



Environmental Construction Standards

YVRAA-EN-STD-0000-0001

Revision Status			Approval		
Rev	Date [mm/dd/yy]	Description	Prepared By	Approved By	Signed off By
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B	11/28/17	2017 Update	Brenden McBain	Jennifer Aldcroft	Marion Town

TABLE OF CONTENTS

1. General.....	4
1.1. Overview	4
1.2. Applicability	4
1.2.1. Land Development and Construction Bylaw	4
1.3. Intent	5
2. Environmental Requirements.....	5
2.1. Archaeological Protection	5
2.2. Air Quality and Dust	6
2.2.1. General Requirements	6
2.2.2. Painting Applications.....	7
2.2.3. Halocarbons	7
2.3. Contaminated Soil and Groundwater	7
2.4. Hazardous Materials	8
2.4.1. Handling & Storage	8
2.4.2. Spill Prevention and Emergency Response.....	9
2.4.3. Underground and Aboveground Storage Tanks	11
2.5. Noise	11
2.6. Vegetation and Wildlife	12
2.6.1. Tree Protection and Removal	13
2.6.2. Revegetation / Site Restoration	13
2.6.3. Hydroseed and Seeding.....	13
2.6.4. Invasive Species Management	14
2.7. Waste Management	15
2.7.1. Non-Hazardous Waste	15
2.7.2. Hazardous Waste.....	16
2.8. Water Quality Protection	16
2.8.1. General Requirements	17
2.8.2. Dewatering	17
2.8.3. Water Treatment System and Well Points	17
2.8.4. Concrete Works.....	18
2.8.5. Erosion and Sediment Control	19

YVRAA Development Rules, Manuals And Guidelines ENVIRONMENTAL CONSTRUCTION STANDARDS	00.12 Rev #B <i>Page 3 of 32</i>
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2.8.6.	Water Quality Monitoring.....	21
3.	Definitions.....	22
4.	Guidance Documents.....	24
4.1.	Salmon-Safe.....	24
4.2.	Additional Airport Authority Plans, Standards and Guidelines	24
4.3.	Best Management Practices and Guidance Documents	24
5.	Airport Authority Surface Water Quality Guidelines	26
6.	Construction Environmental Management Plan – Annotated Table of Contents	28
7.	References	30

1. GENERAL

1.1. Overview

Vancouver International Airport (YVR) is located on Sea Island located within the Fraser River Delta. The surrounding area outside of the dykes constitutes one of the few remaining estuaries on the British Columbia coast to support regionally and internationally significant natural resources. Environmental protection and improving ecosystem health is a priority of the Vancouver Airport Authority (Airport Authority).

This document provides requirements to Applicants / Contractors who are proposing works and activities ("projects") on Airport Authority managed lands and waters.

A list of terms and definitions are provided in Section 3.

1.2. Applicability

These Standards are applicable to all Applicants / Contractors and environmental professionals who may be hired to assist with aspects of project design and implementation, including facility alterations performed on behalf of the Airport Authority, tenants, or others. The Environmental Construction Standards are intended to be specific to the construction and maintenance phases of a project. However, some requirements for facility operation are included.

In undertaking construction activities, the Applicant is responsible for the actions of its agents, employees, Contractors, or Sub-contractors, including any contravention of these Environmental Construction Standards or applicable legislation, regulations, guidelines, standards, and codes of practice.

It is the responsibility of the Applicant/Contractor to verify the most up to date versions of all applicable standards are followed. In the event of uncertainty in the interpretation of a specific standard please contact the Airport Authority Environment Department (environment@yvr.ca).

The relevant legislation, standards, and guidance documents are outlined in the following sections. A list of Best Management Practices (BMPs) has been provided in Section 4; these may be used in the preparation of site and activity specific mitigation measures for construction activities. Applicable legislation is included in Section 7.

1.2.1. Land Development and Construction Bylaw

This bylaw and associated Development Rules, establish a process for the granting of permits relating to the use of land and the construction of structures on Airport Lands, including Development Permits, Facility Permits and Occupancy / Use Permits.

Environmental standards, as defined in the bylaw, means the standards published by the Executive Team from time to time, to be used in construction and operations on airport lands. These Environmental Construction Standards are one of the "Environmental Standards" that shall apply to construction activities undertaken on behalf of the Airport Authority or on behalf of tenants or others.

1.3. Intent

Prior to the start of construction, the Airport Authority requires information on projects and on how environmental protection measures will be applied to the project. Typical requirements for environmental protection during construction include the development of a Construction Environmental Management Plan (CEMP) which describes how the project will be conducted and includes waste management, waste water management, water conservation, sediment control and spill response. These Environmental Construction Standards outline the expectations of the Airport Authority.

All Contractors working outdoors must have a CEMP in place prior to the start of construction. The CEMP shall be tailored to the scope of the project and may include all or subsections of these Environmental Construction Standards. The CEMP will be submitted to environment@yvr.ca for review and comment prior to work beginning. Allow 5 business days for review. For larger or more sensitive projects a longer time frame is recommended with a minimum of one week.

An annotated table of contents to CEMP is provided in Section 6. Please refer to Section 6 for guidance on structure and expectations for a CEMP. Some plans may be straightforward such as a spill prevention and emergency response plan while others may be more involved.

In the event of a conflict between different applicable environmental standards the more restrictive requirements will apply.

2. ENVIRONMENTAL REQUIREMENTS

2.1. Archaeological Protection

1. The Applicant/Contractor shall comply with the Vancouver Airport Authority Archaeological Procedures. If works are in an archaeologically sensitive area, or if unexpected archaeological materials are identified during the work, the Applicant/Contractor shall comply with any other written instructions that the Airport Authority deems necessary during the course of the project.
2. The Applicant/Contractor shall, if requested by the Airport Authority, retain the services of an Airport Authority approved archaeologist to conduct a site specific archaeological assessment. The Applicant/Contractor shall provide the archaeologist with all necessary drawings and plans and if necessary allow the archaeologist to conduct site investigations prior to construction and during construction, as required, to conduct the assessment. The archaeologist shall provide a written report of the results of the archaeological assessment. The Applicant/Contractor shall implement all requirements and recommendations contained in the report.
3. Chance Find Procedure – If required by the archaeologist, a Chance Find Management Procedure must be prepared for a project. This Procedure must be followed in the event that archaeological materials are encountered during construction. If an artifact or suspected artifact is encountered, work in the immediate area must cease and a qualified, Airport Authority approved, archaeologist must be notified so that the area may be inspected. Work shall not continue in the area in question until the archeologist has indicated that it is acceptable to do so.
4. All First Nations artifacts, ecofacts, features, ancestral remains and other remains of First Nation settlements are protected, whether found on the ground surface or buried beneath the surface. All such remains and deposits are not to be disturbed until their significance has been assessed by an archaeologist to the satisfaction of the Airport Authority.

5. All historic remains are protected, whether found on the ground surface or buried beneath the surface. All such remains and deposits are not to be disturbed until their significance has been assessed by an archaeologist or historian to the satisfaction of the Airport Authority.
6. All ground disturbance activities, regardless of size, depth or location, have the potential to result in the discovery of previously unrecorded archaeological resources. The Applicant / Contractor shall establish procedures to avoid and/or protect potentially existing, and as yet unrecorded, archaeological and heritage resources in the project area.

2.2. Air Quality and Dust

2.2.1. General Requirements

Air quality and dust management issues may occur during site preparation, demolition or decommissioning of existing structures, stockpiling, vehicle and equipment operations, batch plant operation, transport of materials, and any other project construction activities producing deleterious air emissions and/or fugitive dust.

The following mitigation measures must be implemented to reduce dust and air emissions resulting from site activities:

1. The Applicant/Contractor must have in place appropriate air quality control measures to ensure that construction and public areas are not adversely affected by uncomfortable temperatures, fugitive dust, and other unacceptable air emissions.
2. The Applicant/Contractor must use low-emission construction equipment and best available control technology.
3. All diesel equipment with an engine of 25hp or greater must be a Tier 2 or higher rated engine. Equipment which does not comply with this standard (i.e., Tier 0 or Tier 1) shall be identified to the Airport Authority.
4. Equipment must not idle for more than five consecutive minutes unless the idling is necessary to serve the purpose of the machine. Stationary emission sources (e.g., portable diesel generators, compressors, etc.) must be turned off when not in use.
5. Dust suppression chemicals must be approved by the Airport Authority prior to use and application. The use of water is preferred as a dust suppressant, and is the only accepted suppressant on Airside areas. Run off from any dust suppression agents, including water, should be considered for impacts to water quality;
6. Burning of refuse or other material on Sea Island is prohibited.
7. Before starting construction and operation of any facilities with point-source emissions (such as exhaust vents, chimneys, and stacks), the Applicant/Contractor must obtain, and retain for inspection if requested by the Airport Authority, all necessary regulatory permits.
8. Mud and dirt track-out on to aircraft aprons, taxiways and public roads must be avoided. The track out of mud from construction sites must be managed and may require the use of wheel wash stations, cleaning of road ways, etc.

9. All equipment, vehicles and stationary emission sources must be well-maintained and used at optimal loads to minimize emissions. A preventative maintenance program must be implemented for all diesel and gasoline-powered equipment (e.g., 500 hours or sooner if required by manufacturer). Any parts showing excessive signs of wear or malfunction must be promptly repaired or replaced prior to mobilizing to site.

2.2.2. Painting Applications

The Applicant/contractor must ensure that all traffic marking coatings (i.e., line paint) used comply with the Volatile Organic Compound (VOC) Concentration Limits for Architectural Coatings Regulations under the Canadian Environmental Protection Act. Traffic marking coatings containing greater than 150g/L VOCs are prohibited between May 1 and October 15.

2.2.3. Halocarbons

1. The Applicant/Contractor shall comply with Federal Halocarbon Regulations.
2. All halocarbons must be recovered when installing, servicing, leak testing, charging, before decommissioning, dismantling, or destroying equipment, or other works that could result in a release.
3. Work must be performed in accordance with Environment Canada's Environmental Code of Practice for Elimination or Fluorocarbon Emissions from Refrigeration and Air Conditioning Systems and the standard Halocarbon Clean Agent Recovery and Reconditioning Equipment (ULC/ORD-C1058.5-2004).
4. Halocarbons must always be stored, purchased, transported and recovered in containers designed and manufactured to be refilled and to contain that specific type of halocarbon.
5. All work that could result in a release of a halocarbon must be done by a certified person.

2.3. Contaminated Soil and Groundwater

Construction activities have the potential to encounter contaminated soil and/or groundwater.

The following measures must be implemented to reduce the potential for environmental impacts associated with contaminated sediment/soil and groundwater that may be removed or handled during construction-related activities:

1. The import of fill onto airport lands or the movement of fill between locations on airport lands must conform to the Airport Authority's Fill Quality and Fill Placement Standards.
2. If any suspect contaminated soils or water are encountered during construction, work must be stopped in the area and the Airport Authority Environment Department must be notified immediately.
3. Following an assessment by the Airport Authority Environment Department, any suspect contaminated materials must be segregated and may need to be assessed and properly characterized by a qualified environmental professional (see BC Contaminated Site Regulation Technical Guidance 1 Site Characterization and Confirmatory Testing).

4. Contractors working in an area with known contamination or potential contamination must have experience or must receive appropriate training on how to recognize potentially contaminated sediments or groundwater and what steps to follow to verify that both contaminated material and worker health and safety are handled appropriately.
5. All contaminated material must be disposed at a facility that is authorized under the Environmental Management Act to accept such wastes using licensed transporters authorized to carry such material, unless otherwise directed by the Airport Authority (see Airport Authority's Fill Quality and Fill Placement Standards).
6. Transport of contaminated materials will require waste manifests and may be subject to BC Hazardous Waste Regulation and Transportation of Dangerous Goods Regulations (both Provincial and Federal).

2.4. Hazardous Materials

Improper storage, use and/or handling of hazardous materials has the potential to pose threats to human health and safety, introduce contaminants into previously uncontaminated soils, vegetated areas, surface waters, and/or groundwater, cause changes to ecosystems or solid waste; and/or pose threats to wildlife.

2.4.1. Handling & Storage

The following mitigation measures must be implemented to reduce the potential for environmental impacts associated with hazardous materials handling and storage during construction activities:

1. Hazardous materials must be transported, labeled, stored, used and disposed of in accordance with all regulatory requirements and product labels instructions. Workers handling hazardous materials must be appropriately trained in their handling, storage and use.
2. Hazardous materials and dangerous substances, including fuels, bitumens, cement, paints, solvents, cleaners, dust suppressants, used fuel and oil filters, will be stored and handled to prevent spills.
3. The Applicant/Contractor must designate areas for the transfer and temporary storage of hazardous materials and wastes.
4. Containers with hazardous materials must comply with requirements of Workplace Hazardous Material Information Systems [WHMIS] including labeling and provision of Safety Data Sheets (SDS). Container materials must be in good condition and appropriate for that particular hazardous substance.
5. Hazardous substances must be stored, handled and used in accordance with information in their respective SDS which must be maintained at appropriate areas on site at all times. SDS should be updated as necessary whenever a new hazardous material comes to the site.
6. Hazardous materials not in active use must be removed promptly by the Applicant/Contractor. The Airport Authority may inspect the designated areas at any time and may require the prompt removal of any material not in active use.
7. Mobile fuel storage trucks must be parked on impermeable surfaces.

2.4.2. Spill Prevention and Emergency Response

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 prevention. Proper planning and preparation will provide effective management of any accident, spill or disaster, with the objective of ensuring the personal safety of all individuals within the influence of the project and reducing damage to property and the environment.

1. Before construction activities start, the Applicant/Contractor must prepare a written site-specific Emergency Response Plan appropriate to the scale of the project. The Emergency Response Plan shall be posted in a visible location and available to all site workers. Required elements of the Emergency Response Plan include:
 - a general assessment of the probability and severity of a spill occurring,
 - spill/release notification and alerting procedures, with a specific statement that all spills, regardless of size, must be reported to Airport Operations at 604-207-7022,
 - an Emergency Contacts List including all persons and agencies that may require notification of an event,
 - roles and responsibilities in the event of an emergency,
 - containment, recovery, and clean-up procedures,
 - details of emergency equipment and locations, and
 - a general evacuation plan.

All spills regardless of size are to be reported immediately to Airport Operations at 604-207-7022
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The Airport Authority reserves the right to require the Applicant/Contractor to submit, revise, and resubmit the Emergency Response Plan before construction activities start if, in the opinion of the Airport Authority, the plan as submitted is inadequate to ensure compliance with the legislative and regulatory requirements in the event of an incident involving a hazardous material spill, leakage, or discharge from the site.

YVRAA Development Rules, Manuals And Guidelines ENVIRONMENTAL CONSTRUCTION STANDARDS	00.12 Rev #B Page 10 of 32
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The following mitigation measures must be followed during construction to avoid or reduce the potential for environmental emergencies as a result of spills or emergencies:

1. Supervisory personnel, such as site superintendents and general foremen, must be trained in spill response methods.
2. The Applicant/Contractor must maintain a readily available supply of emergency response material and equipment on site at all times (e.g., spill kit). The material and equipment must be in effective working condition and appropriate to the nature of the work. Emergency response equipment must be stored in clearly signed, easily accessible and identified locations.
3. All machinery used on site must be in good repair and free of excess oil and grease.
4. All machinery and equipment shall be inspected daily to ensure that it is free of leaks.
5. Vehicle and equipment maintenance must be confined to designated areas so that any spills can be contained and collected before contaminants reach permeable ground, ditches, watercourses, and stormwater systems. The designated area must be 30 m from the nearest water body.
6. Oils, lubricants and other hazardous products must not be stored within 30 m of any water body.
7. Wood preservatives, paints or stains, or other chemicals must be applied upland in the dry with sufficient time to allow complete absorption or drying, thus preventing leaching into drainage features or storm sewers.
8. Immediately upon discovery, the Applicant/Contractor must notify the Airport Authority of the existence of any hazardous conditions, property, or equipment within or immediately adjacent to the construction project site. The Applicant/Contractor is responsible for taking all necessary precautions against damage to the environment or injury to persons, against damage to the property of the Applicant, Contractors, Sub-Contractors, and suppliers, or to other persons, from the hazards until corrected by the responsible party.
9. In the event of an emergency, the Applicant must immediately notify Airport Operations Centre at 604-207-7022.
10. The Applicant/Contractor must submit written incident reports to the Airport Authority within 24 hours of any environmental incident or spill/release. The incident report must identify and describe the:
 - reporting organization,
 - date, time, and location of incident,
 - hazardous materials involved,
 - source of spill/release,
 - persons or organizations notified,
 - how the spill or release occurred,
 - remedial action taken or planned, and

- actions necessary to prevent recurrence.

2.4.3. Underground and Aboveground Storage Tanks

Design, construction, operation, and decommissioning of all underground and aboveground storage tanks systems must comply with the:

- Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum Products and Allied Petroleum Products (CCME 2003), and the
- Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations (SOR/2008-197).

Temporary generator tanks less than 2500 L are not captured by Storage Tank Regulations shall comply with CSA B139-15 and CSA C282-15 (if for Life Safety).

All temporary and permanent hazardous material storage tanks (petroleum products such as diesel fuel, gasoline, waste oil and others which have 70% or more hydrocarbons by volume) greater than 230 L must be registered by the Applicant/Contractor with the Airport Authority. Contact the Airport Authority Environment Department for further details (environment@yvr.ca).

The following mitigation measures must be implemented to minimize the potential impacts associated with underground and aboveground storage tanks:

1. Tank decommissioning procedures must be submitted to the Airport Authority for review.
2. Secondary containment must be capable of holding at least 110% of the volume of the Applicant/Contractor's largest storage tank, or 25% of the total volume of all containers in the same area, whichever is larger.
3. Storage tank areas must be fully bermed, lined, and have in place appropriate drainage systems for removing accumulated rainwater.
4. Appropriately sized oil/water separators must be installed in new facility construction where there is a source of oils, greases, fuels, or other hydrocarbons in discharges to the stormwater system.
5. The Applicant/Contractor must provide adequate ongoing maintenance of these facilities until the work is completed at the end of the phase, including the measurement and removal of fuel and oil at regular, frequent intervals as per the manufacture's specifications and regulatory requirements. These activities must be documented and available upon request.

2.5. Noise

Construction works at YVR may produce noise from the activity being undertaken, machinery, and equipment. YVR is considered a high noise environment associated with aircraft operations; however, this noise is not continuous in nature. While YVR is on federal lands and is therefore not subject to municipal noise by-laws, all efforts shall be taken to minimize additional noise and disturbance from construction works to neighbouring areas of the surrounding cities, as well as airport workers and tenants.

The following mitigation measures must be implemented to minimize noise emissions resulting from construction activities:

1. The Applicant/Contractor must act reasonably to minimize noise through the use of best available noise control technologies on construction equipment, keep equipment in a well-maintained state, and comply with standards on noise established by the Workers' Compensation Board.
2. The Applicant/Contractor must comply with any restrictions on hours of work for the site set by the Airport Authority, and must ensure work crews are briefed on noise control measures. Such control measures may be subject to change with little notice based on day-to-day airport operational requirements.
3. When undertaking high-noise activities close to sensitive residential or airport tenant areas, the Applicant/Contractor must notify the Airport Authority in advance and develop a noise mitigation plan with measures to reduce noise impacts and must be responsive to resolve concerns through all means available.
4. Work should be planned to minimize the duration and extent of noise disturbance. Work sites must be planned to minimize the need for the reversing of equipment and in this way, reduce the frequency of backup alarms.
5. Equipment must not idle for more than five consecutive minutes unless the idling is necessary to serve the purpose of the machine. Stationary emission sources (e.g., portable diesel generators, compressors, etc.) must be turned off when not in use.
6. Machinery and equipment must only be operated within specification and capacity (e.g., machines shall not be overloaded).
7. Municipal noise bylaws shall apply to any activity located off airport property such as trucking, hauling, remote sites and batch plants located on municipal roads and property.

2.6. Vegetation and Wildlife

Impacts to vegetation and wildlife management on the site may occur during site preparation, stockpiling, vehicle, machinery and equipment operations, transport of materials, and other site activities, leading to:

- Aquatic habitat degradation,
- Wildlife sensory disturbance, and/or
- The unintended introduction or spreading of invasive plant species.

The following mitigation measures must be implemented to avoid or mitigate potential negative impacts to wildlife and vegetation during construction-related activities:

1. Construction activities must be confined to the project footprint. Ground cover must be maintained wherever possible and buffer strips left around drainage ditches by the Applicant/Contractor.
2. Prior to site preparation, all clearing limits must be marked on plans and in the field to prevent project works from encroaching beyond the planned footprint. Measures may include flagging, fencing, signage, monitoring, or other means as identified by the Airport Authority.

3. Vegetation clearing, if required, should be conducted outside of the breeding bird season for migratory songbirds, where possible.
4. All intact surface water drainage ditches and their vegetation must be preserved where possible, unless alternative measures are identified by the Airport Authority.
5. Contractors must consult with the Airport Authority regarding appropriate mitigation measures if wildlife species are encountered.
6. All food, food waste, fuels, oils and lubricants, and other attractants must be stored in sealed containers that are inaccessible to wildlife, and removed from site on a regular basis.

2.6.1. Tree Protection and Removal

Trees are important for overall ecosystem health at YVR. The relocation of a tree shall always be considered prior to removal. A tree that has a diameter of 20 cm or greater, measured at 1.4 m above the ground, must not be removed without approval from the Airport Authority.

Unless otherwise approved by the Airport Authority, trees remaining on site must be adequately protected as follows:

1. Physical barriers must be installed around each tree on site and the permeable area under the leaf structure (i.e., drip line).
2. The protection measure(s) must not obstruct access, egress, or other safety or security related requirements.
3. The tree protection area is to remain free of people, vehicles, equipment, rubbish, or other materials deemed unacceptable to the Airport Authority.
4. These facilities must be maintained by the Applicant/Contractor until work is completed.

2.6.2. Revegetation / Site Restoration

Areas disturbed during construction must be restored following completion of their use. This includes seeding disturbed or exposed soils in unused areas of the construction footprint. Furthermore:

1. The Applicant/Contractor must replant/seed disturbed areas as soon as possible to minimize soil erosion.
2. Disturbed areas adjacent to ditches, watercourses, and storm water systems must be reseeded with a grass seed mixture, or other vegetation species as agreed with the Airport Authority. Sand and soil stockpiles must be bermed, sloped, and seeded when abandoned to minimize runoff.
3. Ditches and newly constructed diversion channels must be seeded and planted with grasses or native vegetation to reduce surface erosion.

2.6.3. Hydroseed and Seeding

Hydroseeding in the vicinity of the project site must be successful. Any areas determined to be unsatisfactory (i.e., unsuccessful germination, inadequate rate of seeding, or establishment of weeds) must be reapplied to the Airport Authority's satisfaction. Hydroseeding is best applied in March, April, May or September and October. Hydroseeding after October 15th or before March will likely require a follow up

YVRAA Development Rules, Manuals And Guidelines ENVIRONMENTAL CONSTRUCTION STANDARDS	00.12 Rev #B Page 14 of 32
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application but may still be required in an area during this time if it is deemed to be an erosion and sediment control concern.

The allowed hydroseed mixtures for all **Groundside use** unless otherwise agreed to by the Airport Authority are:

- 50% Turf-type Tall Fescue (varieties include Hounddog 8; Essential; and Cannavaro) seeded at a rate of 224kg/ha (equivalent to 200 lb/acre),
- 50% Turf-type perennial ryegrass seeded at a rate of 224kg/ha (equivalent to 200 lb/acre),
- 16-32-8 synthetic, water insoluble, slow release fertilizer (Spring - Summer) at the rate of 224kg/ha (equivalent to 200 lb/acre), and
- 18-18-18 synthetic, water insoluble, slow release fertilizer (Fall - Winter) at the rate of 224kg/ha (equivalent to 200 lb/acre).

The turf-type tall-fescues are known to be infected with an endophytic fungus. **Seed produced in the calendar year is preferred**, as it will possess the highest rate of endophyte infection. Any variety of turf-type perennial ryegrass may be seeded.

Plants that are prohibited whether as part of a seed mix, or contained within mulch, soil, or other substrate brought to YVR from another location are:

- Bent grass (red top),
- Blue grass,
- Barnyard grass,
- Cereal grasses, including rye; oats; barley; and wheat,
- Clovers and other legumes, including sweet clover; vetch; alfalfa; and medic,
- Brassicas, including forage rape; and forage radish, and
- Noxious weeds, including, but not limited to stinking mayweed (*Anthemis cotula*); dock (*Rumex* spp.); Knotweeds (*Polygonum* spp.); and giant hogweed (*Heracleum mantegazzianum*).

For approved seed mixtures for use on airside, application rates, and additional questions contact the Airport Authority Wildlife Program Coordinator (david_bradbeer@yvr.ca or airside_coordinator@yvr.ca)

2.6.4. Invasive Species Management

It is the responsibility of the Applicant/Contractor to prevent the introduction and spread of invasive species on site. Invasive species recorded on Sea Island include European Fire Ants (*Myrmica rubra*), Knotweeds (*Polygonum* spp.) and Giant Hogweed (*Heracleum mantegazzianum*). The following measures must be implemented to control the introduction and spread of invasive species unless alternative measures are identified by the Airport Authority:

1. All work shall be in compliance with Integrated Pest Management Act and Weed Control Act.
2. The construction footprint, including areas to be cleared and grubbed, must be assessed for invasive species presence prior to the start of site works. Identified invasive species should be removed and disposed of in consultation with the Airport Authority.
3. Invasive species removal activities must be documented and reported to the Airport Authority. Include species, location, estimated area (m²), and photo to environment@yvr.ca.

4. Earthworks equipment must be cleaned prior to arriving at the airport.
5. Equipment must only be cleaned in designated washing areas where invasive plants and their propagules may be properly captured and disposed of.
6. Herbicide use must be preapproved by the Airport Authority.

2.7. Waste Management

Effectively managing construction waste with an emphasis on maximizing recycling and diversion of waste from landfills is a priority at all YVR construction sites.

2.7.1. Non-Hazardous Waste

The following mitigation measures must be implemented when dealing with non-hazardous wastes generated on site:

1. The Applicant/Contractor must develop and implement a construction waste management plan to ensure waste is managed appropriately to achieve an overall minimum target of 80% waste diversion by weight from landfill sites. Wood, cardboard, metal, drywall, concrete, and asphalt should achieve 100% reuse and/or recycling.
2. The Applicant/Contractor is responsible for storing, transporting, and disposing of demolition, land clearing, and construction (DLC) waste in accordance with the Transportation of Dangerous Good Act and Regulations, provincial Environmental Management Act and Regulations, and with Greater Vancouver Regional District [GVRD] Integrated Solid Waste and Resource Management Plan, Bylaws and code of practice guidelines.
3. The Applicant/Contractor must make every effort to reduce the amount of material disposed to landfill by using waste reduction, reuse, and recycling programs.
4. Non-hazardous solid wastes, such as waste wood, asphalt, concrete, and metals must be disposed of off-site at an approved disposal facility in compliance with the BC Waste Management Act and GVRD bylaws unless otherwise directed by the Airport Authority to be reused onsite (e.g., crushing and reusing concrete).
5. The Applicant/Contractor must designate and label collection areas for all recyclable and non-recyclable wastes. Labeling of waste containers must include a description of what materials are and are not accepted in each container.
6. Animal-proof garbage bins with lids, recycling containers, and compost containers must be made available for lunchroom food waste and recyclable office waste.
7. The Applicant/Contractor must not dump, burn, or allow others under its control to dump or burn garbage, including DLC waste, on Sea Island.
8. Cigarette butts must be discarded in an appropriate receptacle in designated smoking areas and not be left or buried on the site.

2.7.2. Hazardous Waste

Construction activities may generate hazardous wastes, including cementitious materials, waste oils, chemical wastes and used absorbent materials and filters. The following mitigation measures must be implemented to reduce the potential for releases of hazardous waste materials to the environment:

1. The Applicant/Contractor must determine if any material present in the work area or waste generated from execution of the work is classified as a hazardous waste ("Hazardous Waste") or has any hazardous, toxic, corrosive or flammability characteristics (such as spray or trowel-applied asbestos, Polychlorinated Biphenyls or mould).
2. Hazardous wastes generated by the Applicant/Contractor in the course of the construction activities must be kept segregated from non-hazardous wastes and must be managed, transported, labelled, stored, and disposed of according to the BC Hazardous Waste Regulation and the Transportation of Dangerous Goods (TDG) Act.
3. Individuals who are signing waste manifest forms, offering waste for transport, must have current Transportation of Dangerous Goods (TDG) training (see Federal TDG Regulations 1.17 and 6.1).
4. Each container or area used to store hazardous waste must be equipped with adequate secondary containment. Hazardous waste containers must be kept closed at all times except when being filled or emptied.
5. Where projects involve the handling, storage, and removal of hazardous wastes, the Applicant/Contractor must maintain the following records:
 6. Inventories of types and quantities of special wastes generated, stored, or removed
 7. Manifests identifying hazardous waste haulers and disposal destinations
 8. Disposal certification documents
9. If unexpected hazardous waste materials are discovered on site, the Applicant/Contractor must stop work immediately and notify the Airport Authority who will advise of further action required.

2.8. **Water Quality Protection**

The airport is drained by a network of catch basins, culverts and ditches that form part of the airport drainage system and eventually drain to the Fraser River.

Construction works can lead to discharges of pollutants to aquatic receptors, either directly or via the drainage system, causing negative impacts to water quality, and resulting fish and fish habitat concerns. All discharges from the Applicant/Contractor's construction site and related work areas (including access roads, soil fill areas, dewatering, etc.) must comply with the Airport Authority's Surface Water Quality Guidelines (Section 5).

2.8.1. General Requirements

The following mitigation measures must be implemented for all works with the potential to affect water quality, fish and fish habitat unless alternative measures are identified by the Airport Authority:

1. All discharges from the Applicant/Contractor's construction site and related work areas must comply with the Airport Authority's Surface Water Quality Guidelines (Section 5).
2. Discharges to sanitary sewer shall comply with Greater Vancouver Sewage and Drainage District Sewer Use Bylaw No. 299.
3. Work must be performed and completed in isolation of flowing water, or potential stormwater.
4. Temporary diversion works must be constructed in a manner that prevents siltation or channel erosion.
5. Machinery must work from the top of bank of the ditch, trench, or other watercourse and not within the wetted channel, unless otherwise directed by the Airport Authority Environment Department.
6. No surface water withdrawals may be made in association with construction activities. For additional information contact the Airport Authority Environment Department.

2.8.2. Dewatering

Dewatering is required when stormwater or groundwater must be removed from a work area or excavation. Due to the shallow groundwater table at YVR dewatering is common on many excavation projects.

1. Dewatering must be discharged through erosion and sediment control measures appropriate for the site and must comply with Airport Authority's Surface Water Quality Guidelines (Section 5).
2. Discharging directly into storm sewer (i.e., catch basin) is not permitted unless contained specifically within the CEMP with appropriate mitigation measures.

Dewatering can involve many potential risks depending on the site-specific conditions; see the following sections for additional information:

- Contaminated Soil and Groundwater 2.3,
- Concrete Works 2.8.4, and
- Erosion and Sediment Control 2.8.5.

2.8.3. Water Treatment System and Well Points

1. Water treatment systems are required for treatment of water discharges which do not meet or are reasonably expected to not meet applicable discharge criteria.
2. The Applicant/Contractor must develop a Water Treatment Plan and submit to the Airport Authority for review prior to installation and operation of any water treatment facilities. The plan must include a diagram of the system, estimate flow volumes, sampling ports, and SDS for any product used.

YVRAA Development Rules, Manuals And Guidelines
ENVIRONMENTAL CONSTRUCTION STANDARDS

00.12

Rev #B

Page 18 of 32

3. The water treatment plant must be constructed and operated by experienced, trained, and qualified personnel.
4. Analytical confirmation is required for all water treatment systems and well point systems to prove compliance with applicable discharge criteria prior to discharge.
5. The water treatment system must be capable of:
 - Treating water generated from work areas to meet applicable permit requirements and discharge criteria (e.g., Airport Authority Surface Water Quality Guidelines (Section 5)),
 - Removing sediment or any identified potential contaminant of concern (e.g., hydrocarbons, metals, volatile organic compounds, etc.), and
 - Storing wastewaters such that effluent quality can be analyzed and approved prior to discharge.

The following procedures for discharge quality testing must be followed:

1. Provide the Airport Authority with a minimum of 48 hours' notice in advance of any water treatment system's first operation.
2. Begin dewatering operations to generate effluent from the water treatment plant. The effluent must be contained in a tank or other means to prevent discharge of contaminated water.
3. Following a brief operating period, two water samples shall be collected by the Airport Authority or Contractor Environmental Monitor. Samples shall be collected at the water treatment plant input (untreated water) and discharge (treated water).
4. After the collection of the sample the operations must cease, unless directed otherwise by the Airport Authority, until sample results are received and demonstrate compliance with applicable standards. Allow for a minimum of one full day for lab results.
5. If water samples demonstrate the discharge complies with the Airport Authority Surface Water Quality Guidelines (Section 5) and the water treatment plant is functioning properly then water treatment operations may commence.
6. On the basis of the analytical results water treatment system modifications may be required to satisfy effluent criteria and the testing procedure may need to be repeated.
7. Additional samples must be collected as required per the site-specific Water Treatment Plan or as required by the Airport Authority.

2.8.4. Concrete Works

Fresh concrete and runoff from uncured concrete has very high pH and is toxic to aquatic environments.

The following mitigation measures must be implemented to prevent adverse effects to the environment during concrete works:

1. The Applicant/Contractor must ensure that all works associated with concrete, cement, mortar, or lime-containing construction materials are conducted in a manner that prevents the introduction of concrete, sediment, or debris (cured or uncured) into any aquatic environment.

YVRAA Development Rules, Manuals And Guidelines
ENVIRONMENTAL CONSTRUCTION STANDARDS

00.12

Rev #B

Page 19 of 32

2. Spillage must be avoided when pouring concrete. Complete isolation of the work area is required for cast-in-place concrete works near or below the high-water mark of the Fraser River.
3. All spills of concrete, sediment or debris into water must be reported to the Airport Authority Environment Department.
4. Excess uncured concrete and grout mixtures must be stored in an impermeable container, a minimum of 30 m from any aquatic environments and in an area isolated from rain. Materials must be disposed off-site at an appropriately permitted facility once the mixture has cured (approximately 72 hours).
5. Concrete pours must be scheduled during dry weather.
6. Concrete delivery trucks shall be equipped with wash collection systems. Discharge of concrete truck wash water directly to ground or water is prohibited. Adequate facilities must be provided should wash-down of any equipment occur on-site. Chutes must be washed into a bucket, and water poured back into the truck and returned to the concrete plant.
7. Concrete washout must occur in designated areas only, as determined in consultation with the Airport Authority prior to the start of work.
8. Potentially high pH water originating from areas where concrete pours and other concrete or grouting works occur must be contained and treated as required. The concrete affected water must be either treated prior to release to ground (e.g., treatment with CO₂ bubbler) or removed for off-site disposal at an acceptable facility.

2.8.5. Erosion and Sediment Control

Construction and land development activities, such as clearing land, apron and road building, excavation and dewatering, present the risk of introduction of sediment into watercourses or drainage systems leading to water quality impairment or fish and fish habitat concerns.

The following measures must be implemented to minimize erosion and reduce sediment mobilization:

1. An Erosion and Sediment Control Plan (ESCP) must be developed and implemented by the Applicant/Contractor for projects greater than 3000 m² footprint which involve road/apron construction, excavation, fill placement, or dewatering and those which are required to develop an ESCP as part of the Facility Permit of Contract.
2. The ESCP must include figures or drawings at the appropriate scale clearly detailing site-specific erosion and sediment control measures, airport drainage features and any sensitive environmental receptors. The ESCP must show the location and type of any proposed water quality monitoring locations. The ESCP must be submitted to, and approved by, the Airport Authority prior to works commencing on site.
3. The Applicant/Contractor must implement construction practices that limit soil erosion, minimize impacts to graded, vegetated, seeded or otherwise stable areas and eliminate sediment inputs into watercourses or drainage systems to the greatest extent operationally feasible.
4. Mitigation measures must be installed prior to construction.
5. Wherever possible, ground-disturbing work must be conducted in drier summer months to avoid potential rain events and potential erosion issues.

YVRAA Development Rules, Manuals And Guidelines
ENVIRONMENTAL CONSTRUCTION STANDARDS

00.12

Rev #B

Page 20 of 32

6. Earthwork must be temporarily suspended prior to or during periods of significant precipitation (>30 mm/day).
7. Surface water must be diverted around disturbed construction areas, stockpiles and lay down areas (e.g., by installing bypasses, sandbags and/or temporary interceptor ditches/berms).
8. Any erodible construction spoils/materials stockpiled on site must be placed so that erosion into aquatic environments is prevented.
9. Any erodible construction spoils/materials stockpiled on site must be covered when not in immediate use and prior to any significant precipitation or periods longer than 1 week.
10. Runoff or other substances deleterious to aquatic life must not be discharged from construction sites to drainage ditches or to the Fraser River.
11. Sediment-laden water may be discharged to natural vegetation or natural depression to allow for filtration and/or infiltration.
12. Discharge points must be armoured with gravel, anchored poly, or geotextile to prevent scouring and erosion.
13. The Applicant/Contractor must monitor, repair, and replace erosion and sediment control measures as needed. These must be inspected daily during prolonged rainfall and repaired promptly as required. These measures must be maintained until the affected areas are sufficiently stabilized and until there is no longer a risk of sedimentation from the project site.
14. Erosion and sediment control measures shall be removed once the area has stabilized.
15. Fill or accumulated sediments from erosion control devices (e.g., sediment fence or check dam) must be removed offsite or spread out, leveled, and seeded to promote re-vegetation and reduce surface erosion.
16. The Applicant/Contractor must protect the bottom and slopes of ditches, trenches, and watercourses from erosion and deterioration. New ditches should be configured and landscaped to minimize erosion.
17. All ditches, trenches, and watercourses affected during construction must be maintained and returned to their original condition or to a condition acceptable to the Airport Authority.
18. No fill may be stockpiled on marsh or marsh fringe areas outside of the dyke or otherwise sensitive habitat.
19. Due to foreign object debris (FOD) concerns, the application of straw as surface erosion control is prohibited on airside projects unless under an approved ESCP.
20. Check dams, straw wattles, or triangular silt dikes should be installed in ditches to enhance settling. No silt fences should be installed within ditches.
21. Catch basins should have inserts with filtration devices with overflow bypass capability to prevent flooding.
22. Erosion control mats should be fully biodegradable material and should be installed to stabilize

steep or sensitive areas prior to or as a complement to re-vegetation measures.

23. Sandbags or reusable water filled interceptor berms should be installed to redirect runoff from paved surfaces away from work areas or excavations.
24. Sediment control measures for track-out from the project must be implemented and reviewed and maintained as required, this may include use of sweeper trucks, wheel wash stations, or coarse gravel entrance pads.

2.8.6. Water Quality Monitoring

The Applicant/Contractor shall monitor the quality of water discharges from the construction site, and maintain records of water quality monitoring results as required in the Erosion Sediment Control Plan or as required by the Airport Authority. See Section 2.8.3 for requirements for water quality monitoring associated with dewatering systems.

- a) Water quality monitoring must be included within the CEMP submitted to the Airport Authority prior to the start of works. Details will include proposed water quality monitoring locations, parameters to be included (e.g., pH and turbidity) and frequency of sampling (e.g., weekly or daily). The monitoring frequency must consider factors such as weather, sensitivity of location and activities being conducted. Water quality monitoring locations must be established downstream of the project footprint at a minimum.
- b) Routine sampling during construction should be conducted on a regular schedule (i.e. daily or weekly) or in accordance with the CEMP.
- c) Visual observation of surface water (including drainage ditches) must be conducted 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.
- d) At the end of the project, or as required, the water quality monitoring results must be provided to the Airport Authority.

3. DEFINITIONS

Airport Authority means the Vancouver Airport Authority.

Airport Lands means those lands, water, air space, buildings and structures leased to the Airport Authority by Her Majesty the Queen in right of Canada pursuant to the terms of the Ground Lease.

Airside means areas beyond security gates: runways, taxiways, and areas requiring Restricted Area Identification Cards for access.

Applicant as defined in the Land Development and Construction Bylaw means the third party or the Airport Authority group applying for or receiving preliminary approval or a Facility Permit, and includes an agent representing the Applicant by written consent. The term *Applicant* applies equally to both the Airport Authority itself and the Airport Authority's tenants, and is consistent with the term *Applicant* as defined in the bylaw.

Archaeological resources include all First Nations artifacts, remains of First Nations camps, villages, and resource procurement sites, all historic artifacts, remains of post-1859 settlements, building cornerstones and contents, commemorative plaques, inscribed tablets, and similar objects found on site or in buildings to be demolished or renovated.

Archaeological area is any known or recorded archaeological site, or other area where the Airport Authority believes, expects, or discovers the existence of archaeological resources.

Construction is any clearing, excavating, depositing soil, grading, building, construction facilities, landscaping, includes the process of designing, building, erecting, installing, repairing, altering, adding, enlarging, moving, locating, relocating, reconstructing, demolishing, removing, renovating, excavating and shoring a Structure and all other functions and practices normally carried out in the course of any of these activities.

Contractor as defined in the Land Development and Construction Bylaw means the person, firm, or corporation identified in a *Form of Agreement*, and referred to throughout a contract as if singular in number. The term includes the Contractor's permitted assigns, successors, and legal representatives.

Drainage system means all storm sewer works and appurtenances including without limitation storm sewers, watercourses, storm service connections, detention facilities, pumping stations, and outfalls located on Airport Authority Land.

Environment is the air, land, water, and all other external conditions or influences under which humans, animals, and plants live or are developed.

Environmental protection is the protection of, and the minimization of disturbance to, land, water, and air quality. The minimization and, where necessary, mitigation of all potential environmental and archaeological impacts

Fill is the material used for facility development including but not limited to pre-load, site grading, pavement construction, landscaping activities, and temporary stockpiles. This includes material foreign to Sea Island and originating from Sea Island.

Flocculant is a polymer that has been reviewed by the Airport Authority and is added to water to assist in the sedimentation of suspended particles (e.g., Chitosan)

YVRAA Development Rules, Manuals And Guidelines ENVIRONMENTAL CONSTRUCTION STANDARDS	00.12 Rev #B <i>Page 23 of 32</i>
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Foreign object debris/damage (FOD) is refuse or litter on airside which can cause damage if ingested into an aircraft engine.

Groundside refers to non-restricted areas outside the terminal.

Stop Work Order is the direction of the immediate suspension of all or a portion of the activities causing the environmental impact, and may take or order remedial measures to be conducted as deemed necessary. The costs of any work stoppages or remedial works necessary are the responsibility of the Applicant/Contractor.

Turbidity is a measure of the lack of clarity or transparency of water caused by biotic and abiotic suspended or dissolved substances. The higher the concentration of these substances in water, the more turbid the water becomes (CCME, 2002).

Watercourse means a natural or man-made channel through which water flows at any time of year and includes a slough, ditch, pond, and any other body of water.

Water Treatment Facility means a series of pumps, hoses, tanks, and products which moves and treats influent water such that the effluent water meets applicable water quality criteria.

4. GUIDANCE DOCUMENTS

4.1. Salmon-Safe

The Airport Authority is certified under the Salmon-Safe Certification Standards for Infrastructure Development (<https://www.salmonsafe.org/sites/default/files/file/salmonsafe-infrastructure-certification-standards2015.pdf>). Salmon-Safe focuses on environmental protection through the following objectives which are incorporated into these standards:

- Eliminate sediment-laden runoff during construction
- Minimize ground disturbance, soil erosion, and sediment transport
- Protect and enhance sensitive areas
- Restrict use of harmful chemicals
- Protect fish and wildlife
- Avoid or reduce negative stormwater impacts
- Reduce impacts on water quality and quantity through stormwater management .

4.2. Additional Airport Authority Plans, Standards and Guidelines

Airport Authority environmental standards and guidelines relevant to the scope of this document include, but are not limited to:

- Archeological Resource Protection Standard
- Surface Water Quality Guidelines (Section 5)
- Fill Quality and Fill Placement Standard
- Vancouver Airport Authority Environmental Management Plan

4.3. Best Management Practices and Guidance Documents

The following list of BMPs and guidance documents provides reference information for construction activities.

- A Field Guide to Fuel Handling, Transportation and Storage (BC MOWLA, 2002).
- A Guidebook for British Columbia: Stormwater Planning. (BC MOWLAP, 2002).
- 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).
- 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 (BC MOWLAP, 2013).
- British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture. Summary Report (BC MOE, 2017).
- British Columbia Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture (BC MOE, 2017).
- Canadian Environmental Quality Guidelines (CEQG, CCME, 2014).

YVRAA Development Rules, Manuals And Guidelines ENVIRONMENTAL CONSTRUCTION STANDARDS	00.12 Rev #B Page 25 of 32
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- Develop with Care 2014: Environmental Guidelines for Urban and Rural Land Development in British Columbia (BC MOE, 2014).
- DLC Waste Management Toolkit: A Guide for the Building Construction Industry (Greater Vancouver Regional District).
- Environmental Code of Practice for Elimination or Fluorocarbon Emissions from Refrigeration and Air Conditioning Systems Halocarbon Clean Agent Recovery and Reconditioning Equipment (ULC/ORD-C1058.5-2004) (Environment Canada, 2004).
- Environmental Management Practices for Ready Mixed Concrete Operations in Canada (Canadian Ready Mixed Concrete Association, 2007).
- Guidance Document on the Management of Contaminated Sites in Canada (Canadian Council of Ministers of Environment [CCME], 1997).
- Hazardous Waste Legislation Guide (BC MOE, 2016).
- Invasive Alien Plant Program Reference Guide Part 1 (Range Branch, BC MOFR, 2010).
- 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).
- 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).
- Technical Guidance 3, Environmental Quality Standards (BC MOE, 2009).

YVRAA Development Rules, Manuals And Guidelines
ENVIRONMENTAL CONSTRUCTION STANDARDS

00.12

Rev #B

Page 26 of 32

5. Airport Authority Surface Water Quality Guidelines

Parameter	YVR Water Quality Standard (mg/L, unless otherwise stated)
General:	
pH	6.5 – 9.0
Total Suspended Solids (TSS)	5mg/L above background
Temperature	Within 1°C of baseline
Turbidity	< 8 NTU above background (1 day) Max: ≤ 50 NTU
Inorganic:	
Total Ammonia Nitrogen	See CCME
Total & Dissolved Metals:	
Aluminum (Al)	0.005 (pH < 6.5), 0.1 (pH ≥ 6.5)
Arsenic (As)	0.005
Cadmium (Cd)	0.000095
Chromium (Cr)	0.001
Copper (Cu)	0.002
Iron (Fe)	1
Lead (Pb)	0.001
Mercury (Hg)	0.00002
Molybdenum (Mo)	0.073
Nickel (Ni)	0.025
Selenium (Se)	0.001
Silver (Ag)	0.0001
Zinc (Zn)	0.03
Organic:	
Biochemical Oxygen Demand (BOD)	20
Total Glycols	100
Benzene	0.04
Ethylbenzene	0.025
Toluene	0.0005
Bacteriology:	
Fecal Coliform	200/100mL (CFU/100mL)

Standards are based on existing federal and provincial water quality criteria (CCME, BCWWQG, BCAWQG, CEPA) and are subject to change. In all legal matters the relevant federal, provincial or regional regulations and guidelines will apply. For more detailed information contact environment@yvr.ca or 604-276-6656.

YVRAA Development Rules, Manuals And Guidelines
ENVIRONMENTAL CONSTRUCTION STANDARDS

00.12

Rev #B

Page 27 of 32

Justification of Standards

Parameter	Guideline Level Source and Comments
General:	
pH	CCME
Total Suspended Solids (TSS)	CCME
Temperature	BCWWQG
Turbidity	CCME
Inorganic:	
Total Ammonia Nitrogen	CCME (table required)
Nitrite- Nitrogen	BCWWQG
Nitrate - Nitrogen	BCWWQG
Phosphorus	CCME
Total & Dissolved Metals:	
Aluminum (Al)	CCME
Arsenic (As)	CCME
Cadmium (Cd)	CCME
Chromium (Cr)	CCME
Copper (Cu)	CCME
Iron (Fe)	BCAWQG
Lead (Pb)	CCME
Mercury	BCAWQG
Molybdenum	CCME
Nickel	CCME
Selenium	CCME
Silver	BCAWQG
Zinc (Zn)	CCME
Organic:	
Biochemical Oxygen Demand (BOD)	Canadian Guidelines for Effluent Quality at Federal Establishments (1976)
Total Glycols	CEPA Glycol Guideline
Benzene	BCWWQG
Ethylbenzene	CCME - Marine
Toluene	BCWWQG
Bacteriology:	
Fecal Coliform	Ambient Fraser River Guidelines

Notes:

CCME = Canadian Environmental Quality Guidelines (Canadian Council of Ministers of the Environment)

BCWWQG = BC Working Water Quality Guidelines

BCAWQG = BC Approved Water Quality Guidelines

CEPA = Canadian Environmental Protection Act

6. CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN – ANNOTATED TABLE OF CONTENTS

The following provides a typical table on contents for a CEMP. The table may be reduced based on the scope of the project; however all must include a **spill prevention and response component**. Italicized comments detail minimum information to be included in the section. This list is not exhaustive and serves to indicate the level of detail expected by the Airport Authority.

1. Introduction

2. Project Description

Include project location and site description, project team, a brief description of the scope of work, construction methodology and proposed schedule.

3. Key Environmental Issues

Include a summary of existing environmental conditions and key environmental issues which may arise during construction (e.g., concrete work)

4. Environmental Management

At a minimum, the CEMP should include sections outlining environmental management measures for the following topics.

5. Archaeology

Include details of a chance find procedure to be followed in the event a suspected archaeological resource is encountered during construction.

6. Air Quality

Include measures to control dust, vehicle track out, and emissions from vehicles and equipment. Include a list of vehicles and equipment to be used on site identifying the equipment type, fuel type, year of manufacture, and engine power rating (e.g., Tier 2).

7. Erosion and Sediment Control

Include measures to prevent erosion and sediment migration to nearby waterbodies during construction activities. The level of detail is determined based on size of the site, methodologies, and time of year. **Include a figure or construction drawing clearing showing site specific erosion and sediment control measures.**

8. Noise

Include measures to reduce noise emissions from equipment and construction activities.

9. Soil Management

Include mitigation measures for management of stockpiles and other soils on site. Include procedures for identification and handling of contaminated soils.

10. Water Management

o Water Quality and Dewatering

Include measures to prevent deposition of deleterious substances into waterbodies or the YVR drainage system. If dewatering is required on site, the CEMP should include details of how this will be conducted.

o Water Use/Consumption

Include anticipated water usage and metering requirements and measures to eliminate potable water wastage on site.

11. Waste Management

Include measures for waste reduction, reuse, recycling, storage, handling and disposal. Must include requirements for hazardous and non-hazardous waste.

12. Wildlife and Vegetation

Include details of any sensitive species on the site and mitigation measures to prevent unnecessary disturbance of wildlife and vegetation.

13. Environmental Monitoring and Reporting

The CEMP should detail anticipated monitoring and reporting during construction, which may include:

- Summary of any environmental incident and copies of Environmental Incident Reports
- Waste and recycling report and copies of all waste manifests
- List of onsite non-road diesel equipment and tier status
- Potable water use
- Spill Prevention and Emergency Response
- Include procedures to following the event of a spill, including notification and reporting responsibilities.

14. Spill Prevention

Include identification of potential hazardous products, details of spill response equipment and preventative measures to reduce the risk of spills occurring.

15. Spill and Emergency Response Plan

At YVR all spills are to be reported to Airport Operations at 604-207-7022. Ensure this is included within the spill response procedure. Include the list of key project and agency contacts.

16. Environmental Incident Reporting

Include the process and copy of any forms related to Incident reporting.

7. REFERENCES

- BC Contaminated Sites Regulation, B.C. Reg. 375/96, http://www.bclaws.ca/civix/document/id/loo90/loo90/375_96_00
- BC Contaminated Sites Regulation Technical Guidance, Online Resource: <http://www2.gov.bc.ca/gov/content/environment/air-land-water/site-remediation/guidance-resources/technical-guidance>
- [BC MOE] BC Ministry of Environment, 2009. A User's Guide to Working In and Around Water; Understanding the Regulation under British Columbia's Water Act. http://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/natural-resource-use/land-water-use/crown-land/working_around_water.pdf
- BC MOE. 2014. Develop with Care 2014: Environmental Guidelines for Urban and Rural Land Development in British Columbia.
- BC MOE. BC Ministry of Environment. 2016. Hazardous Waste Legislation Guide.
- BC MOE, 2017. British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture. Summary Report. http://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/wqgs-wqos/approved-wqgs/wqg_summary_aquaticlife_wildlife_agri.pdf
- BC MOE, 2017. British Columbia Working Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture. http://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/wqgs-wqos/bc_env_working_water_quality_guidelines.pdf
- [BC MOELP] BC Ministry of Environment, Lands and Parks and [DFO] Department of Fisheries and Oceans, 1993. Land Development Guidelines for the Protection of Aquatic Habitat
- BC Ministry of Forests and Range, 2010. Invasive Alien Plant Program Reference Guide Part 1. https://www.for.gov.bc.ca/hra/plants/IAPP_Reference_Guide/IAPP_Reference_Guide_Part_1.pdf
- [BC MOWLAP] Ministry of Water, Land and Air Protection, 2002. A Field Guide to Fuel Handling, Transportation and Storage.
- BC MOWLAP Ministry of Water, Land and Air Protection, 2002. Stormwater Planning: A Guidebook for British Columbia
- BC MOWLAP. March 2004. Standards and Best Practices for Instream Works. <http://www.env.gov.bc.ca/wld/documents/bmp/iswstdsbpsmarch2004.pdf>
- BC MOWLAP, 2013. British Columbia Field Sampling Manual for Continuous Monitoring Plus the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment and Biological Samples. http://www2.gov.bc.ca/assets/gov/environment/research-monitoring-and-reporting/monitoring/emre/field_sample_man2013.pdf
- Canadian Environmental Assessment Act, 2012, SC 2012, c 19, s 52, <<http://canlii.ca/t/52zzf>>
- Canadian Environmental Protection Act, 1999, SC 1999, c 33, <<http://canlii.ca/t/52z4m>>
- Canadian Environmental Quality Guidelines, Online Resource: http://www.ccme.ca/en/resources/canadian_environmental_quality_guidelines/
- [CCME] Canadian Council of Ministers of the Environment, 1997. Guidance Document on the Management of Contaminated Sites in Canada, http://www.ccme.ca/files/Resources/csm/pn_1279_e.pdf
- CCME, 2003. Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum Products and Allied Petroleum Products. Online: https://www.ec.gc.ca/lcpe-cepa/61B26EE8-AFB3-47AC-91AC-12AFBB0B549B/CCME_eng.pdf
- Canadian Ready Mixed Concrete Association, 2007. Environmental Management Practices for Ready Mixed Concrete Operations in Canada. <http://s1.www.scrd.ca/files/File/Community/Planning/Box%20Canyon/2.D%20Concrete%20Operations%20Best%20Management%20Practices.pdf>
- Cheminfo Services Ltd. for Environment Canada, Transboundary Issues Branch. 2005. Best Practices for the Reduction of Air Emissions From Construction and Demolition Activities.

YVRAA Development Rules, Manuals And Guidelines
ENVIRONMENTAL CONSTRUCTION STANDARDS

00.12

Rev #B

Page 31 of 32

- [DFO] Department of Fisheries and Oceans. 2013. Measures to Avoid Causing Harm to Fish and Fish Habitat. Online resource: <http://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures/measures-mesures-eng.html>
- Environment Canada, 2004. Environmental Code of Practice for Elimination or Fluorocarbon Emissions from Refrigeration and Air Conditioning Systems Halocarbon Clean Agent Recovery and Reconditioning Equipment (ULC/ORD-C1058.5-2004).
- Environmental Management Act, SBC 2003, c.53, http://www.bclaws.ca/civix/document/id/lc/statreg/03053_00
- Federal Halocarbon Regulations, 2003. SOR/2003-289. <http://laws-lois.justice.gc.ca/eng/regulations/SOR-2003-289/FullText.html>
- Fisheries Act, RSC 1985, c. F-14, <http://laws-lois.justice.gc.ca/eng/acts/f-14/>
- [GVRD] Greater Vancouver Regional District Air Quality Management Bylaw No. 1082, 2008, http://www.metrovancouver.org/boards/Bylaws1/GVRD_Bylaw_1082.pdf
- GVRD. 2008. DLC Waste Management Toolkit: A Guide for the Building Construction Industry. <http://www.metrovancouver.org/services/solid-waste/SolidWastePublications/DLCToolkit.pdf>
- GVRD, 2012. Non-Road Diesel Engine Emissions Regulation Bylaw No. 1161, 2012. http://www.metrovancouver.org/boards/Bylaws1/GVRD_Bylaw_1161.pdf
- Greater Vancouver Sewage and Drainage District Sewer Use Bylaw No. 299, 2007. http://www.metrovancouver.org/boards/Bylaws1/GVSDD_Bylaw_299.pdf
- Hazardous Waste Regulation, BC Reg. 63/88, http://www.bclaws.ca/Recon/document/ID/freeside/63_88_00
- Heritage Conservation Act. RSBC 1996, c 187. http://www.bclaws.ca/Recon/document/ID/freeside/00_96187_01
- Herrera Environmental Consultants, Inc., 2014. Salmon-Safe Certification Standards for Infrastructure Development. <https://www.salmonsafe.org/sites/default/files/file/salmonsafe-infrastructure-certification-standards2015.pdf>
- Integrated Pest Management Act, SBC 2003, c. 58, http://www.bclaws.ca/civix/document/id/consol21/consol21/00_03058_01
- Metro Vancouver, 2010. Integrated Solid Waste and Resource Management a Solid Waste Management Plan for the Greater Vancouver Regional District and Member Municipalities. <http://www.metrovancouver.org/services/solid-waste/SolidWastePublications/ISWRMP.pdf>
- Migratory Birds Convention Act, S.C. 1994, c. 22, <http://laws-lois.justice.gc.ca/eng/acts/m-7.01/>
- National Research Council Canada. 2010. National Fire Code of Canada.
- Navigation Protection Act, R.S.C., 1985, c/ N-22, <http://laws-lois.justice.gc.ca/eng/acts/N-22/>
- Pest Control Products Act. SC 2002, c 28. <http://canlii.ca/t/52vl7>
- Seeds Act, RSC 1985, c S-8, <<http://canlii.ca/t/52dzn>>
- Species at Risk Act, SC 2002, c 29, <<http://canlii.ca/t/52zdz>>
- Spill Reporting Regulation, BC Reg. 263/90, http://www.bclaws.ca/civix/document/id/loo99/loo99/46_263_90
- Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations (SOR/2008-197), <http://laws-lois.justice.gc.ca/eng/regulations/sor-2008-197/FullText.html>
- Transport of Dangerous Goods Act, RSBC 1996, c. 458, http://www.bclaws.ca/civix/document/id/complete/statreg/96458_01
- Transport of Dangerous Goods Regulation, BC Reg. 203/85, http://www.bclaws.ca/civix/document/id/loo91/loo91/10_203_85
- Transportation of Dangerous Goods Act, S.C. 1992, c.34, <http://lois-laws.justice.gc.ca/eng/acts/T-19.01/>
- Transportation of Dangerous Goods Regulations, SOR/2017-137, <https://www.tc.gc.ca/media/documents/tdg->

YVRAA Development Rules, Manuals And Guidelines ENVIRONMENTAL CONSTRUCTION STANDARDS	00.12 Rev #B Page 32 of 32
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- eng/consolidated_tdg_regulations_including_amendment_SOR_2017-137.pdf
- Vancouver International Airport Authority, 2005. Land Development and Construction Bylaw.
http://www.yvr.ca/-/media/yvr/documents/construction-documents/t18by-law2_8dec05_sflb_ashx.pdf?la=en.
 - Vancouver International Airport Authority, 2017, Archaeological Resource Procedures.
Available upon request.
 - Vancouver International Airport Authority, 1998, Fill Quality and Fill Placement Standards.
Available upon request.
 - Volatile Organic Compound (VOC) Concentration Limits for Architectural Coatings Regulations ,
SOR/2009-264, <http://laws-lois.justice.gc.ca/eng/regulations/SOR-2009-264/index.html>
 - Waste Discharge Regulation, BC Reg. 320/2004,
http://www.bclaws.ca/civix/document/id/complete/statreg/320_2004
 - Water Protection Act, RSBC 1996, c. 484,
http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/00_96484_01
 - Water Sustainability Act, SBC 2014, c. 15,
<http://www.bclaws.ca/civix/document/id/lc/statreg/14015>
 - Water Sustainability Regulation, BC Reg. 36/2016,
http://www.bclaws.ca/civix/document/id/loo99/loo99/36_2016
 - Weed Control Act, RSBC 1996, c. 487,
http://www.bclaws.ca/civix/document/id/lc/statreg/96487_01
 - Wildlife Act, RSBC 1996, c. 488.
http://www.bclaws.ca/civix/document/id/consol24/consol24/00_96488_01

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