Columbia's biodiversity No. 37 (Resource Inventory Committee, 1998);
- Inventory Methods for Raptors, Standards for Components of British Columbia's Biodiversity No. 11, Version 2.0 (Resource Inventory Committee, 2001);
- Land Development Guidelines for the Protection of Aquatic Habitat (DFO and BC MOELP, 1993);
- Migratory Birds Policy and Regulations: Incidental Take - Avoidance Guidelines, General Avoidance Information (Environment Canada, online resource);
- Planning Ahead to Reduce the Risk of Detrimental Effects to Migratory Birds, and Their Nests and Eggs (Environment Canada, 2013);
- Protocols for Rare Plant Surveys (Red- and Blue-listed Species) (Penney, J. and R. Klinkenberg, BC Conservation Data Centre and E-Flora BC, 2013. In: Klinkenberg, Brian. (Ed) 2013. E-Flora BC: Electronic Atlas of the Flora of British Columbia [eflora.bc.ca]. Lab for Advanced Spatial Analysis, Department of Geography, University of British Columbia, Vancouver); and
- Recover Strategy for the Pacific Water Shrew (*Sorex bendirii*) in British Columbia (BC MOE, 2009a).

5.0 MITIGATION MEASURES

All works shall be conducted according to relevant legislation, BMPs and mitigation measures outlined in this document. Training of site personnel shall be required so that crews understand the sensitivity of particular works. Environmental management measures will be implemented to avoid or mitigate potential impacts to surrounding vegetation and wildlife.

General

The following general mitigation measures shall be implemented prior to and during site works to minimize impacts to vegetation, wildlife and wildlife habitats:

- Site activities shall be generally confined to the Project footprint and adjacent areas as required to develop the site and as required by PMVs Project Permit;
- All intact surface water drainage ditches (and any other water bodies) and their vegetation shall be preserved (when feasible) as these areas can be used by amphibians at various times of the year for breeding habitat and cover;

- Wildlife habitat attributes such as logs and snags shall be retained where feasible and practical;
- Excessive loud noise and human disruption shall be minimized in active breeding areas to the extent practical and in accordance with municipal bylaws;
- Roads created for the site works shall be maintained as necessary to reduce the potential for potholes and ponding to minimize attraction of these small water bodies to western toads;
- Dust suppressants shall be applied regularly to roads to minimize the potential for habitat degradation along road margins; and
- Night works on the site shall be avoided or limited to the extent practical and in accordance with municipal bylaws to reduce the potential for noise disturbance to wildlife.

Site Preparation - Clearing and Soil Disturbance

Site preparation activities will include clearing and grubbing, and excavation of soils. To minimize the potential impacts of site preparation works on vegetation and wildlife, the following mitigation measures are recommended:

- Prior to site preparation, all clearing limits shall be marked on plans and in the field with the intention of prevent Project works encroaching beyond the planned footprint. Measures may include flagging, fencing, signage, monitoring, or other means as deemed appropriate by the contractor's Environmental Monitor (EM);
- It is recommended that vegetation clearing, if required, be conducted outside of the breeding bird season for migratory songbirds where feasible (from March 28 to August 15, though that breeding window may extend to August 31 for some species). If not feasible, it is recommended that nesting surveys be conducted as close as possible to the start of vegetation clearing works for the purposes of identifying active breeding nests. A raptor survey shall be conducted before the start of site works to determine if raptor mitigation is required;
- If an active breeding nest is identified in areas of vegetation clearing works, appropriately sized buffers shall be placed around the nest as per best practices. Buffers shall remain in place until a nest is determined to be inactive by a qualified environmental professional (QEP). Buffers for nests that are protected year-round (e.g., eagles and herons) shall not be removed when the nest is no longer active;
- If clearing is not completed within 7 days of a nesting survey, a new nesting survey shall be conducted as appropriate;
- Prior to site works commencing, amphibian surveys (i.e., for northern red-legged frog and western toad, and any other species encountered) shall be conducted by a QEP in surface water drainage ditches (and any other water bodies) located within 30 m of the construction footprint. If required, an amphibian salvage plan (active or passive depending on the species) shall be prepared for breeding populations and the salvage shall be undertaken in accordance with a Wildlife Salvage Permit prior to the start of any Project works within 30 m;

- If and when required, amphibian salvages shall involve the temporary removal of: (1) tadpoles or larvae from water bodies; (2) juveniles and adults in or next to water; and/or (3) migrating toadlets anywhere, depending on the circumstances; and
- Notwithstanding the site history, nature and condition, and as a matter of best practice, rare plant and dragonfly surveys shall be conducted by a QEP. The following plant species shall be targeted in the survey: yellow marsh marigold, Vancouver Island beggarstick and flowering quillwort. In the unlikely event that any of these plant species are identified, appropriate measures shall be taken to demarcate its extent (i.e., fencing). Marked areas should be avoided where feasible. Where avoidance is not feasible, a QEP should assess the possibility of relocating the plant(s) to suitable habitat nearby. The following dragonfly species shall be targeted in the survey: beaverpond baskettail and autumn meadowhawk. Both are species that could potentially breed in the slow-moving water of ditches near the development footprint. In the event these species are observed, a QEP shall be engaged for guidance on appropriate mitigation strategies.

Wildlife Encounter Protocol

Wildlife encounter protocols shall be implemented on the Project site to manage possible encounter(s) with wildlife species/habitats during construction. Workers shall not touch, collect, harm or harass wildlife encountered on site. It is recommended that the following mitigation measures are implemented:

- Contractors shall consult with the EM regarding appropriate mitigation measures if wildlife species are encountered;
- All site personnel and subcontractors shall receive training on how to report incidental wildlife observations. Such observations shall be used by the EM to address site-specific mitigation needs;
- If amphibian breeding areas are identified, appropriate mitigation measures shall be undertaken by the contractor in consultation with VAFFC's Environmental Manager;
- Appropriate speed limits shall be set and posted on the site to avoid or reduce the potential for wildlife collisions; and
- All site personnel shall yield the right of way to wildlife encountered while driving.

Soil Conservation and Stripped Organic Materials, Site Grading and Contouring

The erosion of unstable soils and the discharge of sediment-laden water to surface water drainage ditches (or any other water body) can potentially increase turbidity to the detriment of riparian and aquatic wildlife and vegetation. To minimize the potential impacts to vegetation and wildlife, the mitigation measures recommended in the Surface Water Quality, Fisheries Protection and Sediment Control Plan (see **CEMP Appendix A10**) and Spill Prevention and Emergency Response Plan (see **CEMP Appendix A9**) shall be followed.

Invasive Species Management

Care shall be taken to prevent the introduction and spread of invasive species on site. The following measures are recommended to control the introduction and spread of invasive species:

- The construction footprint, including areas to be cleared and grubbed, shall be assessed by the EM for invasive species presence prior to the start of site works. Identified invasive species shall be removed and disposed of using the control measures outlined in BMPs (refer to Section 4.0);
- Invasive species removal activities shall be documented and reported to the Invasive Plant Council of BC;
- Any imported soil and topsoil used on-site shall be from a source that states that the material is free of invasive plants and their propagules (seeds, etc.);
- Prior to entering the Project footprint, and in instances where invasive plant species and/or noxious weeds are identified on the site where equipment is to be used, earthworks equipment shall be cleaned. Records shall be kept by the EM and provided to VAFFC's Environmental Manager on request;
- Equipment shall only be cleaned in designated washing areas where invasive plants and their propagules may be properly captured and disposed of;
- The pooling of water shall be avoided onsite to the extent practical; to avoid the spread of invasive species;
- Invasive species inspections shall be conducted monthly during the site work by the EM;
- Ground cover within the Project footprint shall be re-established using native species once an area is no longer actively being used for construction and is not required for operations, to control erosion and sedimentation and the establishment of invasive plants; and
- Measures to prevent the spread of green frogs (*Lithobates clamitans*), if observed on the site, to the extent feasible and practical.

Wildlife Attractants and Pest Management

- All food, food waste, fuels, oils and lubricants, and other attractants shall be stored in sealed containers that are inaccessible to wildlife, and removed from site on a daily basis;
- Food waste shall not be mixed with construction waste;
- Poisons shall not be used to control rodents and other pests that may be present on site; and
- Integrated pest/weed management shall be used and the use of herbicides shall be minimized.

Restoration and Revegetation

Restoration of all disturbed areas will abide by the restoration design plans to be prepared in accordance with the CEMP revision during the future construction works.

6.0 MONITORING

Project activities with the potential to adversely affect vegetation and/or wildlife shall be monitored by the EM. Monitoring shall verify conformance with Project approvals, applicable legislation, BMPs, mitigation measures, the objectives of this Plan and the detailed site/activity-specific EWPs.

The EM shall assess and document the following:

- General construction monitoring to track compliance with applicable sections of the CEMP, key environmental performance indicators, and with site/activity-specific EWPs;
- Areas of temporary and permanent vegetation loss, including details on type and quantity of vegetation that requires clearing to accommodate construction;
- Incidental wildlife observations, records of wildlife encounters and wildlife activity;
- Any incidents of clearing outside of designated boundaries;
- Presence of invasive species and noxious weeds, and measures used to prevent their spread;
- The condition of the site and access roads;
- Active nest monitoring, as relevant, to evaluate the effectiveness of established buffers and the date at which works can commence in the area (the time of fledging);
- Amphibian breeding monitoring to determine the most effective salvage technique for the species and life stages observed, as may be required; and
- Installation and maintenance of protective fencing, including wildlife exclusion fencing and silt fencing.

The EM shall provide recommendations to Project personnel, as required to rectify any noted deficiencies. In the event that vegetation and/or wildlife management becomes an ongoing issue, further monitoring may be implemented, at the discretion of VAFFCs Environmental Manager.

For works that have the potential to pose an immediate threat to vegetation or wildlife, the contractor's EM, VAFFCs Environmental Manager and VAFFC shall have the authority to stop works until such time as impacts can be mitigated. Triggers that may result in a Stop Work Order include the failure to meet the requirements of any of the Project approvals, or other activities that pose an increased risk beyond those contemplated in the CEMP. VAFFCs Environmental Manager shall be available as required to provide strategic advice and/or measures to achieve the desired results for mitigating impacts.

7.0 REPORTING

Monthly environmental monitoring reports shall be prepared by the EM and submitted to VAFFCs Environmental Manager, and shall include:

- A description of site activities and general associated vegetation and wildlife management measures that were implemented;

- Corrective action in response to wildlife incidents requiring direct wildlife management (identification of active songbird nests, raptor nests, and/or wildlife encounters, scavengers of Project-related waste products) within the Project footprint;
- Invasive species management measures implemented on site, including identification of species encountered. Details of any invasive species encountered and treatment of invasive species will be provided to the Invasive Plant Council of BC;
- A description and photos that document any vegetation or wildlife issues and corresponding mitigation measures implemented; and
- A status update regarding implementation of all specific mitigation plans.

The QEP shall prepare summary reports of any vegetation and/or wildlife surveys carried out.

The Contractor shall be responsible for submitting incident reports, should construction activities result in adverse effects to vegetation and/or wildlife. If work results in adverse effects, the EM shall complete an incident report in accordance with the Accidents or Malfunctions Management Plan (CEMP Appendix A3) and the Spill Prevention and Emergency Response Plan (CEMP Appendix A9).

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VANCOUVER AIRPORT FUEL DELIVERY PROJECT

CEMP WASTE MANAGEMENT PLAN

Prepared for:

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MAY 2015

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LIST OF ACRONYMS

BMP	Best Management Practices
EAC	Environmental Assessment Certificate
EM	Environmental Monitor
EMA	Environmental Management Act
EWP	Environmental Work Plan
MFLNRO	Ministry of Forests, Lands and Natural Resource Operations
MOE	Ministry of Environment
MSDS	Material Safety Data Sheets
PMV	Port Metro Vancouver
TDG	Transport of Dangerous Goods
VAFFC	Vancouver Airport Fuel Facilities Corporation
VFPA	Vancouver Fraser Port Authority

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Angus Johnston	Hatfield Consultants	-	-	✓	-
Andrew Taylor	Port Metro Vancouver	-	-	-	-
Carolina Eliasson	Port Metro Vancouver	-	-	-	-

AMENDMENT RECORD

This report has been issued and amended as follows:

Issue	Description	Date	Approved by	
1	First version of CEMP Waste Management Plan	20150501		
2	Second version of CEMP Waste Management Plan	20150511		
			Garth Taylor Project Director	Angus Johnston Project Manager

1.0 INTRODUCTION

This Waste Management Plan (the Plan) describes waste generating construction-related activities for the Vancouver Airport Fuel Delivery Project (the Project). It outlines the methods for waste minimization, recycling, storage and disposal, and the monitoring and reporting requirements.

The Plan is based on the recommended mitigation measures, standards and Best Management Practices (BMPs) presented in Vancouver Airport Fuel Facility Corporation's (VAFFCs) application for a Project Environmental Assessment Certificate (EAC), and has been prepared in compliance with the conditions to the EAC and Vancouver Fraser Port Authority's (VFPA trading as Port Metro Vancouver (PMV)) Environmental Assessment Decision Statement, and relevant legislation.

The focus for this version of the Plan is development of the fuel receiving facility and pipeline sections located on PMV land. The Plan will be further developed as detailed engineering progresses and to address the construction of other Project components.

1.1 OBJECTIVES AND SCOPE

The purpose of the Plan is to describe the typical strategies for managing hazardous and non-hazardous wastes in the vicinity of the Project site. Implementation of this Plan and the detailed Contractor EWPs will minimize the potential for adverse effects as a result of wastes generated on site.

The key objectives of the Waste Management Plan include the following:

- Provide guidance to contractors in the preparation of detailed site/activity-specific Environmental Work Plans (EWPs) and in their implementation of site waste management protocols, monitoring and reporting requirements;
- Reduce the potential for effects associated with hazardous and non-hazardous waste on the human health and the environment;
- Identify the types of materials and hazardous wastes requiring disposal;
- Identify procedures for managing non-hazardous and hazardous wastes generated during construction, including waste minimization, handling, storage, transportation and disposal;
- Identify procedures to be followed to prevent the loss of waste materials, contaminants, construction-related debris, and/or other types of materials into environmentally sensitive areas (e.g., streams, wetlands), public lands and roadways, or private property;
- Provide a comprehensive list of BMPs and mitigation measures related to hazardous and nonhazardous waste; and
- Describe the monitoring and reporting requirements for verifying compliance with all relevant legislation and regulations and that BMPs and mitigation are being implemented as intended and are effective.

The Contractor will prepare EWPs to outline how waste will be collected, segregated, stored and disposed of. Each type of waste shall be segregated and treated according to its properties.

Additional information on proper storage, handling and use of hazardous materials used for construction can be found in the Actions or Malfunctions Management Plan (CEMP Appendix A3), the Fuels, Chemicals and Materials Storage and Handling Plan (CEMP Appendix A7), and the Spill Prevention and Emergency Response Plan (CEMP Appendix A9). Management of any contamination on site is addressed separately in the Contaminated Sites Management Plan (CEMP Appendix A6). Management of discharges from excavation dewatering and stormwater arising on site shall be in accordance with the Groundwater Management Plan (CEMP Appendix A13).

2.0 POTENTIAL ENVIRONMENTAL IMPACTS

Hazardous and non-hazardous wastes will be generated at the Project site including:

- Land clearing and organic debris;
- Garbage (e.g., waste food, paper and other garbage produced by site workers);
- Topsoil and excavation spoil;
- Other non-hazardous solid waste;
- Batteries and battery fluid;
- Oily rags or sorbents containing flammable liquids;
- Organic and inorganic contaminants;
- Waste oils, lubricants and filters;
- Concrete and cementitious materials; and
- Paints and related chemicals.

Improper storage, handling and management of wastes have the potential to:

- Pose threats to human health and safety;
- Pose threats to wildlife through creating attractants and habituation or accidental poisoning; and
- Introducing deleterious substances and/or contaminants into previously uncontaminated upland areas, surface waters, and/or groundwater.

3.0 REGULATORY CONTEXT

Key legislation and regulations that applies to waste management includes:

- BC Contaminated Sites Regulation (BC CSR, BC Reg. 375/96, O.C. 1480/96 and M271/2004, including amendments up to BC Reg. 4/2014, January 31, 2014);
- BC *Environmental Management Act* (SBC 2003, c. 53), Hazardous Waste Regulation (BC Reg. 63/2009), Spill Reporting Regulation (BC Reg. 376/2008), and Ambient Water Quality Guidelines for the Protection of Aquatic Life;

- *BC Fire Code* (2012) and *Fire Services Act* (RSBC 1996, c. 144);
- *BC Fish Protection Act* (SBC 1997, c.21);
- *BC Public Health Act* (SBC 2008, c. 28);
- *BC Transport of Dangerous Goods Act* (RSBC 1996, c. 458) and *Transport of Dangerous Goods Regulation* (BC Reg. 231/2002);
- *BC Water Act* (MoE) (RSBC 1996, c. 483); *Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations* (SOR/2005-149);
- *BC Worker's Compensation Act* (RSBC 1996, c.492) and *Occupational Health and Safety Regulation* (BC Reg. 404/2012);
- *Canadian Environmental Protection Act* (SC 1999, c. 33);
- *Canada Fisheries Act* (RSC 1985, c. F-14);
- *Canada Hazardous Products Act* (R.S.C. 1985, c. H-3) and *Controlled Products Regulation* (SOR/88-66);
- *Canada Transportation of Dangerous Goods Act* (SC 1992, c. 34) and *Transportation of Dangerous Goods Regulations* (Transport Canada) (SOR/2001-286);
- City of Richmond Pollution Prevention and Clean-Up Bylaw No. 8475, 2009; and
- City of Richmond Solid Waste & Recycling Regulation Bylaw No. 6803, 2015.

3.1 PERMITS

The EMA prohibits the unauthorized release of wastes into the environment and sets the requirement for wastes to be disposed of at authorized facilities. The EMA Waste Discharge Regulation identifies prescribed activities which require an authorization, which could be in the form of a permit, approval, an operational certificate, an order or a waste management plan, to introduce waste into the environment.

The EMA Hazardous Waste Regulation identifies types of substances that are considered “hazardous wastes”, and sets out requirements for registration, transportation, handling, storage, treatment and emergency response. Registration and permits for storage of hazardous waste may be required, and transporters must be licensed under the Regulation.

Works requiring an authorization under the Environmental Management Act during Project construction are not anticipated.

4.0 BEST MANAGEMENT PRACTICES AND GUIDELINES

The following BMPs and guidelines shall be followed when dealing with wastes generated on site:

- A Best Practices Guide to Solid Waste Reduction (Canadian Construction Association, 2001);
- A Field Guide to Fuel Handling, Transportation and Storage (BC MOWLAP, 2002);
- British Columbia Field Sampling Manual for Continuous Monitoring plus the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment and Biological Samples (BC MOWLAP, 2003);
- British Columbia's Recycling Handbook (Stewardship Agencies of British Columbia, 2012);
- Dangerous Goods Spill Response Plan (City of Richmond, 2003);
- Develop with Care 2014: Environmental Guidelines for Urban and Rural Land Development in British Columbia (BC MOE, 2014);
- Guidance Document on the Management of Contaminated Sites in Canada (CCME, 1997);
- Hazardous Waste Legislation Guide (BC MOE, 2005);
- Land Development Guidelines for the Protection of Aquatic Habitat (DFO and BC MOELP, 1993); and
- 2012 Emergency Response Guidebook (Transport Canada, 2012).

5.0 MITIGATION MEASURES

The greatest risks from hazardous and non-hazardous wastes is from improper handling and disposal, which could result in contamination to the environment, threats to human health and safety, and/or threats to wildlife. When mitigation measures are properly implemented the magnitude of any impacts are expected to be low. All works shall be conducted according to relevant legislation, BMPs and mitigation measures outlined in this document. Training of site personnel is also required so that construction crews understand the sensitivity of particular works.

The following mitigation measures are recommended to reduce the effects of waste materials generated on site:

5.1 GENERAL

- Outdoor refuse containers shall remain sealed at all times except when filling or emptying. Any refuse containers that are damaged or leaking shall be repaired or replaced;
- All tools, equipment and waste shall be stored in the appropriate locations at the end of each day;
- Waste material shall be stored in a manner that is secure and protected from the elements;
- Material excavated from the fuel receiving facility site shall be transferred to the Ecowaste Landfill site, as appropriate;

- Material that is not suitable for disposal at the Ecowaste Landfill shall be temporarily stored on site prior to disposal, in accordance with relevant laws, regulations and permitting requirements, at an approved facility that is licensed to accept such material for disposal;
- All temporary sanitary facilities shall be self-contained with no septic fields. Portable sanitary facilities shall be located a minimum of 30 m from any open watercourse, on flat ground, in an area that is protected from damage resulting from construction activities, vandalism, or environmental factors. Sanitary facilities shall be regularly maintained by an approved operator for disposal (i.e., vac truck) off-site. The use of supplied washroom facilities is mandatory for all site personnel; and
- Waste concrete and cementitious materials shall be handled in accordance with the Fuels, Chemicals and Materials Storage and Handling Plan (CEMP Appendix A7).

5.2 NON-HAZARDOUS WASTE

Project works will generate non-hazardous waste. The following mitigation measures are recommended to reduce the potential for releases of non-hazardous waste materials to the environment:

- Littering shall be prohibited on site. Measures shall be implemented to prevent and control littering;
- The Contractor shall label designated areas and repositories for all recyclable and non-recyclable wastes. All construction personnel shall be trained in determining whether wastes can be recycled on-site, off-site or must be disposed of as wastes. Labeling of waste containers shall include a description of what materials are and are not accepted in each container;
- Cigarette butts shall be discarded in an appropriate receptacle in designated smoking areas and not be left or buried on site;
- Food and food wastes shall be stored in a manner that is not readily accessible to wildlife. All food and other wildlife attractants, which may contain any substance with a strong smell, shall be stored appropriately in a wildlife-proof container or building and removed from the Project site at the end of each day. The feeding of wildlife shall be prohibited on site;
- Regular disposal or recycling shall be carried out at a frequency sufficient to prevent accumulating large quantities of waste. All solid waste shall be handled in accordance with applicable municipal, provincial and federal regulations and disposed of at an authorized receiving facility. All materials shall be transported in accordance with the *Transport of Dangerous Goods Act (TDG)*, Transportation of Dangerous Goods Regulations and the *BC Environmental Management Act (EMA)* Hazardous Waste Regulation;
- No burning of wastes shall be conducted on site without permit;
- Volumes and dates of delivery of all site material sent to each disposal location must be provided to the contractor's Environmental Monitor (EM) for information; and
- Waste materials generated that do not pose a risk to contamination of the site shall be recycled on site where possible. Waste materials generated on site that are non-hazardous and cannot be reused on site shall be recycled at an approved facility, where practicable.

5.3 HAZARDOUS WASTE

Project works will generate hazardous waste, including cementitious materials, waste oils, chemical wastes and used absorbent materials and filters. The follow mitigation measures are recommended to reduce the potential for releases of hazardous waste materials to the environment:

- Workers handling hazardous wastes shall be appropriately trained in their handling, storage and disposal. Training records for those involved with the handling and transportation of hazardous waste shall be kept at the site office;
- Hazardous wastes must be managed, transported, labelled, stored, and disposed of according to the *EMA Hazardous Waste Regulation* via licensed transportation and disposal facilities;
- Hazardous wastes shall be kept segregated from non-hazardous wastes and stored and transported in a manner that prevents incompatible materials from being mixed. Wastes contaminated with flammable liquid shall not be mixed with wastes contaminated with oil;
- Each container or area used to store hazardous waste shall be clearly labelled as containing hazardous waste and shall be equipped with adequate secondary containment. Hazardous waste containers shall be kept closed at all times except when being filled or emptied;
- Hazardous waste storage areas shall be checked weekly and a corresponding inspection log shall be kept in the site office;
- All hazardous waste containers shall be labeled and stored in accordance with all requirements of the *TDG Act* and *Workers Compensation Act* (WHMIS MSDS labeling requirements);
- Waste rags and sorbents shall be stored in containers with self-closing lids, with the bottom of the container raised and vented;
- Used oil and antifreeze shall be picked up by a collector registered by the BC Used Oil Management Association;
- If necessary, hazardous waste shall be temporarily stored in designated, secure areas with secondary containment and protected from the weather. The storage areas shall be located at least 30 m away from any watercourses. Hazardous wastes shall be managed in compliance with applicable fire codes;
- Any stockpiled contaminated and hazardous soils shall be separated from non-contaminated soils, and segregated according to soil quality classes. Hazardous waste, waste quality and Industrial Land soils shall not be mixed together, nor shall they be diluted with clean water or soils. All stockpiled contaminated soils shall be contained in a manner that prevents interaction with water and moisture accumulation, as outlined in the Contaminated Sites Management Plan [CEMP Appendix A6). Any contaminated and hazardous soils shall be marked with signs and safety warnings; and
- Spills of hazardous materials shall be cleaned-up and immediately reported to the EM and to appropriate regulatory agencies in accordance with the *EMA* and the Spill Prevention and Emergency Response Plan [CEMP Appendix A9).

6.0 MONITORING

Activities with the potential to result in releases of non-hazardous and hazardous wastes to the environment shall be monitored full time during construction by the EM, to verify conformance with Project approvals, applicable legislation, BMPs, mitigation measures and the objectives of this Plan and the detailed site/activity-specific EWPs. Monitoring for environmental hazards shall be the responsibility of every worker and shall be covered during training.

The EM shall assess and document the following waste management measures on a regular basis:

- Volumes of waste generated on site;
- Labelling, storage and containment of hazardous wastes on site;
- Spill response materials and equipment, posted spill response procedures and spill response readiness;
- Documents and recordkeeping, including waste training records, disposal records, and hazardous wastes manifests;
- General site cleanliness and conditions; and
- Mitigation measures being implemented on site.

The EM shall provide recommendations to Project personnel, as required to rectify any noted deficiencies. In the event that waste management becomes an ongoing issue, further mitigation measures may be implemented, at the discretion of VAFFCs Environmental Manager.

For works that have the potential to pose an immediate threat to human health and / or the environment, the EM and VAFFCs Environmental Manager shall have the authority to stop works until such time as impacts can be mitigated. Triggers that may result in a Stop Work Order include the failure to meet the requirements of any of the Project approvals, or other activities that pose an increased risk beyond those contemplated in the CEMP. The VAFFC Environmental Manager will be available as required to provide strategic advice and/or measures to achieve the desired results for mitigating impacts.

7.0 REPORTING

The monthly environmental monitoring reports prepared by the EM shall include:

- A description of waste types generated on site;
- A description of construction activities and associated waste handling and storage measures that were implemented;
- Documented inspections of hazardous waste manifests, including soil waste material disposed off-site. Disposal details shall include volumes and date of delivery of site materials sent to each disposal location;

- A description of maintenance checks on existing containment structures and spill response equipment;
- A description and photos that document any waste storage and handling management issues and corresponding mitigation measures implemented;
- Monthly reports shall include a status report regarding implementation of all specific waste mitigation plans.

The Contractor shall be responsible for submitting incident reports to the EM, the Environmental Manager and the VAFFC Project Manager, should construction activities result in releases of waste materials or risks to human health and the environment.

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VANCOUVER AIRPORT FUEL DELIVERY PROJECT

CEMP GROUNDWATER MANAGEMENT PLAN

Prepared for:

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LIST OF ACRONYMS

BMP	Best Management Practices
CSR	Contaminated Sites Regulation
EAC	Environmental Assessment Certificate
EM	Environmental Monitor
EWP	Environmental Work Plan
HW	Hazardous Waste
<IL	Industrial Land Use Soil Standard
MOE	Ministry of Environment
PMV	Port Metro Vancouver
VAFFC	Vancouver Airport Fuel Facilities Corporation
VFPA	Vancouver Fraser Port Authority

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Mark McCaskill	FSM Management Group Inc	-	-	✓	-
Angus Johnston	Hatfield Consultants	-	-	✓	-
Andrew Taylor	Port Metro Vancouver	-	-	-	-
Justin Carlson	Environmental Assessment Office	-	-	-	-

AMENDMENT RECORD

This report has been issued and amended as follows:

Issue	Description	Date	Approved by	
1	First version of CEMP Groundwater Management Plan	20150430		
2	Second version of CEMP Groundwater Management Plan	20150507		
			Garth Taylor Project Director	Angus Johnston Project Manager

1.0 INTRODUCTION

This Groundwater Management Plan (the Plan) has been prepared to address construction-related activities for the Vancouver Airport Fuel Delivery Project (Project) with the potential to impact groundwater quality and groundwater aspects of dewatering of excavations. Recommended mitigation is provided for protecting groundwater quality and controlling the release of sediments or contamination into an aquatic environment. Monitoring and reporting requirements are also described.

The Plan is based on the recommended mitigation measures, standards and Best Management Practices (BMPs) presented in Vancouver Airport Fuel Facility Corporation's (VAFFCs) application for a Project Environmental Assessment Certificate (EAC), and has been prepared in compliance with the conditions to the EAC and Vancouver Fraser Port Authority's (VFPA trading as Port Metro Vancouver (PMV)) Environmental Assessment Decision Statement, and relevant legislation.

The focus for this version of the Plan is development of the fuel receiving facility and pipeline sections located on PMV land. The Plan will be further developed as detailed engineering progresses and to address the construction of other Project components.

2.0 OBJECTIVES AND SCOPE

The purpose of the Plan is to describe the typical strategies for managing groundwater quality and excavation dewatering to prevent the release of sediments to watercourses in the vicinity of the Project site. These strategies are intended to guide the construction contractor's Environmental Monitor (EM) in the preparation and implementation of detailed site/activity-specific Environmental Work Plans (EWPs).

The key objectives of the Plan include the following:

- Provide guidance to contractors on handling groundwater seepage and accumulation of water in the excavation area, and in their implementation of site specific groundwater management and groundwater quality protection protocols, monitoring and reporting requirements;
- Prevent contamination of groundwater resources and / or other aquatic resources;
- Describe typical methods for dewatering activities to prevent the release of silt, soil or other substances deleterious to aquatic life into any watercourse;
- Describe typical methods for water flow and discharge to prevent localised erosion and ponding;
- Develop guidance protocols for managing, regular monitoring, maintaining and repairing of dewatering systems and sediment control measures to verify that these measures function effectively and as intended under all site conditions;
- Identify procedures for notification in the event of an environmental incident that could or is resulting in the discharge of deleterious materials to the receiving groundwater environment;
- Develop protocols to be followed in the event that the EM determines that the quality of the discharge water from excavations leaving the site exceeds, or has the potential to exceed, prescribed levels;

- Provide a comprehensive list of BMPs and mitigation measures related to groundwater quality management and dewatering; and
- Describe the monitoring and reporting requirements for verifying that BMPs and mitigation measures are being implemented as intended and are effective.

3.0 POTENTIAL ENVIRONMENTAL IMPACTS

The fuel receiving facility site is near the South Arm of the Fraser River, which is the principle environmental receptor within the general area. A network of drainage channels exist on the fuel receiving facility site which are linked to the Fraser River.

Site preparation works will require excavation to approximately 7 to 10 meters (m) below existing grade, and below the local water table. In general, groundwater levels are expected to be at or slightly above the mean river level at the site, typically 2 to 4 m below current ground surface. The groundwater level will be affected by the surface run-off and groundwater seepage/flow in the upland areas, will fluctuate seasonally, and may rise to near ground surface following an extended period of rainy weather. Groundwater encountered in excavations or surface water that contacts excavated materials will be managed in accordance with this Plan and discharged to ground at the northeast of the project site.

Activities that have the potential to cause adverse environmental impacts to groundwater quality include:

- Site preparation works, including soil excavation/disturbance; and
- Other activities that could potentially result in the introduction of deleterious substances to groundwater (e.g., accidental spills of petroleum-based products or concrete leachate).

Excavation dewatering could potentially result in the following environmental impacts:

- The release of sediment and other deleterious substances into groundwater and/or waters that flow directly into fish-bearing waters, leading to water quality, and fish and fish habitat concerns;
- The release of deleterious substances or contaminated groundwater into non-contaminated soils;
- Localised erosion if the flow volume of water at the exit point is not diffused or controlled properly; and
- Ponding of water if the receiving soil cannot adequately absorb the discharge.

4.0 REGULATORY CONTEXT

Key legislation and regulations that apply to groundwater management include:

- BC Groundwater Protection Regulation (B.C. Reg. 299/2004);
- BC Contaminated Sites Regulation (BC CSR, BC Reg. 375/96, O.C. 1480/96 and M271/2004, including amendments up to BC Reg. 4/2014, January 31, 2014);
- *BC Environmental Management Act* (SBC 2003, c. 53);
- *BC Fish Protection Act* (SBC 1997, c. 21) and the Riparian Areas Regulation;
- *BC Water Act* (RSBC 1996, c. 483);
- *Canada Water Act* (RSC 1985, c.C-11);
- *Canada Fisheries Act* (RSC 1985, c. F-14);
- *Canada Wildlife Act* (RSC 1985, c. W-9);
- City of Richmond Pollution Prevention and Clean-Up Bylaw No. 8475, 2009; and
- Environmental Assessment Certificate, Port Metro Vancouver Environmental Assessment Decision Statement and related conditions and assurances.

4.1 PERMITS

There will be no effluent discharge of any type into streams or storm sewers as a result of dewatering excavations during the works. A Non-Stormwater Discharge Agreement is not expected to be required for these works.

5.0 BEST MANAGEMENT PRACTICES AND GUIDELINES

The following BMPs and guidelines shall be followed for all works with the potential to affect groundwater quality or as a result of dewatering excavations:

- A Field Guide to Fuel Handling, Transportation and Storage. BC Ministry of Water, Land and Air Protection. 2002;
- A Guidebook for British Columbia: Stormwater Planning. BC Ministry of Water, Land and Air Protection. 2002;
- Ambient Water Quality Criteria for pH: Technical Appendix. BC Ministry of Environment. 1991;
- Ambient Water Quality Guidelines (Criteria) for Turbidity, Suspended and Benthic Sediment: Overview Report. BC Ministry of Environment and Parks. 2001;
- Ambient Water Quality Guidelines for Sulphate: Overview Report. BC Ministry of Environment. 2000;
- A User's Guide to Working In and Around Water; Understanding the Regulation under British Columbia's *Water Act*. BC Ministry of Environment. May 2005, revised 2009;
- BC Approved Water Quality Guidelines. Online resource. <http://www2.gov.bc.ca/gov/topic.page?id=044DD64C7E24415D83D07430964113C9>;
- British Columbia Field Sampling Manual for Continuous Monitoring and the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment and Biological Samples. 2003 Edition. Ministry of Water Land and Air Protection. 2003;
- Canadian Water Quality Guidelines for the Protection of Aquatic Life. Online resource: <http://ceqg-rcqe.ccme.ca/en/index.html>;
- Construction Site Stormwater Runoff Control. US EPA. Online Resource: <http://water.epa.gov/polwaste/npdes/swbmp/Construction-Site-Stormwater-Run-Off-Control.cfm>;
- Develop with Care 2014: Environmental Guidelines for Urban and Rural Land Development in British Columbia (BC MOE. 2014);
- Fisheries Protection Policy Statement. Fisheries and Oceans Canada. 2013;
- Land Development Guidelines for the Protection of Aquatic Habitat. Department of Fisheries and Oceans and BC Ministry of Environment, Lands and Parks. 1993;
- Measures to Avoid Causing Harm to Fish and Fish Habitat, Department of Fisheries and Oceans. 2013. Online resource: <http://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures/index-eng.html>;
- Technical Guidance on Contaminated Sites 1: Site Characterization and Confirmation Testing. (MWLAP. 2005); and
- Working Water Quality Guidelines for British Columbia. BC Ministry of Environment. 2015.

6.0 MITIGATION MEASURES

All works shall be conducted according to relevant legislation, BMPs and mitigation measures outlined in this document. Training of construction personnel is also required so that construction crews understand the sensitivity of particular works.

The following mitigation measures shall be employed as necessary for works with the potential to affect groundwater quality:

General

- Training shall be provided to on-site personnel on how to avoid or minimize impacts to groundwater quality prior to work;
- Workers shall be trained in fuel handling and spill protocols, including how to use the materials contained in aquatic spill kits as discussed in the Spill Prevention and Emergency Response Plan (CEMP Appendix A9);
- Care shall be taken to undertake the proper use, handling and storage of hazardous substances including fuels and oils, chemicals and other products as required;
- No groundwater shall be directly discharged from site to any waterbody or surface water drain;
- The surfaces of compacted, disturbed and exposed soils shall be roughened to increase infiltration into the ground and break up or slow down sheet flows;
- Fixed and mobile equipment shall be used throughout the works. To minimize the potential impacts of machinery and equipment on groundwater quality, the mitigation measures outlined in the Spill Prevention and Emergency Response Plan (CEMP Appendix A9) shall be followed;
- The Contractor shall be responsible for providing sufficient storage capacity for excavation dewatering, stockpile leachate, and decontamination water;
- The Contractor shall use sump pumps, well points, or a combination of methods to achieve the stated objective;
- All dewatering and pump equipment in direct contact with the excavation or stockpile water must be resistant to VOCs and petroleum hydrocarbons and be explosion proof. Effluent from any holding or treatment system shall be equipped with a flow totaliser and a sample port for access by the EM; and
- The Project Surface Water Quality, Fisheries Protection and Sediment Control Plan (CEMP Appendix A10) shall be followed for the management of surface water that contacts the work areas (e.g., excavation areas, haul routes and stockpile areas). The Groundwater Management Plan (CEMP Appendix A13) shall be followed for groundwater that is pumped or otherwise encountered during excavation work.

Dewatering

Richmond's groundwater situation means that excavations for construction will require pumping of groundwater. To minimize the potential effects resulting from dewatering, the following mitigation measures shall be employed as necessary:

- Prior to commencement of dewatering activities, the pumping rates and the total volume of groundwater requiring abstraction shall be estimated to determine the optimum locations for discharge;
- A floating suction hose or other similar measures shall be used on the pump intake to prevent sediment from being sucked from the bottom of the excavation;
- A dosing tank shall be used to treat dewatering effluent, if required, providing rapid and reliable neutralization of extracted water. Effluent after neutralisation shall be discharged into a polythene lined settling basin;

- The amount of hose and the number/size of pumps used for dewatering shall be sufficient to discharge water at a location which drains away from waterbodies;
- Groundwater encountered in excavations or surface water that contacts excavated materials shall be managed and diverted to pervious areas at the north east of the extraction area. Discharge of water to ground shall only take place in flat areas with soils of high infiltration and storage capacity;
- Discharge outlets shall be inspected regularly, and after each rainfall. Any accumulated sediment shall be removed;
- The flow rate of the discharged water (which may need to vary) shall be continuously monitored by the contractor and managed based on the site conditions to prevent water from reaching any nearby waterbodies. The discharge rate shall be adjusted as necessary to avoid scouring, erosion, or sediment transport from the discharge location; and
- All pumped groundwater (excavation dewatering effluent) shall be discharged through appropriate methods and shall comply with CCME Water Quality Guidelines prior to being released to ground at designated discharge points.

Potentially Contaminated Groundwater

Due to the historical landfilling use on the site, the potential exists for unidentified contaminated materials to be encountered. To minimize the potential effects to groundwater due to unexpected contaminated materials, the following mitigation measures shall be employed as necessary:

- Should suspected contaminated soils be encountered on the site, groundwater encountered in this part of the excavations or surface water that has contacted the excavated materials shall be treated prior to discharge from the site;
- Any water which becomes contaminated due to contact with contaminated soils shall be stored and managed in consultation with the EM. It is recommended that a storage capacity should

accommodate seven full days of excavation dewatering effluent. Provisions shall be put in place to treat contaminated water prior to discharge;

- The Contractor shall make arrangements for the disposal of any treated water. The EM and VAFFC shall be informed of proposed discharges at least 72 hours before treated water is discharged to allow for arrangement of sampling and analyses. Upon receipt of laboratory results, water will be either directed to an appropriate ground discharge point, as determined by the EM, or sent off-site for disposal; and
- Details of the any proposed treatment methods, anticipated dewatering rates, and anticipated storage capacity of on-site tank(s) must be provided by the Contractor prior to excavation work.

Stormwater Management

Stormwater arising on site shall be diverted overland around disturbed construction areas, stockpiles and lay down areas (e.g., by installing temporary curbs along road access points). Stormwater runoff shall be managed and diverted along with the water pumped from excavations to pervious areas at the north east of the extraction area. To minimize the potential impacts of stormwater arising on site, the following mitigation measures shall be employed as necessary:

- Diversion shall avoid significant alteration of pre-existing down slope drainage;
- Stormwater shall be diverted away from disturbed areas and waterbodies;
- Sufficient filter cloth, rock, seed, drain rock, culverts, staking, matting, polyethylene and other materials used for erosion and sedimentation prevention or control shall be readily available on site throughout Project works; and
- In the event of a severe storm event that results in runoff that exceeds the capacity of the sediment control provisions, either additional measures shall be undertaken to contain the runoff and/or work shall be halted.

7.0 MONITORING

Site activities with the potential to affect groundwater shall be monitored full time during construction by the EM, to verify conformance with Project approvals, applicable legislation, BMPs, mitigation measures and the objectives of this Plan and the detailed/activity-specific EWPs. Works requiring monitoring shall include:

- Excavation; and
- Water discharge to ground.

The necessity for regular water quality monitoring is not anticipated. Groundwater quality monitoring may be undertaken by the EM depending on other factors, including weather and unexpected encounters of contaminated soils in excavations. Groundwater quality effects associated with the works shall be systematically assessed at individual sites by comparing the groundwater quality of affected water at a particular site to CCME Water Quality Guideline values.

Environmental monitoring activities shall also include:

- Site inspections to identify signs of erosion;
- Site inspections to verify that erosion and sediment control measures have been installed, are effective, are maintained and are removed when there is no longer the potential for erosion; and
- Inspections to verify that adequate maintenance is being conducted of dewatering management structures.

For works that have the potential to pose an immediate threat to groundwater, the EM and VAFFCs Environmental Manager shall have the authority to stop works until such time as impacts can be mitigated. Triggers that may result in a Stop Work Order include the failure to meet the requirements of any of the Project approvals, or other activities that pose an increased risk beyond those contemplated in the CEMP. The Environmental Manager will be available as required to provide strategic advice and/or measures to achieve the desired results for mitigating impacts.

8.0 REPORTING

The monthly environmental monitoring reports prepared by the EM shall include:

- A summary of any groundwater quality monitoring conducted at the site;
- A description of construction activities and associated groundwater management measures that were implemented;
- A description of maintenance checks on dewatering equipment and erosion and sediment control measures;
- A description and photos that document any erosion and sediment management issues at the discharge area and corresponding mitigation measures implemented; and
- A status update regarding implementation of all specific mitigation plans, including dewatering management, and sediment and erosion control plans.

Environmental personnel shall be responsible for submitting incident reports, should construction activities result in contaminated or otherwise non-compliant groundwater being discharged to ground or local waterbodies.

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VANCOUVER AIRPORT FUEL DELIVERY PROJECT

CEMP TRAFFIC MANAGEMENT PLAN

Prepared for:

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LIST OF ACRONYMS

BC	British Columbia
BMPs	Best Management Practices
CEMP	Construction Environmental Management Plan
COR	City of Richmond
EAC	Environmental Assessment Certificate
EMP	Environmental Management Plan
EWP	Environmental Work Plan
MOTI	Ministry of Transportation and Infrastructure
PMV	Port Metro Vancouver
TMP	Traffic Management Plan
VAFFC	Vancouver Airport Fuel Facilities Corporation
VFPA	Vancouver Fraser Port Authority
YVR	Vancouver International Airport

DISTRIBUTION LIST

The following individuals/firms have received this document:

Name	Firm	Hardcopies	CDs	Email	FTP
Adrian Pollard	FSM Management Group Inc	-	-	✓	-
Mark McCaskill	FSM Management Group Inc	-	-	✓	-
Angus Johnston	Hatfield Consultants	-	-	✓	-
Andrew Taylor	Port Metro Vancouver	-	-	-	-
Carolina Eliasson	Port Metro Vancouver	-	-	-	-

AMENDMENT RECORD

This report has been issued and amended as follows:

Issue	Description	Date	Approved by	
1	First version of Traffic Management Plan	20150512	(insert signature)	(insert signature)
			Garth Taylor Project Director	Angus Johnston Project Manager

1.0 INTRODUCTION

This Traffic Management Plan (TMP) describes construction-related activities for the Vancouver Airport Fuel Delivery (Project) with the potential to cause traffic disruptions, delays, or adverse impacts to the public and/or wildlife. It outlines the recommended methods for mitigating traffic related concerns, and monitoring and reporting requirements.

The Plan is based on the recommended mitigation measures, standards and Best Management Practices (BMPs) presented in Vancouver Airport Fuel Facility Corporation's (VAFFCs) application for a Project Environmental Assessment Certificate (EAC), and has been prepared in compliance with the conditions to the EAC and Vancouver Fraser Port Authority's (VFPA trading as Port Metro Vancouver (PMV)) Environmental Assessment Decision Statement, and relevant legislation.

The focus for this version of the Plan is development of the fuel receiving facility and pipeline sections located on PMV land. The Plan will be further developed as detailed engineering progresses and to address the construction of other Project components.

2.0 OBJECTIVES AND SCOPE

The key objectives of the TMP are to:

- Provide guidance to contractors in their preparation of detailed site/activity-specific Environmental Work Plans (EWPs) and in their implementation of site specific traffic management protocols, monitoring and reporting requirements;
- Identify construction activities with the potential to cause traffic disruptions, delays, or adverse impacts to the public and/or wildlife;
- Outline procedures and protocols to manage the safety of crews working on the Project as well as the public and wildlife;
- Provide a comprehensive list of BMPs and mitigation measures related to traffic management;
- Provide a communications strategy to inform stakeholders and the public about construction progress and identify methods for providing feedback on issues and concerns;
- Verify compliance with all relevant legislation and regulations; and
- Describe the monitoring and reporting requirements for verifying that BMPs and mitigation are being implemented as intended and are effective.

The EWPs shall be prepared by the Contractor and shall outline the methods to be used to minimize traffic disruptions, delays, or adverse impacts to people and wildlife, and meet applicable regulatory requirements and standards.

3.0 POTENTIAL TRAFFIC-RELATED IMPACTS

Project works at the fuel receiving facility site will include site preparation, ground improvements and facility construction (including foundations and tank construction). Site preparation works will require removal of overburden, excavation of underlying materials and transport to the adjacent Ecowaste Facility along a temporary haul road (see Figure 1). Excavated materials will be replaced with sand material which may be dredged from the river and pumped directly to the site or may be delivered via barge to the VAFFC marine terminal property. The delivery of materials including sands, gravels, and steel plates for the storage tank construction will be via barge transport, where possible. Materials will be offloaded and stockpiled at VAFFC's marine terminal property prior to transport across Williams Road into the site as shown on Figure 1.

Where possible, construction materials shall be delivered to the site via VAFFC's marine terminal property to minimize on-road activities and the potential for traffic disruptions. Materials that cannot be viably delivered via the marine terminal property shall be transported to the site via transport truck. The only means of access to the site is via No. 6 Road to Williams Road. Hauling and transport routes shall be further developed and identified once the contractor and suppliers are identified.

Construction activities that have the potential to cause traffic disruptions, delays, or adverse traffic-related impacts to the public and/or wildlife include:

- Transport of construction equipment to the Project site, including excavators, dump trucks, cranes, and general purpose equipment;
- Transport of materials across Williams Road;
- Transport of materials (including concrete) and workers to the Project site via No. 6 Road and Williams Road;
- Accidental spills of hydrocarbons or other deleterious substances from vehicles and equipment; and
- Transport of non-hazardous and hazardous wastes from the Project site.

Traffic management issues are expected to be limited in duration to working hours, and limited to the extent of the Project site boundaries and major haul roads. Impacts are expected to be low provided that appropriate mitigation techniques are employed during the Project works.

4.0 REGULATORY CONTEXT

All Project-related activities shall be undertaken in compliance with applicable municipal, provincial and federal legislation and associated regulations. Legislation which may be applicable to Project traffic-related activities includes:

- BC Environmental Management Act (SBC 2003, c. 53);

- Hazardous Waste Regulation (BC Reg. 63/2009),
- Spill Reporting Regulation (BC Reg. 376/2008),
- BC *Motor Vehicle Act* (RSBC 1996, c.318);
- BC *Worker's Compensation Act* (RSBC 1996, c.492) and Occupational Health and Safety Regulation (BC Reg. 404/2012);
- BC Transportation Act (SBC 2004, c. 44);
- BC *Transport of Dangerous Goods Act* (RSBC 1996, c. 458) and Transport of Dangerous Goods Regulation (BC Reg. 231/2002);
- Canada *Transportation of Dangerous Goods Act* (SC 1992, c. 34) and Transportation of Dangerous Goods Regulations (Transport Canada) (SOR/2001-286); and
- *City of Richmond Traffic Control Bylaw No. 5870.*

Unless otherwise directed by VAFFC, the Contractor shall be responsible for obtaining any traffic related permits necessary to undertake Project-related work.

5.0 BEST MANAGEMENT PRACTICES AND GUIDELINES

Contractors shall follow Best Management Practices (BMPs) and applicable provincial and federal environmental guidelines. Relevant environmental BMPs and guidelines include:

- Traffic Control Manual for Work on Roadways (Ministry of Transportation and Infrastructure (MOTI) 1999); and
- General Traffic Control Guidelines for City of Richmond Roadways (City of Richmond).

6.0 MITIGATION MEASURES

The first line of defense against traffic related concerns is through prevention. Provided mitigation measures are properly implemented the magnitude of any impacts are expected to be low. Training of construction personnel is also required so that site crews understand the sensitivity of particular works.

The following mitigation measures shall be implemented to reduce the potential for traffic related concerns as a result of Project activities:

6.1 GENERAL

The Contractor will be responsible for coordinating traffic management and achieving the objectives of this Plan. The Contractor shall:

- Provide site crews with guidelines, procedures, and techniques for managing traffic near work sites;
- Maintain communications with existing road users (including the public) during construction; and
- Post notices of traffic speeds, safety and temporary closure timing in the field.

The Contractor(s) shall incorporate the following general traffic management mitigation measures:

- Public traffic shall be diverted away from and/or safely through construction areas, as required;
- All workers shall be instructed to wear high visibility apparel at all times, in accordance with WorkSafe BC and Port Metro Vancouver requirements;
- Partial or complete closure of roads as a result of the Project and requiring the detour of Project traffic in at least one direction shall require the City of Richmond's approval at least five days before work starts;
- Security shall be provided at the site 24 hours, 7 days a week during periods when construction is active; and
- A designated parking area shall be provided for workers on site.

6.2 HAULING AND TRANSPORT ACTIVITIES AND ROUTES

To avoid or minimize the potential for effects related to hauling and transport activities, the following mitigation measures are recommended:

- The use of public roads shall be limited to worker transport and for those deliveries which cannot be arranged via barge for delivery to VAFFC's marine terminal property;
- Vehicles shall travel only on designated roads while offsite;
- Construction traffic traveling to and from the site shall be managed. Safety measures shall include, but are not limited to flag persons and monitoring;
- Vehicle speeds on access roads shall be controlled through signage with speed limits that consider seasonal and changing site conditions to maintain safety of Project personnel, the public and to minimize the potential for wildlife collisions;
- Radio communication protocols shall be developed for onsite traffic;
- Notice of potential traffic disruption shall be provided to the general public, nearby residents and businesses at least 24 hours before the start of that disruption. Notification procedures shall be in accordance with the Communications Plan (refer to Section 7.0);
- Equipment checks, including brake checks, shall be undertaken prior to vehicles entering the work site;

- All workers actively involved in Project activities on roadways shall be instructed on safe work practices in traffic on an ongoing basis. Methods used may include site orientation, tailboard meetings, memos, individual instruction and supervision;
- Unpaved roads shall be treated to decrease airborne dust. Water and/or other government-approved dust suppressants shall be applied to roads during dry conditions to avoid or minimise dust generation; and
- Vehicle and equipment idling time shall be restricted and minimized during construction activities on site. Employees shall be required to turn off vehicles or heavy equipment when not in use. Idle reduction initiatives shall be communicated and encouraged during site orientations and health and safety, tailboard and project progress meetings.

6.3 APPLICATION OF TRAFFIC CONTROL MEASURES

Where hauling and transport activities may result in potential danger to other road users, the following traffic control measures shall be employed:

- Works shall be planned during appropriate weather conditions and time of day, when feasible;
- Advance notice shall be provided to other road users through signage and flagging;
- Changes to road and traffic conditions shall be clearly signed and/or illuminated;
- Traffic control measures shall be implemented at areas of high public interaction with Project activities. Traffic control measures (e.g., signage, warning devices, traffic control persons etc.) shall be clearly shown on relevant drawings and maps;
- Traffic control persons shall be positioned in a safe location clear of potential environmental and traffic hazards;
- Traffic control persons shall have a current valid traffic control certification by a body acceptable to PMV. In accordance with the WCB Occupational Health and Safety Regulations, personnel conducting short or emergency traffic control (less than 15 minutes) do not require a valid certificate. However, these personnel must receive training for this activity.
- Heavy equipment deliveries on public roads shall be scheduled outside of peak public traffic periods where practical;
- During non-working hours, appropriate signage, delineators and barricades shall be in place to protect against any potential hazards; and
- Appropriate access routes to site areas where emergency vehicles and response personnel may require passage shall be planned and communicated to all workers.

6.4 INCIDENT MANAGEMENT

In the event of a traffic-related incident such as a collision, the contractor shall:

- Respond quickly with emergency traffic control measures to manage public and field crew safety once an incident has been identified;
- Contact the appropriate emergency response agencies. Emergency telephone numbers are provided in the Spill Prevention and Emergency Response Plan (CEMP Appendix A9);
- Make use of available devices and equipment. Prompt access for emergency vehicles and assistance to emergency response personnel will be provided by all workers on-site;
- If on a public road, inform RCMP and City of Richmond (COR) of the incident. COR shall be updated regularly after the incident with respect to traffic conditions and actions taken to normalize traffic flow;
- Assist emergency response personnel as requested;
- If necessary, halt works and clear the work zone to enable emergency response vehicles to travel through unimpeded;
- Restore normal traffic operations by modifying work plans and activities, where necessary;
- Review and analyze any incidents and undertake preventative actions to avoid reoccurrence; and
- If the traffic incident has resulted in any spills or leaks of oils, hydrocarbons or other deleterious substances, the procedures outlined in the Spill Prevention and Emergency Response Plan (CEMP Appendix A9) shall be followed.

6.5 ACCESS MANAGEMENT

Project works are not expected to cause any access restrictions to nearby residences or businesses. There will be no road closures required as part of the Project site works at the fuel receiving facility site.

In early 2016, the neighbouring Ecowaste facility proposes to complete works relating to their storm drain system and road improvements. A temporary detour to Dyke Road may be required at this time, specifics for which shall be determined in consultation with Ecowaste.

To the extent attributable to the Project works and within VAFFCs control, access for public and business operations (including deliveries) to/from all businesses along Williams Road shall be provided at all times during construction, including maintaining existing parking spaces and at least one lane in front of businesses.

7.0 COMMUNICATIONS STRATEGY

A Communications Plan has been developed that details how communication and notification shall be carried out for the duration of site works. The plan targets the general public, nearby residents and businesses, and various government agencies and authorities. It summarizes how VAFFC intends to

meet the notification and consultation requirements of PMV and the EAC conditions. Further information relating to the Communications Plan is provided in Section 3.3 of the CEMP.

Relevant information shall be provided by the Contractor for the purposes of communicating with the public, emergency response agencies, stakeholders and groups directly affected by changes in road restrictions. This information may include, but is not limited to:

- Project schedule details; and
- Active work zones in publicly accessible areas.

8.0 MONITORING

Activities with the potential to result in traffic disruptions, delays, or adverse impacts to the public and/or wildlife shall be monitored full time during construction by a designated Contractor site representative, to verify conformance with Project approvals, applicable legislation, BMPs, mitigation measures and the objectives of this Plan and the detailed site/activity-specific EWPs.

The Contractor shall assess and document the following traffic management measures on a regular basis:

- Daily traffic control logs;
- Traffic related wildlife mortality (including birds);
- Road conditions and traffic movement at the site;
- Any traffic related incident including construction materials or debris encroaching onto public roadways;
- Traffic control device and traffic management equipment inventory; and
- Mitigation measures being implemented on site.

9.0 REPORTING

The Contractor shall prepare a monthly traffic report which shall include:

- A description of any traffic-related near misses, and/or documented incidents;
- Documented inspections of traffic control devices and traffic management equipment;
- A summary of any traffic related complaints received; and
- A description and photos that document any traffic management issues and corresponding mitigation measures implemented.

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