Land Development Manual

YVRAA-GUI-ES-003

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1 General

1.1 Introduction

The YVRAA guidelines are a set of manuals, rules, standards and recommendations tied to the YVRAA permitting process. They are therefore applicable to projects not exclusively led by YVRAA.

The purpose of the guideline documents overall is to provide a central resource of:

- YVRAA specific requirements related to the design and construction of repair, renovation and/or construction occurring on Airport Authority owned or controlled properties on Sea Island, and
- YVRAA specific forms and other documentation to be submitted over the course of the Project.

As required by the Land Lease with the federal government of Canada, the Airport Authority has its own established facility permitting process for project developments occurring within its jurisdiction on Sea Island.

Any requirements identified here are expected to be adhered to in all projects where a YVRAA permit is required. Exceptions are considered on a project by project basis, and must be first discussed with YVRAA for its consideration.

The Vancouver Airport Authority may choose to issue amendments of this document from time to time. Amendments can be considered effective on their date of issue.

1.2 Intent

The Land Development Manual establishes the requirements that apply to development of property at YVRAA leased land.

1.3 Applicability

The manual applies to all developments by a third party on land leased from the Vancouver Airport Authority that is part of the Ground Lease that the Vancouver Airport Authority has with Transport Canada. It does not apply to:

- proposed developments within the International Terminal or South Terminal Buildings. (See the Tenant Design Criteria Manual for requirements applying to tenant improvements in the Terminal Buildings.)
- developments that are entirely airside.

Although the project types defined here include renovations, this manual *may* not apply to renovations of existing buildings. For a renovation project, its applicability will be assessed for each project and a decision provided by the YVRAA Engineering Services Department.

For tenant improvements, it does not alter any portions of existing or future leases. If there is a conflict between a lease and this document, the lease terms shall preside.

These guidelines do not generally apply to proposed developments that are YVRAA led and VAPM led.

1.4 References

1.4.1 Applicable & Related Sections

Process, Guideline or Standard Reference No	Description
Legacy documents - Building Heights. The design guidelines outline the maximum height permitted for a structure on airport Authority properties depending on the area of construction.	Vancouver International Airport Authority, Design Guidelines, May 1998
	Vancouver International Airport Authority, Design Guidelines Northlands Area, November 2002
Legacy Document – Universal Access	YVRAA Universal Access Design Requirements (2017)
Legacy Document - Permitting and Construction	YVRAA Facility Permit Guidelines (2017)
YVRAA-EN-GUI-001	YVRAA Environmental Construction Standards (2017)

1.4.2 Applicable Codes & Regulations

Some of the relevant codes and regulations

Code or Regulation	Description
Land Use in the Vicinity of Airports – TP1247[1]"	Covers Obstacle Limitation Surfaces, Protection of Telecommunications and Electronic Systems, Bird Hazards, Aircraft Noise, Restrictions to Visibility and Site Protection and Line of Sight Requirements
Current Sea Island Zoning Drawing (available through TDC)	Information on Obstacle Limitation Surfaces (OLS), Protection of telecommunications and electronics systems, and Line of Sight requirements for Vancouver International Airport
NAVCANADA Land Use[2]	Process requires that proposed structures be evaluated by NAVCANADA to determine the impact a proposed structure could have on aircraft navigation. The Airport Authority retains the right to require mitigation or changes to the proposed structures to reduce or eliminate potential degradation of the aircraft navigation system.
TP312 Aerodrome Standards and Recommended Practices	

[1] https://www.tc.gc.ca/eng/civilaviation/publications/tp1247-menu-1418.htm
[2]http://www.navcanada.ca/NavCanada.asp?Content=ContentDefinitionFiles/Services/ANSPrograms/LandUseProposal/default.%20xml

1.4.3 Best practice

Although not an applicable regulation to federal works, the following represent best practices and are expected to be implemented by our tenants:

Greater Vancouver Sewerage and Drainage District Sewer Use Bylaw No. 299, 2007	Sanitary Sewer connections
Greater Vancouver Sewerage and Drainage District Food Sector Grease Interceptor Bylaw No. 268, 2012[3]	Sanitary Sewer connections

2 Land Development

2.1 Building and Structure Heights

The following principles govern the allowable height of buildings and structures:

- Avoiding penetration of Obstacle Limitation Surfaces, which are pre-existing and established to limit the height of objects associated with an aerodrome in order to ensure a required level of safety and current and future usability of the aerodrome;
- Avoiding interference with signals or communications to/from aircraft;
- Protection of telecommunications and electronic systems; and
- Conformance to line of sight requirements for Vancouver International Airport, i.e. avoiding any impact on aircraft navigation.

Developments must adhere to the above principles: The YVRAA Engineering Services Department will assist with providing project specific height restrictions and will advise on the NAV Canada Approval process as required. See Section 1.4.2 for a list of relevant external codes and standards.

2.2 Building Setbacks

The minimum requirements for building setbacks for all developments are:

- Front Yard 10 m
- Side Yards 6 m
- Rear Yard 6 m

Exceptions: Cornices, leaders, gutters, pilasters, and sills may intrude into this setback by up to 610 mm (2'-0"). Steps, eaves, sunlight control projections, canopies may intrude into this setback by up to 1220 mm (4'-0").

It should be noted that there are additional requirements for developments adjacent to the Fraser River that may require further setbacks. Any developments adjacent to the Fraser Rivers should be discussed with the YVRAA Environment Department for building siting assistance.

Development around the Canada Line is required to be set back from the edge of the guideway or station by a minimum or 30m.

2.3 Lot Coverage and Maximum Density (Floor Area Ratio-FAR)

AC (Airside Commercial) 60% lot coverage and a density of 1.0.

Groundside Commercial:

- GC 1 (Office) 75% lot coverage and a density of 2.5.
- GC 2 (Light Industrial) 60% lot coverage and a density of 1.0.
- GC 3 (Airport Service) 60% lot coverage and a density of 1.0.
- GC 4 (Business Park) 50% lot coverage and a density of 1.5.

2.4 Landscape/Planting

The landscaping at Vancouver International Airport forms a significant part of the impression a visitor has of our region of Canada. Developers are encouraged to ensure that both a high level of quality and an appropriate consistency are maintained.

2.4.1 Existing landscaped Areas

Contractors must respect established landscaped areas and will be required to install safe zones around these areas using hoarding or fencing. During construction, contractors will be required to submit a plan for utilities relative to large trees and their root systems and indicate what steps are being taken to lessen the impact on the trees.

2.4.2 Landscape Plans

Landscape plans should indicate at a minimum:

- plant material and quantity,
- irrigation systems valve and backflow preventer locations,
- proposed grading materials and quantities, and
- proposed lot grading elevations.

2.4.3 Plant Material

Plant material is to meet or exceed BC Nursery Trade Association (BCNTA) standards. Native to B.C. plants should be used (substitutes will be considered). In addition to the regular plant materials, seasonal plants are recommended to increase color. Recommended materials are listed in Appendix A - "YVRAA Drought Tolerant Native Plant List."

2.4.4 Irrigation

However, if the landscaping requires irrigation, a built-in irrigation system is to be provided. Backflow prevention is required. Note: Testing requirements in Sections 4.8. Metering Requirements in Section 3.3.2.

2.4.5 Maintenance Programs

Information is to be made available to the Airport Authority on landscape maintenance programs in place when the landscaping is completed. On request, the company name, phone number and contact person must be provided to the Airport Authority.

2.4.6 Wildlife

During design, consideration must be given to eliminating nesting or roosting areas for birds. Plant material chosen should not provide a food source for birds or other wildlife.

2.4.7 Separation from Utilities

Trees are not to be planted within 2.5m of kiosks and vaults.

2.5 Construction in a Floodplain

Sea Island is located in the Fraser River floodplain. Designers should consider the use and occupancy, the site, operational requirements, flood proofing, risk assessments, and requirements imposed by other agencies. Details on Sea Island dykes can be obtained through the YVRAA Engineering Services Department.

2.6 Environmental Requirements

Sea Island is an environmentally sensitive area and environmental protection is a priority of the Airport Authority. All new land development activities at Vancouver International Airport are required to undergo an environmental review to ensure that environmental issues are identified and impacts are mitigated. Prospective land developers and builders are encouraged to contact the YVRAA Environment Department (phone 604-276-6656 e-mail: environment@yvr.ca) as early in the planning stages of their project as possible. Environmental approval may be required prior to submission of a Development/Use Permit or Facility Permit.

3 Site Servicing

3.1 General

3.1.1 Underground Services Specifications:

Specifications shall meet or exceed MMCD Platinum Edition, MMCD Design Guidelines and City of Richmond Engineering Standards.

3.1.2 Road Crossings – Site Services

Where site servicing crosses airport roads, directional drilling shall be used for installation rather than trenching unless approved in writing by the Engineering Services Department.

3.1.3 Responsibility for Site Service Connections

The developer is responsible for providing all site service connections to the site including those beyond the lease line unless special arrangements with the Airport

Authority have been made. All service connections to YVRAA utilities shall be by YVRAA approved contractors.

Note: When connecting to existing service corridors, provision shall be made to allow a smooth transition between service elevations, as many of the older installations have not been installed at the currently recommended elevations.

All connections are to be witnessed and approved by the Airport Authority.

3.2 Road Design

Roads should be designed in accordance with MMCD standards.

Design of entrances and fire department access roads will also have to meet the requirements of the City of Richmond Fire Department's rescue vehicle turning radius. See the National Building Code of Canada for requirements on design.

Road designs require a minimum 90 mm asphalt base course during the development phase of an area. Upon completion of the development a 50 mm asphalt finish course is required to complete the road to the final grade specifications.

3.3 Water Connections

YVRAA supplies water for certain developments, at the developer's expense. The size of the connections is to be determined by the developer's engineer. The water supply may not be placed into service until the developer has furnished the Vancouver Airport Authority with all tests reports related to the water service (Backflow prevention reports, chlorinating reports and signed reports of system been flushed and all other relevant test reports). See Section 3.3.7 for temporary water supply requirements.

3.3.1 Testing

Prior to water main connection, the contractor shall supply static and residual water flow tests to the YVRAA Engineering Services Department for hydrants up and downstream from the proposed connection. The City of Richmond Fire Rescue Department must be given an opportunity to witness the field tests.

3.3.2 Water Meters

Water meters are required on all water services. Meters must be installed in a readily accessible location. Installation should include lockable bypass and isolation valves. The lessee is responsible for installation, maintenance and repairs of these meters.

The water meters are required to be E-Code/R900i or equivalent. The water meter base shall be Neptune T10 for sizes up to 2in, for sizes over 2in Neptune compound meters are required.

The manufacturer or vendor shall furnish a certificate showing that it complies with the accuracy and capacity requirements of AWWA C-700 and tested in accordance with AWWA C-705.

Unit of measure must be in cubic meters. It must provide a six-digit visual registration at the meter. The unit must be provided with a centre sweep hand for calibration and a low flow indicator. The unit shall, in digital format, encode the six most significant digits of the meter for remote interrogation for automatic meter readings using the ECR II protocol compatible with the Neptune R900 RF Transmitter.

3.3.3 Triple valves

Triple valves shall be installed for all water line installations at each connection to mains for emergency loop continuation and potential service shutdowns. "Hot tap" connections will only be permitted in special circumstances and must be approved by the YVRAA Engineering Services Department.

3.3.4 Valve connections

All valve connections to water mains shall have stainless steel clamps, bolts and nuts. All clamps, bolts and nuts shall be wrapped in dunsil wrap for corrosion protection. All valves shall be Muller Resilient Wedge type c/w stainless steel bolts and nuts.

3.3.5 Valve covers

All valve stem access covers and plates shall be installed in and protected by asphalt or concrete pads approved by the YVRAA Engineering Services Department.

3.3.6 Backflow Prevention Devices

All building developments and connections to the Airport Authority's water distribution system shall utilize premise backflow prevention devices located at the potable water entry to the building or connection. All backflow prevention devices must be approved by the Airport Authority. Note: Testing requirements in Section 3.8.

3.3.7 Temporary Water Connections

All temporary water connections to fire hydrants are to be made by YVRAA Maintenance Department. They will install the appropriate backflow device on the hydrant. There will be a charge for this service and the water will be metered and the cost of the water will be billed to the developer. Notice of the required connection will have to be given to the Maintenance Department 72 hours in advance. If water is required for preloading or other construction activities, the developer shall contact the YVRAA Engineering Services Department for meter, backflow and billing requirements.

a) Electrical and Telecommunications Services

All electrical and telecommunications distribution is to be provided underground. The objective is to reduce aeronautical obstructions on Sea Island. Installation of power poles is no longer acceptable, except for temporary services such as during the construction of a development.

b) Seismic Protection of Natural Gas Service

All gas services require seismic protection on the gas main connection. Automatic gas shut off valves shall be installed on gas mains prior to entering the building.

c) Storm Drainage

A system of drainage ditches and culverts are used to minimize the risk of storm runoff flooding on Sea Island. Property development must protect the capacity of the existing system and provide additional storage and runoff capacity where required as a result of the development.

d) Oil Water Separators

Oil Water separators are generally required on any parking lot provided with culverted drainage. This should be discussed with the Environment Department.

4 On-Site Requirements

4.1 Parking Requirements:

Requirements for parking are included in Appendix C.

4.2 Bicycle parking facilities

All facilities with employees on site are recommended to provide bicycle parking. This is to encourage bicycle riding for transportation and to prevent bicycles from being locked to inappropriate street furniture.

For further bicycle guidance, please contact the YVRAA Environment Department via (604) 276-6656 or environment@yvr.ca.

4.2.1 Bicycle Racks

Bicycle racks are used for short-term parking and be able to accommodate a minimum of three bicycles.

A bicycle rack should be provided in a location that is close to and visible from the building entrance area and is protected from vehicle damage. Bike racks should be oriented to ensure that bicycles to not interfere with pedestrians, fire zones, loading zones, bus zones, taxi zones and other areas where access is required.

Bicycle racks must be designed to enable a cyclist to lock the bicycle frame and one wheel (without removing the wheel) with a U-shaped locking device. Cost-effective designs include: inverted U rack, post-and ring rack, and coat hanger rack. Bicycle racks that support the bicycle by a wheel rather than the frame should not be used. Some examples of these racks include: grid or fence style racks, wave or ribbon style racks, and racks that hold the bike by the wheel with no way to lock the frame and wheel to the rack with a U-lock.

All bike lockers and bike racks must be securely anchored to the ground or building structure to prevent the racks and lockers being removed from the location. The design should not have sharp edges or projections and materials/paint should resist rust, corrosion and vandalism.

4.2.2 Employee bicycle parking

Secure bicycle parking is recommended to be provided for employee use for long-term parking to minimize the potential for theft and exposure to weather conditions.

Secure parking facilities include:

- Controlled access parking – a locked room or cage accessible only to cyclists. This facility should have bicycle racks available to lock bicycles to.
- Bicycle lockers – only allow access to individual cyclists. This space may be leased to cyclists on monthly or indefinite basis, or access may be provided on a daily basis with coin deposit.
- In any facility more than 1000m2 secure bicycle parking is recommended to be provided as follows:
- Office locations should provide bicycle parking at a minimum of 1 space for each 500 square meters of gross floor area.
- Light industrial should provide bicycle parking at minimum, the greater of 1 space for each 1000 square meters of gross building floor area or 1 space for every 17 employees based at the facility.

4.2.3 End-of-trip facilities

Where employee bicycle parking exceeds 3 parking space, water closets, wash basins, showers and grooming stations are recommended. Where facilities are provided as part of a fitness centre or other facility that is available to all employees before and after work shifts, additional shower and change facilities are not required.

Minimum number required for each sex:

Bicycle parking spaces required	Water closets	Wash basins	Showers
0-3	0	0	0
4-29	1	1	1
30-64	2	1	2
Over 65	2 plus 1 for each additional 30 bicycle spaces or part thereof	1 plus 1 for each additional 30 bicycle spaces or part thereof	2 plus 1 for each additional 30 bicycle spaces or part thereof

4.3 Airside/Groundside Security Requirements

The Transport Canada "Aerodrome Security Regulations" (quoted in TP 312) require that when a fence forms part of the security barrier between the airside and groundside, it is to be chain link, no less than 2.13 m high plus a 0.3 m three strand barbed wire overhang facing out. The security barrier must be kept clear of objects that may constitute a threat to the security of the aerodrome for a distance of 1 m inside (airside) the security barrier and 3 m outside the security barrier. (Generally this includes objects that may assist in climbing over the security barrier or could obscure a hole in the barrier.)

4.4 Dykes

Sea Island is protected on all sides by a system of dykes to prevent river freshet and storm surge from flooding Sea Island. Dykes through the leased property must be protected and must be available for inspection and maintenance.

Dikes are required to be designed and maintained in accordance with the guidelines published by the Province of BC Ministry of Environment & Climate Change Strategy.

4.4.1 Height

Where dykes are being moved or significantly upgraded, the new height must meet the required heights for that location to be established by Engineering Services.

4.4.2 Width

Unless agreed to otherwise, the dyke must have a hard surface roadway along the crest of the dike with a minimum width of 4.0 m for inspection and maintenance.

4.4.3 Planting

Nothing may be planted on the dyke that has an extensive root system. Any planting shall be low shrubs and shall not block the maintenance road along the top of the dyke and shall allow easy inspection of the dykes.

4.4.4 Structures

Any structures must not obstruct the maintenance roadway along the top of the dyke.

4.5 Bird Nesting

Openings that permit bird nesting shall not be allowed in buildings and structures. This requirement includes the enclosure of all canopies and building soffit designs.

4.6 Navigational Requirements

Transport Canada approved obstruction lights may be required on buildings, equipment, antennas, light poles and other objects. (Subject to review by Transport Canada.) Transport Canada and NAV Canada reserves the right to require changes to building finishes, signage, flood lighting, and reflective surfaces that adversely affect air traffic or ground control operations.

4.7 Signage

All structures must have a conspicuous street number consistent with Richmond Bylaws and policies to facilitate identification by responding emergency services. For commercial signage, see Appendix "C" (Non-Terminal Commercial Signage Requirements).

4.8 Annual Tests

Backflow, Sprinkler Systems and Hydrants. The lessee will be responsible for annual testing of the premise and irrigation backflow devices, sprinkler systems and fire hydrants. Results of these tests are to be forwarded to the YVRAA Engineering Services Department.

4.9 Universal Access Design

The Airport Authority has established universal access requirements for all construction projects at the Vancouver Airport Authority that go beyond the requirements of the National Building Code of Canada. Where feasible, entrances to buildings and access to facilities should be designed so that the universal access path of travel is the same or immediately adjacent to the primary path of travel. In general universal design principles must be applied to the design of facilities. See the YVRAA Universal Access Requirements Manual referenced in Section 1.4.1.

4.10 Fire Inspection, Investigation and Prevention Services

The City of Richmond Fire Department responds to any fire call for a structural fire at the Vancouver Airport Authority (YVRAA). YVRAA works with the City of Richmond Fire Department to ensure that any new development meets the City's requirements for Fire Department Access. Richmond conducts construction plan reviews with regard to life

and property safety systems and access for City fire-rescue equipment. The City may review installations and witness testing of these systems. The City may also conduct ongoing fire prevention inspections and review Fire Safety Plans. All noted deficiencies in the Fire Inspection must be addressed to the satisfaction of the Fire Inspector.

4.11 Heritage Buildings

The following buildings have been recognized as Heritage Buildings by the federal buildings heritage review office:

- Hangar Building T-131 (Current tenant West Jet)
- Hangar Building T-018 (Current tenant Harbour Air)

Any construction in these facilities should preserve the heritage character of the facility. For more information please consult with the Engineering Services or Land Development Departments of the Vancouver Airport Authority.

5 Environmentally Sustainable Design

The Vancouver Airport Authority (Airport Authority) is committed to be a leader in sustainability. The four pillars of sustainability - economic, social, environmental, and governance are at the core of decision making by the Airport Authority. The Airport Authority documents its activities through these pillars annually and makes information in the Annual & Sustainability report, available online to the public. (See http://www.yvr.ca/en/2018).

The Airport Authority's commitment to environmental management is engrained in the Safety, Security, and Environment policy. The two key strategic documents that define and demonstrate how this commitment will be achieved are the Environmental Management Plan and the Energy Source Strategy, described below.

All third Party projects at YVR must develop a set of project goals based on the Environmentally Sustainable design recommendations of this section specific to the project. The proposed approach for the sustainable design must be submitted as part of the Development permit application. The project will then be expected to meet the goals that were established for the development permit.

5.1.1 Environmental Management Plan

The Airport Authority has set clear goals and ambitious targets to reduce the environmental impact of airport operations, both in the Terminal and across the entire airport. The 2015-2019 YVR Environmental Management Plan (EMP, 2014) identifies targets and outlines a broad framework of environmental programs. The four strategic priorities of the EMP are listed, with examples of recent initiatives showing progress:

1. Reducing emissions. YVR has committed to tracking and reducing its emissions, in particular greenhouse gases. Most emissions are associated with energy consumed to heat and cool buildings, as well as to provide power to light, move people and bags and electrify machines. Thoughtful building design is essential to reduce emissions. Progress towards meeting the emissions target has taken the form of fuel switching and energy conservation initiatives. A planned HVAC plant upgrade and new central utility building will see further gains.
2. Reducing waste. There are two significantly different waste streams at YVR: terminal and office waste and construction waste. New buildings need to consider the lifecycle of new materials used and plan for recycling of construction waste. Terminal designs need to support waste diversion. The waste program at the Terminal has gained international recognition through its Airport Council International – North America award for our Waste Wars program.
3. Reducing potable water usage. Potable water use is being reduced through installation of more water-efficient washroom and kitchen facilities, installing non-potable water systems where appropriate and eliminating irrigation needs.
4. Improving ecosystem health. YVR is the first airport in North America to be awarded Salmon-Safe certification. With this status comes a commitment to maintaining Sea Island ecosystem health, including: ensuring air and water quality standards are maintained, implementation of an Integrated Pest Management (IPM) program to reduce use of pesticides and fertilizers, topsoil conservation and stormwater retention measures as well as habitat protection and enhancement is supported.

5.2 Project Types

For the purposes of the environmental sustainability requirements, project categories have been identified by type and scope of work as follows:

Type A - New Buildings (stand-alone buildings). Type A projects include new buildings (stand-alone buildings).

Type B - Major Expansions. Type B projects are major expansions or renovations to existing buildings including expansion of the terminal building.

Type C - Medium Renovations and Interior Fit-out. Type C projects include renovations to existing buildings and interior projects that do not require expansion of the building footprint.

Type D - Small Renovations. Type D projects are small renovations and interior fit-out projects with project budget less than $500,000. To be considered Type D, renovation would have little or no impact on existing mechanical systems, energy demand and have low potential for greenhouse gas emissions.

Type E - Civil/Infrastructure Construction (paving, parking lots and utility services). Type E projects include civil construction such as apron paving and new road or parking lot construction. This group also includes new utility and infrastructure projects such as sewer stations, pipelines and electrical services. These projects do not involve work in occupied buildings.

The above categories have been identified as unique in their potential for environmental impact including energy demand, greenhouse gas emissions, water use and biophysical impacts.

The following sections are structured according to the EMP strategic environmental priorities as follows:

- Reduce greenhouse gas emissions (see Section 1.12)
- Reduce waste (see Section 1.13)
- Reduce potable water consumption (see Section 1.13)
- Improve ecosystem health (see Section 1.14)

The corresponding goals, targets and baselines that steer the sustainable growth and development of YVR are provided below, along with further project recommended approaches in order to comply with the above priorities.

5.3 Reduce Greenhouse Gas Emissions

The EMP identifies greenhouse gas (GHG) reductions as one of the Airport Authority's top priorities. To meet emissions targets and maintain service levels as this growth occurs, improvements to the energy efficiency of existing buildings, concurrent with development of new low or zero energy buildings, will be required to reduce energy use and emissions from corporate and tenant footprints.

The Airport Authority has established a goal to reduce greenhouse gas emissions and has set the following targets in the EMP:

- Reduce Airport Authority tonnes of emissions by 33% over 2012 levels by 2020
- Reduce Sea Island tonnes of emissions by 33% over 2012 levels by 2020

In order to meet the GHG targets and energy goals, projects are encouraged to incorporate specific elements according to project category, summarized in Table 6-1 and discussed below.

Table 5-1
Greenhouse Gas Emissions Reductions - Project Recommendations

	Type A Stand-alone building	Type B Major expansion or renovation	Type C Medium Renovations and Interior Fit-out	Type D Small Renovations	Type E Civil/ Infrastructure Construction
Energy Modeling	✓	✓			
Energy Efficiency	✓	✓			
District Energy	✓	✓			
Renewable Energy	✓	✓			
Greenhouse Gas emission calculations	✓	✓	✓	✓	
Building Commissioning	✓	✓			
Electric Vehicle Charging Stations	✓	✓			✓

	Type A Stand-alone building	Type B Major expansion or renovation	Type C Medium Renovations and Interior Fit-out	Type D Small Renovations	Type E Civil/ Infrastructure Construction
Pedestrian and Cycling Facilities	✓	✓			✓
Transit-Oriented Development	✓	✓			
Building Intelligence	✓	✓			✓

5.3.1 Energy Modeling and Report

Projects should conduct a life cycle assessment of carbon emissions and energy consumption associated with the proposed project. Projects should prepare an energy report that documents the life cycle assessment and includes estimates of the total annual incremental energy consumption associated with the facility and break out energy consumption for each major sub-system (electricity, gas, fuels and greenhouse gas emissions).

If required projects shall develop and conduct an energy model consistent with modeling requirements provided in the National Energy Code of Canada for Buildings (NECB) or an approved equivalent.

5.3.2 Energy Efficiency

The vision for new construction at the airport is a Net Zero Energy performance standard. However, the pace with which the Airport Authority can move towards adopting such a standard is yet to be established, and will be dependent upon factors such as the availability and affordability of green building technologies.

Projects are recommended to meet or exceed requirements of the current version of the NECB including those regarding:

- Building envelope
- Maximum allowable lighting power densities
- Heating, ventilation and air-conditioning systems

- Service water heating
- Electrical power systems and motors
- The Airport Authority has established anticipated infrastructure capacities for mechanical and electrical supplies to the terminal building. Projects shall develop and establish energy use intensity goals (Watts/m^2), in order to ensure that infrastructure capacities are not exceeded prematurely. As determined by the CORE Program Executive Steering Committee, for future terminal expansion projects (Type B) the following maximum peak load intensity shall be adopted, in order to ensure that the new Central Utilities Building does not require additional equipment or expansion earlier than planned:
- 35 W/m2 or less for cooling
- 30 W/m2 or less for heating

Projects shall specify and use ENERGY STAR® products when available.

5.3.3 District Energy

Projects should assess the opportunity to design for a future connection to a district energy system. Projects are encouraged to be district energy ready. Large expansions that are proximate to the new Central Utilities Building (Pier F, East Concourse, Pier A) must install Geoexchange well fields and piping in order to offset the Greenhouse Gas emission increases caused by terminal expansions and other capital projects.

5.3.4 Renewable Energy

Projects are encouraged include an onsite renewable energy component to reduce reliance on fossil fuels and minimize greenhouse gas emissions. Renewable energy should be equivalent to 5% or greater of the total energy demand of the facility. Renewable energy is considered energy provided by heat recovery, solar photovoltaic, solar thermal, wind or geo-exchange sources.

If renewable energy is not feasible for the project then the project shall include a design component to accommodate future renewable power projects and shall demonstrate an equivalent energy savings through other efficiencies.

5.3.5 Greenhouse Gas Emissions

All projects should estimate the operational energy consumption, and calculate the associated greenhouse gas emissions. All units and emissions factors must be documented and be consistent with emissions factors in B.C. Best Practice Methodology documentation.

Projects shall develop methods for verifying performance during detailed design, commissioning and operation.

5.3.6 Building Commissioning

Projects should:

- Prepare and implement a commissioning plan for mechanical, electrical and plumbing systems in accordance with ASHRAE Guideline 0-2205 and ASHRAE Guideline 1.1-2007 for HVAC&R Systems as they relate to energy, water and indoor environmental quality and durability.
- Retain the services of a qualified commissioning authority
- Prepare a facility operations and maintenance plan.

5.3.7 Electric Vehicle Charging Stations

If the project includes new parking lots it should ensure that at least 1% of vehicle parking stalls included in the project are provided with access to a Level 2 electric vehicle charging station. Projects involving parking should be designed with the ability to eventually provide electrical capacity for charging at 25% of parking stalls including overall electrical capacity of the facility, space for transformers and distribution panels, and conduit for electrical distribution.

5.3.8 Pedestrian and Cycling Facilities

Provide safe, direct and accessible pedestrian and cycling routes including crosswalks, sidewalks and separated cycling facilities to connect to neighbouring pedestrian and cycling networks.

Bicycle parking facilities shall be provided and should be located in secure and central locations.

5.3.9 Transit-Oriented Development

Developments that are not situated close to transit should provide for an efficient means for visitors or workers to access nearby transit connections in order to reduce the number of single occupancy vehicle trips on and to/from Sea Island.

5.3.10 Building Intelligence

As reflected in the Airport Authority's IT and Digital Plan (November 2016), building projects should consider incorporating technology in ways that increase efficiency, reduce costs and reduce emissions by better responding to programmed and actual use. This can take the form of sensors which enable lighting, heating and cooling to change in response to occupancy.

5.4 Reduce Waste

YVR has established a goal to reduce waste generation and increase recycling with the following targets:

- Terminal operations: 50% kilograms total waste diverted from landfill by 2020.
- Greater Sea Island (off terminal): establish baseline in 2015 and reduce over 5 years.

- Waste management requirements are summarized by project type in Table 6-2 and described in detail below.

Table 5-2
Reduce Waste – Project Recommendations

	Type A Stand-alone building	Type B Major expansion or renovation	Type C Medium Renovations and Interior Fit-out	Type D Small Renovations	Type E Civil/Infrastructure Construction
Construction Waste Management	✓	✓	✓	✓	✓
Storage and collection of Recyclables	✓	✓	✓		

5.4.1 Construction Waste Management

Projects Should prepare a Construction Waste Management Plan in advance of the start of demolition and construction. The plan shall include a target that is at least 90% of solid waste generated during demolition and construction be diverted from landfill/incineration. This shall include demolition, land clearing and construction waste. Diversion shall consist of reuse, recycling and salvage.

Projects should track and report monthly on waste disposal and material diversion rate.

5.4.2 Storage and Collection of Recyclables

Provide facilities for the storage and collection of recyclables and sortation of waste materials, including diversion of compostable waste. This will include centralized space for collection of all waste materials for the entire building for individual offices, public space and tenant units shall have adequate space and facilities to collect and sort waste. Shipping and receiving areas and loading docks shall have dedicated space for collecting and sorting of all waste materials including waste compactors.

Terminal facilities should participate in the airport's waste management system and are required to reduce their waste by maximizing recycling and composting in their facilities. Sufficient space must be provided by all tenants, restaurant or retail, for appropriate separation and storage of recyclables including the four waste streams: organics,

containers (plastics & metals), paper/cardboard and landfill (garbage) for tenant spaces and all public spaces.

5.5 Reduce Potable Water Consumption

YVR has established a goal to reduce potable water consumption and has set the following target:

- Reduce Sea Island cubic metres of potable water consumption by 30% over 2012 levels by 2020

In order for Airport Authority capital projects to contribute towards the Sea Island targets, a number of requirements have been identified and are subject to review by the Airport Authority Environment Department.

The requirements summarized by project category in Table 6-3 are to ensure projects use potable water efficiently.

Table 5-3
Reduce Potable Water Consumption – Project Recommendations

	Type A Stand-alone building	Type B Major expansion or renovation	Type C Medium Renovations and Interior Fit-out	Type D Small Renovations	Type E Civil/Infrastructure Construction
Indoor Water Use Reduction	✓	✓	✓	✓	N/A
Outdoor Water Use Reduction	✓	✓	✓	✓	✓
Water Metering	✓	✓	✓	✓	✓
Construction Water Use	✓	✓			✓

5.5.1 Indoor Water Use Reduction

Where applicable projects should:

- Develop an inventory of all water fixtures and process water use and related equipment.
- Develop a water use budget estimate.
- All washroom fixtures shall meet or beat the following flow rates:
    - Toilets* 4.8 L/flush,
    - Urinals 1.9L/flush,
    - Faucets 1.9L/min
- Utilize automatic controls, occupant sensors and/or timers for water fixtures.
- Utilize aerators on all handwashing and kitchen faucets.
- Utilize electric-type instant hot water heaters where appropriate.
- Any piece of equipment or appliance with a once-through cooling system using potable water is prohibited.
- Cooling towers and evaporative condensers shall be reviewed on a case by case basis with ENV and MTE.
- Assess the feasibility of rainwater capture to reduce potable water demand and to reduce stormwater runoff. Include an assessment of non-potable water for toilet and urinal flushing
- Projects shall provide costing and feasibility for the following:
    - Installation of non-potable/grey water systems in Type A (new buildings) and Type B (Major Renovations)
    - If non-potable water systems are not installed, ensure that all new buildings are future ready to support non-potable water use opportunities.

*The Airport Authority has initiated a pilot program in new buildings with low flow infrastructure that achieves lower flow rates. However, although toilets are achieving flush rates as low as 4.2L/flush, there are associated design implications, i.e. pipes require steeper slopes. Achieving these lower flush rates in renovation projects may therefore be problematic.

5.5.2 Outdoor Water Use Reduction

Where applicable Projects should:

- Select landscaping materials that do not require irrigation.

- Incorporate native or drought-tolerant plant species to minimize potable water use. (see section 7.5.6 Landscaping).
- Assess the feasibility of rainwater use for irrigation.
- Assess feasibility of greywater use for irrigation to reduce potable water demand.
- YVR's preference is for directly connected below-ground irrigation systems to both: a) reduce evapotranspiration losses and b) allow greywater use for irrigation in compliance with plumbing code requirements.

5.5.3 Water Metering

Where applicable Projects shall:

- Install a permanent water meter for the entire building and project site.
- Install water meters for any irrigation system connected to the airport/municipal water supply.
- Install water meters for any other system that may use more than 20,000m3 of water per annum such as cooling towers or boilers.

5.5.4 Construction Water Use

Develop a water use reduction plan for construction activities. This plan should outline how potable water will be used for the entire building and project site and identify water conservation initiatives to be undertaken during construction and once the building is fully operational to reduce use. The plan shall also investigate opportunities for use of non-potable water sources such as groundwater, rainwater and grey-water for compaction, dust control and other construction activities. Estimates of total water use and water savings from the building and project site shall be included in the plan.

5.6 Improve Ecosystem Health

YVR has established goals to:

- Meet or exceed Provincial and Federal air and water quality standards
- Maintain or improve the amount of protected habitat on Sea Island while minimizing wildlife hazards to aviation safety and leverage partnerships to improve area riparian areas

- Coordinate invasive species management, integrated pesticide management.
- In 2016 YVR became the first airport to achieve Salmon-Safe certification. Salmon-Safe certification examines land and water management practices, and focuses on restoring and maintaining ecological function by promoting sustainable and responsible:
- Innovative stormwater management techniques
- Control of erosion and sediment loading
- Protection of environmentally sensitive areas including instream, riparian and wetland habitat restoration
- Reduction of water consumption through landscape design and irrigation efficiencies
- Salmon-Safe challenges organizations to change infrastructure and development practices to improve water quality, reduce environmental impacts, and help businesses to function in consideration of the natural environment. It promotes low-impact design and green infrastructure, and seeks to reverse the negative impacts of urbanization evident across city landscapes.
- The requirements summarized by project type below are intended to protect the natural environmental including water quality during construction and operation.

Table 5-4
Improve Ecosystem Health – Project Recommendations

	Type A Stand-alone building	Type B Major expansion or renovation	Type C Medium Renovations and Interior Fit-out	Type D Small Renovations	Type E Civil/Infrastructure Construction
Construction Erosion and Sediment Control Plan	✓	✓	✓		✓
Stormwater Management	✓	✓			✓

	Type A Stand-alone building	Type B Major expansion or renovation	Type C Medium Renovations and Interior Fit-out	Type D Small Renovations	Type E Civil/Infrastructure Construction
Environmental Impact Assessment	✓	✓	✓	✓	✓
Environmental Site Assessment	✓	✓			✓
Spill Prevention and Response Plan	✓	✓	✓	✓	✓
Landscaping	✓	✓	✓	✓	✓

5.6.1 Construction Erosion and Sediment Control Plan

Projects shall prepare and implement an Erosion and Sediment Control Plan during construction. The plan shall be consistent with the practices and procedures outlined in the YVR Environmental Construction Standards and the Salmon-Safe Large Infrastructure Standards.

5.6.2 Stormwater Management

Types A, B, and E projects shall develop and implement a stormwater management plan. The plan shall be consistent with the Airport Authority's overall stormwater plans and shall meet the requirements of Salmon-Safe Accreditation Program (AP) Guidelines for Large-Scale Construction Management[4]. Stormwater management shall give priority to infiltration of runoff and onsite treatment using Low Impact Development and Green Infrastructure techniques (i.e., rain garden and bio-swale) and shall not simply collect and discharge rainwater.

New vehicle parking lots and aircraft apron areas shall include low impact development strategies such as stormwater infiltration/filtration and/or oil-water seperators.

[4] https://www.salmonsafe.org/sites/default/files/file/SSAPG-LSCM-Draft22-121814.pdf

5.6.3 Environmental Impact Assessment

Projects shall conduct an environmental impact assessment/environmental review consistent with requirements of the Impact Assessment Act. Contact ENV for further details (environment@yvr.ca).

5.6.4 Environmental Site Assessment

Projects shall conduct a Phase I Environmental Site Assessment in accordance with CSA Z768 or an equivalent process to identify potential for contamination on the site in advance of development. If, following the Phase I assessment, contamination is suspected a Phase II Environmental Site Assessment consistent with CSA Z769 shall be conducted. If contamination is encountered then it shall be remediated in advance of construction or an appropriate management plan shall be developed in consultation with the Environment Department.

Projects shall manage soil in accordance with the YVR Fill Quality and Fill Placement Standard.

5.6.5 Spill Prevention and Response Plan

All projects shall develop and implement a site specific Spill Prevention and Emergency Response Plan prior to the start of construction. Some projects may also need a Spill Response Plan to address the operations stage. See YVR Environmental Construction Standards for more details.

5.6.6 Landscaping

Projects that include landscaping shall prepare a landscape plan that includes use of native drought-tolerant plants and minimizes irrigation requirements. Any irrigation system shall be a water efficient design with minimal spray irrigation and emphasis on drip-type systems. Include water metering in any irrigation.

Projects shall follow the YVR Integrated Pest Management Plan (IPMP) to meet the commitment to improved ecological health on Sea Island. The IPMP provides specific requirements for the Airport Authority and for tenants managing vegetation and outdoor pests on their leases. IPMP will emphasize an ecological approach which will include the following.

- Reduction in the use of chemical pesticides and fertilizers through the adoption of preventive and alternative control methods.
- All new landscaping work will employ only native vegetation that does not require additional water and fertilizer. See YVR's Drought Tolerant Native Plant List which provides information on acceptable vegetation for use on Sea Island.
- If chemicals must be used for pest management, prior approval from YVR Environment is required. Chemicals will not be permitted for use in areas adjacent to storm drains and riparian/wet areas.

6 Exterior Art

If art pieces are being installed as part of the development or exterior renovation, the Public Art Design Guideline will apply.

7 Permitting and Construction

All new construction on the Airport Authority lands must follow the permitting requirements that have been established by the Airport Authority.

Environmental review

All projects on the Airport Authority lands are subject to environmental review. Please contact the YVRAA Environment Department of the Airport Authority for details on these requirements.

- *Development Permit Process.* A development permit is required for all projects that create a new building larger than 100m^2, add additional floor area to an existing building, or substantially change to appearance or use of the property. Contact the Permits department of the Authority for details.
- *Facility Permits and Trade Permits*. All construction that makes any alteration to the facility must get a Facility Permit. For more information on Facility Permits and the trade permits required for construction, please see the Facility Permit Guidelines.
- *Construction Security*. The Aerodrome Security Act and the Airport Authority and Transport Canada Security Regulations stipulate special procedures and construction requirements for developments that are in or adjacent to airside. These include the Security Escorts, and Fencing and Security requirements.

8 Attachments

Appendix A: YVRAA Drought Tolerant Native Plant List

Landscape Plant List

Form	Common Name	Scientific Name	Drought	Native Species
Tree	Grand fir	*Abies grandis*	Yes	Yes
Tree	Red alder	*Alnus rubra*	Yes	Yes
Tree	Pacific madrone; arbutus	*Arbutus menziesii*	Yes	Yes
Tree	White birch	*Betula papyifera*	Yes	Yes
Tree	Nootka false cypress	*Chamaecyparis nootkatensis*	Semi	Yes
Tree	Pacific dogwood	*Cornus nuttallii*	Semi	Yes
Tree	Shorepine	*Pinus contorta var. contorta*	Yes	Yes
Tree	Lodgepole pine	*Pinus contorta var. latifolia*	Yes	Yes
Tree	Ponderosa pine	*Pinus ponderosa*	Yes	Yes
Tree	Trembling aspen	*Populus tremuloides*	Yes	Yes
Tree	Douglas-fir	*Pseudotsuga menziesii*	Yes	Yes
Tree	Garry oak	*Quercus garryana*	Yes	Yes
Shrub	Bearberry; kinnickinnick	*Arctostaphylus uva-ursi*	Yes	Yes
Shrub	Redstem ceanothus	*Ceanothus sanguineus*	Yes	Yes
Shrub	Snowbrush	*Ceanothus velutinus*	Yes	Yes
Shrub	Beaked hazelnut	*Corylus cornuta*	Yes	Yes
Shrub	Pacific hawthorn	*Crataegus douglasii*	Semi	Yes
Shrub	Shrubby cinquefoil	*Dasiphora fruticosa*	Yes	Yes
Shrub	Salal	*Gaultheria shallon*	Yes	Yes
Shrub	Oceanspray	*Holodiscus discolor*	Yes	Yes
Shrub	Twinflower	*Linnaea borealis*	Yes	Yes
Shrub	Tall Oregon grape	*Mahonia aquifolium*	Yes	Yes
Shrub	Spreading mahonia; dull Oregon	*Mahonia nervosa*	Yes	Yes
Shrub	Mock orange	*Philadelphus lewisii*	Yes	Yes
Shrub	Red flowering currant	*Ribes sanguineum*	Yes	Yes
Shrub	Nootka rose	*Rosa nutkana*	Yes	Yes

Form	Common Name	Scientific Name	Drought	Native Species
Shrub	Prairie rose	Rosa woodsia	Yes	Yes
Shrub	Snowberry	*Symphoricarpos albus*	Yes	Yes
Perennial	Yarrow	*Achillea millefolium*	Yes	Yes
Perennial	Pearly everlasting	*Anaphalis margaritaceae*	Yes	Yes
Perennial	Red columbine	*Aquilegia formosa*	Yes	Yes
Perennial	Large headed sedge	*Carex macrocephala*	Yes	Yes
Perennial	Bleeding heart	*Dicentra formosa*	Semi	Yes
Perennial	Wooly sunflower	*Eriophyllum lanatum*	Yes	Yes
Perennial	Tigerlily	*Lilium columbianum*	Yes	Yes
Perennial	Oregon stonecrop	*Sedum oreganum*	Yes	Yes
Perennial	Broad-leaved stonecrop	*Sedum spathulifoloium*	Yes	Yes
Perennial	Goldenrod	*Solidago canadensis*	Yes	Yes
Perennial	Trillium	*Trillium ovatum*	Semi	Yes
Fern	Deer fern	*Blechnum spicant*	Semi	Yes
Fern	Sword fern	*Polystichum munitum*	Yes	Yes

Appendix B: Parking Requirements

These minimum parking requirements are to ensure that land developments have sufficient parking to accommodate their staff on-site. Where parking can be accommodated by Airport Authority parking, then the required parking may be reduced.

1.0 Voluntary Establishment of Parking Facilities

1.1 Where off-street parking spaces in excess of these requirements are provided, their location, design and operation shall comply with these requirements.

2.0 Use of Parking Facilities

2.1 All required off-street parking spaces shall be used only for the purpose of accommodating the vehicles of clients, customers, employees, members, tenants or visitors who make use of the principal building or use for which the parking area is provided, and such parking area shall not be used for off-street loading, driveways, access or egress, commercial repair work, display, sale or storage of goods of any kind.

2.2 Off street parking spaces may be provided and used collectively by two or more buildings or uses, provided that the total number of parking spaces when used together is not less than the sum of the requirements for the various individual uses and that such parking facilities shall be located not more than 150 meters from any building entry or use to be served.

3.0 Development and Maintenance Standards for Off-Street Parking

3.1 Off-street parking areas shall be developed as an integral part of an overall site plan, and shall be designated to satisfy the concerns of topography, orderly arrangement, ease of access, safety, security and landscaping.

3.2 Off-street parking areas shall be so arranged as to ensure the safe and convenient circulation of vehicles to and from the public road system.

3.3 Off-street parking spaces shall not be arranged so as to require the backing out of vehicles on to a public road.

3.4 Adequate provision shall be made for individual access to or from all parking spaces at all times by means of unobstructed manoeuvering aisles. Manoeuvering aisles of not less than the following widths shall be provided.

Parking Angle:	Width of aisle:
90 deg.	7.0 m.
60 deg.	7.0 m. two way drive aisles
	5.5 m. one way drive aisles

Low turnover parking (employee parking facilities)

Parking Angle:	Width of aisle:
90 deg.	6.8 m. two way drive aisles
60 deg.	6.8 m. two way drive aisles
	5.2 m. one way drive aisles

3.5 Off street parking spaces shall have clear minimum dimensions as follows:

	Length	Width
Standard space:	5.2 m.	2.6 m.
Handicap parking:	5.2 m.	3.7 m.
Low Turnover parking	4.88 m.	2.54 m.

Where parking space adjoins a fence or other structure of greater that 0.3 m. in height, the width of the parking space shall be increased by 0.3 m. to enable the convenient opening of vehicle doors.

3.6 Off-street parking areas shall be surfaced with asphalt, concrete, gravel, or similar material so as to provide a durable surface and shall be graded and drained so as to dispose of surface water. Where a surface such as gravel is provided, measures shall be implemented to ensure that dust is effectively controlled. Individual parking spaces, maneuvering aisles, entrances and exits shall be clearly marked by curbs or fences, lines and signs. (See Environmental Standards for oil-water separator requirements.)

3.7 Off-street parking areas shall be provided with adequate curbs in order to retain vehicles within permitted parking areas, and to ensure that fences, walls, hedges, landscaped areas, buildings, sidewalks and public roads and lanes will be protected.

3.8 Lighting used to illuminate off-street parking areas or parking garages shall be so arranged that all direct rays of light are reflected upon the parking areas or garages, and not upon adjoining property.

3.9 On off-street parking areas which contain 11 or more spaces, a minimum of 2% of the spaces provided, rounded upward to the nearest whole number, shall be located close to the building entrance and shall be marked with a clearly visible sign identifying the spaces for the use by disabled persons only as specified in Schedule 2 of Division 23 of the Motor Vehicle Act Regulations, and marked on the parking surface with the international symbol for wheelchair accessibility.

4.0 Units of Measurement

4.1 For the purposes of calculating off-street parking requirements, "gross floor area" shall be consider to be the total area of all floors of the building(s) measured to the outer limits of the building(s) but excluding basement storage spaces, utility areas and parking.

4.2 For the purposes of calculating off-street parking requirements, "gross leasable floor area" shall be considered to be the total floor area designed for tenant occupancy and exclusive use including basements, mezzanines and upper floors, measured from the centre lines of joint partitions and the outer limits of the building(s).

4.3 When the calculations of off-street parking requirements results in a fractional figure, it shall be rounded upward to the nearest whole number.

5.0 Parking Spaces Required

5.1 College Use
10 spaces for each 100 square metres of gross floor area of building

5.2 Commercial (Office, Retail) Use:
4 spaces for each 100 square metres of gross leasable floor area of building(s)

5.3 Custom Workshop, Trade & Service Use:
4 spaces for each 100 square metres of gross floor area of building(s)

5.4 Food Catering Establishment Use;
10 spaces for each 100 square meters of gross leasable floor area of building.

5.5 Health Care Facility Use:
1 space for each patient bed in Acute, Activation or Rehabilitation Hospitals;
1 space for each 3 patient beds in a Care Facility

5.6 Hotel Use
1 space for each 2 guest sleeping rooms; plus
4 spaces for each 100 square meters of gross floor area of building except guest sleeping rooms and food catering establishments.
Note: There are additional requirements for Commercial, Food Catering Establishment uses if applicable.

5.7 Industrial Use:
1 space for each 100 square meters of gross floor area of building.
Note: There are additional requirements for Custom Workshops, Trades & Services, Recreation Facilities, Commercial and Food Catering Establishment uses, if applicable.

5.8 Marina Use:

1 space for each 2 boat moorages: plus
2 spaces for each float home or live aboard vessel moorage: plus
2 spaces for each 100 square meters of gross floor area of building used for servicing or repairs.
Note: There are additional requirements for Commercial, Food Catering Establishment if applicable.

5.9 Neighborhood Pub Use:
25 spaces for each Neighborhood Pub.

5.10 Places of Worship or Assembly Use:
10 spaces for each 100 square metres of gross floor area of building.

5.11 Public and Private School Use:
2 spaces for each classroom. Note: There are additional requirements for Recreation Facility and Commercial uses, if applicable.

5.12 Recreation Facility Use:
2 spaces for each 100 square metere of gross floor area of building; plus
1 space for each 4 spectator seats provided; plus
3 spaces for each sheet of curling ice; plus
3 spaces for each tennis, badminton or squash court.

5.13 Roadside Stand Use:
6 spaces for each 100 square metres of gross floor area of building.

Appendix C: YVRAA Non-Terminal Commercial Signage Requirements

(These requirements are based on the City of Richmond Sign By-law but has been modified to meet Authority requirements)

1. In these requirements:

"ABANDONED"	means any sign which is not advertising a business existing or a service available on the lot on which such sign is situated, or which is not identifying the owner, occupant, user or use of the lot or of a building or structure on the lot on which the sign is situated.
"AUTHORITY"	means the Vancouver International Airport Authority
"BILLBOARD"	means exterior structure, painting or display used for publishing or advertising a product, service or cause. "BILLBOARD" does not include "SIGN".
"CANOPY"	includes marquee, awning or any other structure or contrivance, whether fixed or retractable, which projects or is intended to project from the face of a building for the purpose of affording protection or shelter from the weather.
"CANOPY SIGN"	means a sign attached to a canopy and entirely supported by the canopy, but does not include a suspended sign.
"DIRECTIONAL SIGN"	means a sign designed to direct pedestrian or vehicular traffic.
"FACIA SIGN"	means any flat sign, illuminated or plain, running for its whole length approximately parallel to the face of the wall of the structure to which it is attached, and projecting not more than 30 cm (11.81 in.) from the face of such wall.
"FREESTANDING SIGN"	means any sign wholly or partially supported from the ground by a structural member which is independent of any of the principal buildings or structures on the lot in question.
"FREESTANDING SIGN (MALL/OUTSIDE)"	means an on-site directional sign located on a multi-user property, the purpose of which is to give direction to businesses which are not clearly visible from the street.

"LOT"	means the smallest unit in which land is designated as a separate and distinct parcel on a legally recorded subdivision plan or description filed in the Land Title Office.
"MARQUEE SIGN"	means a sign intended solely for the identification of a place of business and affixed wholly beneath a permanent canopy, marquee or walkway covering, and situated perpendicular to the face of the building of which the said canopy, marquee or walkway covering is a part. "MARQUEE SIGN" does not include "PROJECTING SIGN".
"PORTABLE SIGN"	means any sign not attached to the land or a building or structure.
"PROJECTING SIGN"	means any sign which projects more than 30 cm (11.81 in.) from the face or wall of any building on the lot in question. "PROJECTING SIGN" does not include "MARQUEE SIGN".
"ROOFTOP SIGN"	means any sign located above or on the roof of the building. Includes signs that face upward.
"SIGN"	means an exterior structure, painting or display used for any of the following purposes: a) Identifying an industrial, commercial, institutional, professional or recreational use of land or use of a structure; b) Identifying land or a structure; c) Indicating a hazard; d) Giving notice of prohibition and penalties respecting a particular structure or area of land; e) Promoting the sale or lease of real estate; f) Indicating a direction. includes the marking by paint or otherwise of letters, figures or symbols on the walls or roofs of a structure; and includes any structure the purpose of which is to border, illuminate, animate or protect a sign. "SIGN" does not include "BILLBOARD", but does include "CANOPY SIGN", "DIRECTIONAL SIGN", FACIA SIGN", "FREESTANDING SIGN", "MARQUEE SIGN", "PROJECTING SIGN" and all things otherwise defined as signs in this Bylaw.
"THOROUGHFARE"	means a private road, lane, walkway or parking lot open to a customarily used by the public.

2. Metric units are used for all measurements and standards in this Bylaw. The approximate equivalents of the metric standards in the British Engineering System of units shown in brackets following each metric standard, appear for convenience only and do not form part of these requirements.

3. The purposes of these requirements are:

    a) To protect signs and lights erected for the direction of traffic from the effects of conflicting commercial and other signs;
    b) To prevent the confusion which may arise from the undue conflict of commercial and other signs, one with another;
    c) To protect the appearance of the various areas of the Airport and its public works and places from the effect of signs which may be inappropriate as to size, design or location;
    d) To protect the public from the dangers of signs of inferior construction, and from nuisances or hazards arising out of improperly sited signs;
    e) To enable local commercial and industrial enterprises to clearly identify their places of business, and to indicate the extent permitted by these requirements the types and trade names of goods and services manufactured or sold on the premises in question;
    f) To ensure Aviation safety.

4. No sign shall be erected or altered in the Airport except those permitted by and in conformity with these requirements. Rooftop signs are not permitted. Billboards shall not be permitted unless the size and location is approved by the Executive Committee of the Vancouver International Airport Authority.

PART I: GENERAL AND ADMINISTRATIVE

5. a) Signs other than those allowed by virtue of Sections 6 and 9 of these requirements shall not be permitted.
    b) Rooftop signs shall not be permitted.
    c) No sign, including posters or banners, shall be placed or maintained on public property, nor upon any pole or other structure located on public property; provided that this Section 9 (f), (h), (i) and (l); nor pursuant to the requirements for Projecting Signs set out in Part III of Schedule 'A'.
    d) The owner of a lot upon which an abandoned sign is situated shall remove such sign within 30 days of the same becoming an abandoned sign.
    e) Except where a portable sign is used in place of a sign permitted by Section 9 (a), (c), (h), (i) and (m); and except where the Manager of Engineering Services in his absolute discretion has approved a portable sign for temporary use in place of a sign described in Section 9 (f), (g), and (l), a portable sign shall not be used for any purpose.

6. Canopy Signs, Facia Signs, Projecting Signs, Freestanding Signs (General), Freestanding Signs (Gas & Service Stations), Freestanding Signs (Mall/Outside), Marquee Signs and Development Signs (Temporary) shall be permitted for the following purposes only:

    a) Identifying an industrial, commercial, institutional, professional, recreational use of land or use of a structure; provided that all such signs, other than Development Signs (Temporary) may also indicate in their text by means of permanent or changeable lettering, the types and trade names of products sold on the premises to which such signs are affixed, so long as the amount of each sign face so utilized does not exceed one-third (1/3) of the area of such sign face.
    b) Identifying lands or structures.
    c) In the case of Development Signs (Temporary) for the sole purpose of indicating that the site is being developed for industrial or commercial purposes. In no case shall a Development Sign (Temporary) be permitted for a period exceeding 12 months or after a building on the site is occupied for industrial or commercial purposes, whichever period is shorter.

7. Canopy Signs, Facia Signs, Projecting Signs, Marquee Signs, Freestanding Signs (General), Freestanding Signs (Gas & Service Stations), Freestanding Signs (Mall/Outside) and Development Signs (Temporary) shall conform to the appropriate detailed requirements set out in Schedule 'A' attached to and forming part of these requirements.

8. In addition to conforming to the requirements set out in Schedule 'A', every Canopy Sign, Facia Sign, Projecting Sign and Marquee Sign shall be of such a design that all the framework and other rigid devices required in the construction of the sign shall be contained within the sign's body in such a manner as not to be visible to the public, and all devices required to support the sign shall be as required.

9. The following Special Purpose Signs do not require permits, and shall be permitted subject to the following limitations:

    a) Signs indicating a hazard; which shall be permitted wherever prudent or customary, provided that they are not grossly in excess of the dimensions necessary for the purpose.
    b) Signs giving notice of prohibition and penalties respecting a particular structure or area; which shall be permitted where customary, provided that they are of the minimum dimensions necessary for the purpose.
    c) Temporary signs promoting the sale or lease of real estate; which shall be permitted where necessary, but provided that there shall not be more than one sign on any given lot and further provided that such sign shall be situated on or adjacent to the lot or lots to which the sign in question refers. Each of the signs shall not exceed in area of 0.6m^2 (6.46 $ft.^2$) per 1,000m^2 (10,764 $ft.^2$) of site area for sale, but in no case shall exceed 3m^2 (32.3 $ft.^2$).
    d) Signs indicating the name and nature of an agricultural or farming use where a current trades license is held, but permitted only upon the site of the land use to which the sign refers; provided that:

(i) No Local Farm Product Sign shall be of a size larger than 1.5m^2 (16.1ft^2), provided that both sides of the sign may be used for lettering; and further provided that on farms of more than 4 ha (9.88 ac.) in area, the size of the sign may be increased by 0.23m^2 (2.5 ft.^{2}) for each 1 ha (2.47 ac.) over 4 ha (9.88 ac.).

(ii) Lettering may be changed to specify certain products as they are in season.

(iii) Local Farm Produce Signs shall be removed from sight during the "no-sale" seasons.

e) Directional Signs, not more than two in number, directing traffic to and from private property; which signs shall be permitted in all zones other than Residential (R) Districts on lands forming part of the site of the building, structure or use; provided that such sign is not more than 1.5m^2 (16.1 ft.^{2}) in area and is neither flashing or animated, or providing advertising.

f) Signs erected by the Authority for airport purposes on any street.

g) Signs on the back of benches, provided that such benches are situated on public property and the location has been approved by the Manager of Engineering Services.

h) Menu Boards at drive-in eating establishments provided that they face the parking area.

i) Temporary Signs advertising special events for community causes and charitable fund raising campaigns; which signs shall be permitted on the public right-of-way only and shall be of such size and design and posted at such locations for such periods as the Manager of Engineering Services in his absolute discretion shall deem fit.

j) Temporary Signs advertising an opening date of a place or business or a change of proprietorship; which signs shall be limited in size to 6 m^2 (64.6 ft.^{2}) including the area of all sides used as a sign; provided that there shall be not more than one such sign per place of business on the lot in question and further provided that the maximum duration of displaying the sign shall be 30 days.

10. For the purpose of computing the area of any given sign whether the sign is composed partially or wholly of letters, figures or symbols which are affixed to a wall separately, or are freestanding on a projecting base; the sign area shall, insofar as such letters, figures or symbols are concerned, be deemed to be the area contained within the shortest line surrounding the whole group of the said letters, figures or symbols.

11. No person shall set up, exhibit, alter or move any sign unless the person has first obtained a Facility Permit as herein required. Readograph and changeable letters signs are not considered altered by virtue only of the message being changed.

12. No person shall maintain or cause or permit to be maintained any sign unless a valid permit has been issued therefore as herein required, except as provided for in Section 9.

13. Where a person is required by these requirements to obtain a Facility Permit, they shall:

a) Submit a FAP Application.

b) Prepare plans and specifications drawn in accordance with standard architectural practice showing such information as may be necessary to provide for the enforcement of these requirements.
   (1) The dimensions and weight of the sign;
   (2) The area of all sides of the structure used as a sign;
   (3) The dimensions and the weight of the sign's supporting members;
   (4) The overall height of the sign and the amount of clearance beneath it; both as measured from grade;
   (5) The proposed location of the sign in relation to the boundaries of the lot it is to be situated upon;
   (6) The proposed location of the sign in relation to the face of the building or in front of which it is to be affixed or located;
   (7) The colours to be used;
   (8) If the sign is to be illuminated, whether any part of the whole of it is to be moving, flashing or oscillating; Note: Moving, flashing or oscillating signs are generally not acceptable.
   (9) If incandescent lamps are to be used, the number to be installed;
   (10) If gas tubing is to be used, the total length of illuminated tubing to be installed.
   (11) Lighting intensity must not adversely affect air traffic control's or Pilot's vision at night.

c) No sign shall be installed until the related Facility Permit has been issued.

14. Each person making an application for a Facility Permit shall pay to the Authority the required fees.

15. The Manager of Engineering Services shall subsequently issue the Applicant the Facility Permit after first satisfying himself that the proposed sign will meet the following conditions:

(a) The proposed sign is to be:
   (i) in complete accordance with the specific requirements of these requirements and;
   (ii) is not such as will necessitate the undertaking of any public improvement;

(b) The proposed sign is to be sited so as not to conflict unduly with adjacent commercial or other signs; nor to conflict in any way with signs, lights or other devices erected for the control of traffic or pedestrians;

(c) The proposed sign is not unsightly, grotesque or inappropriate as to site, design or location;

(d) The proposed sign is not dangerous nor public nuisance by virtue of improper siting and inappropriate lighting.

16. No part of these requirements shall be interpreted as relieving any person from the obligation of complying with other Authority Bylaws, Rules, Conditions of Lease and Regulations.

17. (a) No sign shall be attached to or obstruct the free use of a fir escape;
(b) No sign, or any part thereof, shall project beyond the extension of the adjoining property line to the curb line, and in no case shall any part of a sign project beyond 60 cm (1.96 ft.) from the curb line.

PART II:STRUCTURAL AND ELECTRICAL

18. The Lease shall ensure that every sign shall be maintained at all times in a safe condition.

19. (a) If any sign is in such a condition as to be in immediate danger of falling or is a menace to safety of persons or property, the Manager of Engineering Services shall order the danger abated or the sign removed immediately. The owner or person in charge of the lands or structures upon which the sign is situated shall abate the danger or remove the sign forthwith.
(b) If the order in Subsection (a) above is not promptly complied with, the Manager of Engineering Services is hereby empowered to remove the sign at the expense of the applicant, owner or lessee.

20. All signs shall have the maker's name and the weight of the sign permanently attached to or painted on the exterior of the sign, so that they may be readily seen after the sign is erected.

21. Every painted electric sign shall be painted at least once during each calendar year.

22. No sign shall be attached to or suspended from a building until all wall and roof attachments have been approved by the Manager of Engineering Services.

23. Where necessary, the projecting cantilever system shall be used to support a sign. The 'A' frame system shall not be used.

24. Where a fence or hoarding is erected on a street during the construction or alteration of a building, no signs other than those relating to the construction or alteration shall be placed on the fence or hoarding.

25. The construction, erection, posting, displaying and maintenance of posters, handbills or advertising cards on hoardings and scaffolding, or any erection or construction connected therewith is prohibited.

26. Except as provided in these requirements, signs or construction in connection therewith shall not be placed or maintained on or above a street, nor upon any fence or pole thereon. This Section shall not apply to posters, placards or notices posted by or on behalf of the Authority pertaining to Airport matters, nor the police traffic control signs and notices.

27. All electric signs shall:
    (a) be constructed of metal or other non-combustible material, and shall suitably treated to protect from corrosion;
    (b) be designed so as to afford ample strength and rigidity;
    (c) be waterproof, and shall enclose all terminals and wiring other than leads;
    (d) be provided with adequate drainage;
    (e) be served by underground wiring in an approved conduit where such electric sign is a Freestanding Sign;

28. Any person who erects, owns, maintains or continues the use of a sign which project over a street shall deposit with the Authority a Bond of Indemnity or a Policy of Insurance satisfactory to the Authority's Solicitor indemnifying or insuring the Authority against all claims and demands actions, suits or other proceedings, and against all loss and costs which may be caused by or arise out of the erection, construction, maintenance or use of such projecting sign or appurtenance thereto; such a Bond of Indemnity or Policy of Insurance to be continued in full force and effect during the period that such sign is in use. The Authority is to be notified in writing of any change of ownership of a sign referred to in this Section.

PART III: MISCELLANEOUS

29. Schedule 'A' is attached hereto and form part of these Requirements.

SIGN REQUIREMENTS SCHEDULE 'A'

PART I: PERMITTED SIGNS

1. The following types of sign, or combination thereof as hereinafter described, shall be permitted on each side of a structure or building which fronts a street or thoroughfare, but only to the following extent:

   a) CANOPY SIGNS of an area not in excess of the amount specified in Part II of this Schedule as being permissible for Canopy Signs

   OR

   b) FACIA SIGNS of an area not in excess of the amount specified in Part II of this Schedule as being permissible for Facia Signs

   OR

   c) PROJECTING SIGNS of an area not in excess of the amount specified in Part III of this Schedule as being permissible for Projecting Signs.

   OR

   d) FREESTANDING SIGNS (GENERAL) of an area not in excess of the amount specified in Part IV of this Schedule as being permissible for Freestanding Signs (General) provided that all buildings on the site are situated not less than 6 m (19.68 ft.) from the property line of the street in question.

   OR

   e) A combination of CANOPY SIGNS, FACIA SIGNS, PROJECTING SIGNS or FREESTANDING SIGNS (GENERAL) having an aggregate area not in excess of 1.5 times the area specified in Part II of this Schedule as being permissible for Facia Signs; provided however, that no one type of sign shall exceed in area the amount permissible for Facia Signs.

2. In addition to the signs specified in Section 1 of this Part, there shall be permitted, where applicable and appropriate, the following signs:

   a) FREESTANDING SIGNS (GAS & SERVICE STATION) where they are permitted, subject to the requirements contained in Part V of this Schedule;
   b) DEVELOPMENT SIGNS (TEMPORARY) where they are permitted, subject to the requirements contained in PART V of this Schedule.

PART II: CANOPY SIGNS & FACIA SIGNS

1. SITE:
   a) Canopy Signs and Facia Signs shall be situated upon the site of the structure or land use to which they refer.
   b) A Canopy Sign shall not project more than 30 cm (11.8 in.) beyond the edge of the canopy to which it is attached.
   c) A Facia Sign shall not project more than 30 cm (11.8 in.) over public property.

2. MAXIMUM AREA:

   a) On Land use for the following:

Airport

Signs shall be in area no greater than 1 m^2 (10.8 $ft.^2$) per metre (3.3 ft.) of wall length of the wall to which they are affixed, provided that the wall in question shall be limited to the business premises related to the sign.

b) On Land used for the following:

Local Commercial
Gas Station
Service Station
School & Public Use
Assembly
Health Care Facilities
Marina

signs shall be in area no greater than 0.17 m^2) (1.8 ft.2) per metre (3.3 ft.) of wall length upon which they are affixed.

c) On Land use for the following:

Agricultural
Golf Course
Roadside Stand
Agripark

Canopy signs and Facia Signs are not permitted.

d) On Land use for Airline owned hangars:

Airline owned hangars, with an average wall height of 25 metres or more may install externally illuminated signs with a gross area of up to 15% of the wall area. The sign area will be based on a reasonable perimeter of the sign. Internally illuminated signs may also be used however over the area may be reduced based on the illumination level and aesthetics.

3. MINIMUM HEIGHT:

a) A Canopy Sign or Facia Sign shall not be closer at any point to the finished grade of the site upon which it is situated than 2.4 m (7.9 ft.), provided that this Subsection shall not be applied to a Facia Sign created simply by painting upon the wall of a building or structure.
b) A Canopy Sign shall not project below the lower edge of the canopy.

PART III: PROJECTING SIGNS

1. SITE:

a) A Projecting Sign shall be situated upon the site of the structure or land use to which it refers.
b) A Projecting Sign may not project over Authority property unless the Lessee has first entered into an Agreement with the Authority for such projection.

2. MAXIMUM AREA:

a) On Land used for the following:

Industrial
Light Industrial
Business Park Industrial
Limited Industrial Retail
Industrial Storage
Airport

signs shall be in area no greater than 0.17 m^2 (1.8 $ft.^2$) per metre (3.3 ft.) of wall length upon which they are affixed.

c) On Land used for the following:

Agricultural
Roadside Stand
Agripark
School & Public Use
Assembly
Projecting Signs are not permitted.

3. MINIMUM HEIGHT:

a) A Projecting Sign shall not be closer at any point to the finished grade of the site upon which it is situated than 2.4 m (7.9 ft.)

4. MAXIMUM HEIGHT:

a) A Projecting Sign shall not be higher at any point than the top of the wall to which it is affixed.

PART IV: FREESTANDING SIGNS (GENERAL)

1. SITE:

a) A Freestanding Sign (General) shall be situated wholly upon the site of the structure or land use to which it refers, and shall not project over public property. Signs shall be located on Land not used as a driveway, or for the parking of automobiles and shall not obscure the view from a road, sidewalk or other premises in the vicinity.

b) Only one (1) Freestanding Sign (General) shall be allowed upon a lot, except as provided in Subsections (c) and (d) below.

c) Two (2) Freestanding Signs (General) shall be allowed upon a lot provided that:

(i) the total combined areas of the signs, including all sides used for signs, does not exceed 38 m^2 (409 $ft.^2$), but subject always to the appropriate Maximum Area requirement of this Schedule, and

(ii) the signs situated not less than 30 m (98.4 ft.) apart.

d) Three (3) Freestanding Signs (General) shall be allowed upon a lot provided that:

(i) the lot is 2 ha (4.9 ac.) or more in size;

(ii) the total combined areas of the signs, including all sides used for signs, does not exceed 38 m^2 (409 $ft.^2$), but subject always to the appropriate Maximum Area requirements of this Schedule and

(iii) the signs are situated not less than 30 m (98.4 ft.) apart.

2. MAXIMUM AREA:

a) When situated on Land used for the following:

Industrial
Light Industrial
Business Park Industrial
Limited Industrial Retail
Airport

signs shall be in area (including the area of all sides used as a sign) no greater than 1 m^2 (10.8 $ft.^2$) per metre (3.3 ft.) of wall length fronting the street.

b) When situated on Land used for the following:

Agricultural
Golf Course
Roadside Stand
Agripark
Local Commercial
School & Public Use
Assembly
Health Care Facilities
Marina

signs shall be in area no greater than 0.33 m^2 (3.5 $ft.^2$) per metre (3.3 ft.) of wall length of the building facing the street or thoroughfare.

c) When situated in the following zoning districts:

Gas Station (G1)
Service Station (G2)

Freestanding Signs (General) are not permitted.

d) In no case may a Freestanding Sign (General) exceed in area, including all sides used as a sign, 38 m^2 (409 $ft.^2$)

3. MINIMUM HEIGHT:

a) Signs shall be maintained 0.9 m above finished grade.

4. MAXIMUM HEIGHT:

a) A Freestanding Sign (General) shall not be further at any point from the finished grade of the site upon which it is situated than 3.5 m (11.5 ft.)

5. MAXIMUM WIDTH:

a) The maximum width of a sign shall be 7.3m (24 ft.)

PART V: DEVELOPMENT SIGNS (TEMPORARY)

1. SITE:

a) A Development Sign (Temporary shall be situated wholly upon the site of the structure or land use to which it refers, and shall not project over public property.
b) Only one (1) Development Sign (Temporary) shall be allowed upon a lot.

2. MINIMUM HEIGHT:

a) A Development Sign (Temporary) shall not be closer at any point to the finished grade of the site upon which it is situated than 2.4 m (7.9 ft.).

3. MAXIMUM HEIGHT:

a) A Development Sign (Temporary) shall not be further at any point from the finished grade of the site upon which it is situated than 7.6 m (24.9ft).

END OF SECTION - *YVRAA-LE-GUI-0001*