PORT of vancouver

Project & Environmental Review

Guidelines – Developing Your Stormwater Pollution Prevention Plan

Vancouver Fraser Port Authority

July 2015

Canada

TABLE OF CONTENTS

1. INTRODUCTION

Stormwater is water that originates from precipitation events (such as rainfall) and from snow and ice melt. Stormwater either remains on the ground surface through ponding, gets soaked into the ground, or becomes stormwater runoff, which ultimately enters nearby water bodies. Stormwater runoff flows over land or impervious surfaces such as paved streets, parking lots and building rooftops, and as it flows it accumulates debris, soil and sediment, and pollutants that could negatively affect water quality.

The purpose of effective stormwater pollution prevention is to:

- Design systems appropriate for the site;
- Reduce the amount of stormwater discharged to the environment;
- Prevent or reduce the pollutant loading of stormwater; and
- Treat or otherwise manage stormwater if pollutant loading cannot be prevented.

Stormwater Pollution Prevention Plans should be based on site specific information, and should be customized to address the risk of stormwater pollution on a site. This guideline provides information on how to develop effective Stormwater Pollution Prevention Plans (SPPPs), and summarizes the deliverables expected of Vancouver Fraser Port Authority's tenants, should they be required to provide a SPPP. The development of a SPPP can be included as part of an overall environmental management strategy for a site. It may also be required under the port authority's Project and Environmental Review process, when a lease is being renewed, or in response to identified stormwater pollution. Should a SPPP be required, it is recommended that a qualified environmental professional be retained to produce this technical document.

In addition to outlining the various components that would be required as part of a SPPP, this document also briefly describes the general processes that would need to be completed in the preparation of a SPPP.

2. OVERVIEW

In general terms, there are five main phases in preparing a SPPP, including the following:

- Site inventory;
- Issues identification and risk analysis;
- Stormwater Pollution Prevention Plan;
- Implementation and monitoring; and
- Adaptive management measures.

Appendix A provides an overview of the steps to developing a SPPP.

SPPPs can be developed for application to three lifecycle phases of a tenant's activity on a site:

- Retrofit or formalization of stormwater pollution prevention strategies for existing activities;
- Construction phase activities for all or part of a site as a result of additions, modifications, re-development or new development; and

- Planning and design of permanent post-development stormwater pollution prevention to be applied to a newly developed or re-developed site.

Site Inventory

This initial step involves describing the site including the physical properties, the stormwater infrastructure, primary activities to be carried out on the site, secondary activities, the materials present, the location of all activities and materials, and the hydrologic parameters.

Issues Identification and Risk Analysis

Building on the knowledge of the site, this second step involves identifying the stormwater pollution risks present, and defining their priority level. This includes:

- Applicable Standards, Acts and Regulations;
- Potential Pollutant Sources;
- Potential Sensitive Receptors;
    - Environmental (terrestrial, marine, freshwater)
    - Public (municipal, community, stakeholders)
    - Aboriginal (First Nations and Métis)
- Identified Issues; and
- Identified Pollutant Pathways.

Stormwater Pollution Prevention Plan

Once the stormwater pollution risks have been identified, the third step is to develop an appropriate plan to mitigate these risks. Mitigation measures can include prevention, containment/reduction, and treatment.

Implementation and Monitoring

The fourth step is to implement the stormwater pollution prevention plan, and monitor the quality of stormwater to track effectiveness of mitigation measures.

Adaptive Management Measures

Once the stormwater pollution plan has been established, the final step is to adaptively manage the site which enables continuous improvement.

3. PRINCIPLES/OBJECTIVES

The Vancouver Fraser Port Authority has the responsibility to protect water quality within its jurisdiction. Due to the activities undertaken on properties within the port authority's jurisdiction, there is a risk to stormwater quality and therefore proactive management is required in order to protect water quality. The priority for stormwater management within the port authority's jurisdiction is property-scale adoption of stormwater source control measures and stormwater best management practices for the development of port authority lands, ongoing operations and decommissioning.

4. APPLICABILITY

The development of a Stormwater Pollution Prevention Plan can be included as part of an overall environmental management strategy for a site. It may also be required under the Vancouver Fraser Port Authority's Project and Environmental Review process, when a lease

is being renewed, or in response to identified stormwater pollution. When a SPPP is required under the Project and Environmental Review process, port authority staff will confirm a SPPP is required during the preliminary review phase.

5. GUIDELINES

The following sections outline the expected process for developing a SPPP, and the associated content. Appendix A provides an overview of the steps to developing a SPPP. As indicated in section 1, the SPPP should be completed by a qualified environmental professional with expertise in stormwater management and water quality issues. It is recommended that a qualified environmental professional be retained to produce this technical document (also see section 5.5.2).

5.1 SITE INVENTORY – "KNOWING YOUR SITE"

Tenants or applicants should define all activities that will be carried out on site. This should include construction phase, primary, and secondary activities, and their associated inputs and waste streams. This task should include the following: determine the specific processes that occur and/or are going to occur on the site, how often each of these activities will occur, and the materials involved in each of these processes. In general, this applies to SPPP development for application to an existing facility, for the construction phase, or when planning a new facility. Staff interviews can be conducted to collect information on existing stormwater drainage infrastructure, activities conducted, materials handled and existing stormwater pollution prevention strategies.

Where a SPPP is developed for an established site, stormwater infrastructure will already be in place, though there may be opportunities to implement new measures to properly mitigate stormwater pollution risks, or address new activities. The functionality of the existing system should be evaluated, including connections, catchment areas, and discharge points.

Stormwater runoff from construction sites can cause adverse impacts to the aquatic environment. Therefore, during construction, temporary drainage systems, including their catchment areas and discharge points, must be planned. In many cases a SPPP will need to accommodate and address changes in drainage system function as construction progresses. The SPPP must consider the dynamic environment of a construction site, such as changes in the workforce and phased construction activities, which lead to unique risks that may not be present during routine site operations.

Where a site will be subject to significant development or re-development, there is opportunity to improve the long-term management of stormwater pollution risks. Incorporating stormwater management considerations into site planning and design from the outset may reduce sources of stormwater pollution risk, or allow for more effective mitigation of these risks. Accordingly, stormwater pollution prevention should not be an add-on after the site design is finalized.

5.1.1 IDENTIFY ACTIVITIES

Tenants/applicants should consider all potential activities that could occur on site. These activities will vary over the lifecycle of a site, as a development progresses through construction, operation and decommissioning. The following are typical activities, but the list is not exhaustive.

Examples of Construction or Demolition/Decommissioning Phase Activities:

- Excavation, filling and regrading
- Demolition of existing facilities
- Fueling and servicing of construction equipment
- Concrete forming, pouring and curing
- On-site material preparation, including cutting, cleaning, and painting
- Material and waste storage
- Testing for contaminants (soil and water)
- Disposal of material

Examples of Operational Phase Primary Activities:

- Materials handling
- Trans-shipment and storage
- Manufacturing processes
- Servicing activities

Examples of Operational Phase Secondary Activities:

- Fueling of equipment and vehicles
- Routine servicing of equipment
- Occasional repair and maintenance activities:
    - Cleaning
    - Painting
    - Renewal/replacement of fixed plant

5.1.2 IDENTIFY MATERIALS (POTENTIAL POLLUTANTS)

Tenants/applicants should identify all materials or substances that will be involved in each activity. There could be substances used on site which may be pollutants, such as nutrients, sediments, pathogens and toxins. These substances may appear insignificant at their source, but when transported by stormwater into the Fraser River, Burrard Inlet or Roberts Bank, they can be of environment concern. Industrial and commercial businesses can contribute to polluted stormwater runoff through accidental spills and leaks, and through use and discharge of potentially toxic substances. The following are typical materials but the list in not exhaustive.

Example of materials from Construction or Demolition/Decommissioning Phase Activities:

- Wood
- Steel
- Aggregate and general fill
- Raw (uncured) concrete

- Paints, solvents, corrosion protection
- Asphaltic paving
- Wash water
- Exposed native soils
- Fuels, oils, hydraulic fluid
- Wastes of all of the above
- Soil stock piles from excavations or for reclamation / landscaping
- Contaminated soils
- Dewatering water (groundwater, surface runoff and precipitation dewatered from excavations / tunnels)
- Remaining material from previous operational phase (i.e. chemicals, coal, sulphur, woodchips, grain, hazardous liquids, organic products, bulk fuels and oils)
- Cleaning products
- Solid waste

Examples of materials from Operational Phase Primary Activities:

- Coal
- Sulphur
- Woodchips
- Grain
- Hazardous liquids
- Organic products
- Bulk fuels and oils, etc.
- Containers
- Cars
- Metals

Examples of materials from Operational Phase Secondary Activities:

- Hydrocarbons and coolants from motor vehicles and motorized equipment (from general wear and tear, minor leaks and drips)
- Woodwaste/sawdust from forestry activities
- Liquid waste
- Dust from material stockpiles and handling activities (including soil/material stockpiles for reclamation / landscaping purposes)

- Solid waste (including garbage, refuse and wasted input materials and process byproducts)

Substances that may potentially be introduced to the site as a result of infrequent events such as fires or spills and the resulting response should also be identified.

In addition to identifying which materials may be present on site, approximate quantities of each material should be estimated and where appropriate, indicate which months the material is typically consumed. If materials are stored on site, storage procedures should be documented.

Any hazardous materials that may be present on site should be identified and documented, with specific substance-related regulations outlined.

5.1.3 HYDROLOGIC ASSESSMENT

Tenants/applicants should conduct a hydrologic assessment of the site to estimate the runoff response, including peak flow rates and runoff volumes, for various rainfall events. The following hydrologic assessment process generally applies to existing sites, planning and implementation of stormwater management during construction, and planning and designing permanent stormwater management systems for future development and re-development. The key differences are:

- Existing sites will have established stormwater infrastructure and drainage patterns which may need to be modified to accommodate an effective SPPP.
- Construction phase stormwater management will contend with varying hydrologic conditions and drainage patterns from initiation to completion.
- Future permanent facilities provide an opportunity for stormwater management planning that is coordinated with overall site planning and design from the onset of the project.

Existing drainage patterns provide the basis for assessing the hydrology of a site and should be incorporated in the hydrologic assessment, including consideration of discharge points from the site, such as to natural watercourses, municipal drainage systems and marine waters. Notably, altering drainage patterns such that water courses or other habitats are subjected to a change in hydrological regime can result in ecological damage. This can occur with increased peak flows to small streams or decreased dry period base flows.

By assessing site grading and flow collection points, the tenant/applicant should divide the site into sub-catchments for each of the existing or proposed collection points (i.e. for each catch basin, manhole, storage or treatment unit, and discharge point, etc.). Sub-catchments may also be defined on the basis of activity or built form. An iterative effort is likely, as changes in the overall site design and the drainage system will alter collection points and their associated sub-catchments. Sub-catchments and drainage patterns will also be altered by the overlay of measures such as containment systems or treatment units that may be identified during development of the stormwater pollution prevention strategy later in the SPPP process, requiring a further round of adjustments.

During the construction phase, sub-catchments may vary as temporary facilities are moved to accommodate ongoing construction and varying conditions and activities over the site. Accordingly, a detailed plan is required in advance to ensure that the runoff from all portions of the site is properly managed and routed at all times, even during transitional

periods. Where deviations from the construction phase drainage plan occur, the SPPP should be updated and additional drainage facilities provided if necessary.

Once the sub-catchment boundaries have been determined, the basic hydrologic parameters for each should be estimated, including:

- Area
- Percent Impervious (i.e. the portion of the sub-catchment with hard surfaces such as pavement and roof tops)
- Average slope
- Time of concentration (i.e. how long it takes stormwater to drain off the site to the collection points)

The tenant/applicant should identify appropriate design rainfall events for the site. Below are potential recommendations for rainfall events:

Water Quality Event

A water quality event is a time period over which water with anomalous characteristics is detected. Substances accumulated on site during dry periods can be picked up by the next rainfall and quickly moved to the drainage system. These discharges can be detrimental to the environment, as the 'first flush' concentrations of potential pollutants are elevated.

- This is the design event used for evaluating water quality within the site.
- This should represent a relatively small, but frequently occurring event.
    - This event should be large enough that it accounts for the majority of average annual runoff, as well as the 'first flush' of larger storm events.
    - One example of a common water quality event is 50% of the 2-hour duration, 2-year return period event, with a peak rainfall intensity corresponding to a 15 minute time of concentration.
- A higher standard (larger event) may be advisable for the water quality event if particularly high risk conditions are identified.

Storm Drainage Event

A storm drainage event is a time period used to evaluate stormwater flow and infrastructure requirements to prevent flooding and ensure safe drainage.

- This is the design event used for sizing drainage infrastructure within the site, such as catch basins, storm drains, storage units, etc.
- This event should be selected to ensure efficient and safe drainage within the site.
- Examples of common storm drainage events include the 5 or 10-year return period. A qualified environmental professional will be able to help a tenant/applicant to determine the return period to use at a specific site.

- Runoff from extreme events, such as the 100-year return period rainfall, should be evaluated to prevent property damage and protect the safety of personnel.

The tenant/applicant should obtain rainfall Intensity-Duration-Frequency data for their locale from local rain gauge services. The tenant/applicant should review the available Intensity-Duration-Frequency data from several of the nearest gauges to determine the governing precipitation for the site. The tenant/applicant should also take into account the general rainfall gradient from south to north and west to east across the region when selecting appropriate gauges.

Based on the sub-catchment properties, the design rainfall events, and the appropriate Intensity-Duration-Frequency data, the tenant/applicant should estimate the peak flow rates and total runoff volumes for each collection point. Appropriate calculation methods may include the "Rational" Method for small uncomplicated sites, or more involved modelling using software such as the United States Environmental Protections Agency's Stormwater Management Model or its commercial derivatives where justified.

5.2 ISSUES IDENTIFICATION AND RISK ANALYSIS

5.2.1 APPLICABLE STANDARDS, ACTS AND REGULATIONS

The tenant/applicant should review the activities (construction phase, operational phase primary, operational phase secondary and decommissioning) as well as the potential materials and substances on site, to determine if the site is subject to any specific regulations. A qualified environmental professional will be able to help a tenant/applicant to identify the applicable legislation.

For example, hazardous materials that may be present on site will have specific substance-related regulations.

5.2.2 POTENTIAL POLLUTANT SOURCES

The tenant/applicant should determine if the planned activities and materials on site could result in any special risks in terms of stormwater pollution. Examples of potential pollutant sources include but are not limited to: maintenance activities, chemical/product storage and use, material handling, commodity transfer points, soil stockpiles, etc.

5.2.3 POTENTIAL SENSITIVE RECEPTORS

The tenant/applicant should identify potential sensitive receptors. This may include the following:

- Environmental (terrestrial, marine, freshwater)
- Public (municipal, community, stakeholders)
- Aboriginal (First Nations and Métis)

5.2.4 IDENTIFIED ISSUES

Based on the materials and activities that are anticipated within the site, the tenant/applicant should identify the stormwater pollution risks for each sub-catchment. The tenant/applicant should identify which pollutants are anticipated, and how frequently these pollutants will be released into the site.

This risk analysis should take into consideration the results of the hydrologic assessment to identify the conditions under which the pollutants would be mobilized (i.e. during frequent rainfall events, during major rainfall events, during spills regardless of rainfall, etc.). This analysis should also consider special features within the site such as containment berms, wash pads, fueling stations, etc.

The risk analysis should consider the probability (likelihood) of each type of pollutant being released (i.e. how frequently is it expected to occur), as well as the consequences of the pollutant being released (i.e. how significant would the impacts be on the surrounding environment).

A ranking matrix could be developed for each major pollutant concern, which assesses the relative probability (likelihood) of a pollutant entering runoff, and the consequences if this occurs.

An example ranking matrix is provided below:

		Pollution Consequences				
		Low (1)	Medium Low (2)	Medium (3)	Medium High (4)	High[1] (5)
Pollution Probability	Low (1)	1	2	3	4	5
	Medium Low (2)	2	4	6	8	10
	Medium (3)	3	6	9	12	15
	Medium High (4)	4	8	12	16	20
	High(5)	5	10	15	20	25

Note [1]: In concept, there could be substances that have sufficiently high consequences that any resulting pollution would be an extreme risk, regardless of the probability of occurrence. However, these would likely fall into a highly regulated regime and would be managed outside the context of a SPPP.

Based on any specific regulations or special risks, the tenant/applicant should determine the requirements for mitigating these, and ensure conformance with prevailing regulations. The emergency response plan should be considered in this risk analysis.

5.2.5 IDENTIFIED POLLUTANT PATHWAYS

The tenant/applicant should identify pollutant pathways, which show the source of the polluting material and activity which interacts with stormwater, and the subsequent downstream path. If stormwater pollution prevention measures are in place or proposed, they should be shown.

This information should be provided on a site plan.

5.3 STORMWATER POLLUTION PREVENTION PLAN

5.3.1 MANAGEMENT STRATEGY

Based on the results of the risk analysis, as well as any special issues, the tenant/applicant should develop a management strategy to address the stormwater pollution risks.

The management strategy should incorporate best management practices, and should target the most significant issues identified in the ranking matrix. For example, frequently occurring events with the potential to cause significant effect on the environment should be given a higher priority than occasional events with nominal potential to cause a negative environmental effect.

Generally speaking, an effective stormwater pollution management strategy should employ preventive, containment / reduction, or treatment approaches, in this order of priority.

Prevention: As a primary goal, a management strategy should aim to prevent the release or presence of potentially polluting materials within the site. Prevention begins at project design, and can also be used during construction, operations and decommissioning. During design, exposure of materials to stormwater may be prevented by complete coverage of processes or storage. During construction, minimizing exposed soils or providing surface stabilization will prevent mobilization of sediment. During operation, selection of alternate benign materials or processes will prevent some pollution risks. Site management activities, such as sweeping or cleaning will also prevent or minimize interaction between pollutants and rainfall runoff.

Containment/Reduction: Minimizing the area where potentially polluting activities take place and thereby limiting the quantity of polluted stormwater produced will reduce the subsequent treatment effort that will be required. Containment and reduction practices can occur during project design, construction, operations and decommissioning. A common example is equipment fueling at a specific location equipped with collection pans and containment, versus mobile fueling that may take place anywhere.

Treatment: Where measures to prevent contact between pollutants and rainwater runoff are not feasible or do not provide complete protection, the final stage in mitigating stormwater pollution is to provide treatment of polluted stormwater. Treatment begins with project design through the creation of stormwater infrastructure, and can also occur during construction, operations and decommissioning. Generally, treatment will not completely remove pollutants and can be particularly challenging for dissolved substances or very fine particulates that requires additional measures beyond the common mechanical approaches of filtering, skimming or settling. Chemical or biological treatment processes may be necessary and generally require specialized designs and entail more complicated operation and maintenance efforts.

Where landscaping features are feasible, rain gardens or bioswales are able to treat common pollutants such as total suspended solids and hydrocarbons. However, groundwater interaction and ultimate release points should be considered in their design. Where landscaping features are not feasible or inadequate to handle the pollutant loads, a more robust structural best management practice (BMP) such as a sediment/de-silting basin, will be needed. Where oil, gasoline, light petroleum compounds and grease can potentially enter the stormwater system, an oil and water separator is required immediately upstream of the entry point.

The management strategy should be developed in accordance with the Technical Performance Standards for the proposed treatment method. For example, an oil and grit

separation system such as Stormceptor will have an operational manual that provides the technical specifications on how much and what size of sediment can be filtered.

A combination of strategies may be necessary to achieve the overall requirements for a given site. Successful implementation of prevention and isolation approaches can reduce the total quantity of polluted runoff which requires treatment.

SPPPs developed for construction phase activities should incorporate an Erosion and Sediment Control Plan that details how mobilization of sediment will be minimized or prevented, as well as measures to limit the movement of sediment from site. Common strategies employed in an Erosion and Sediment Control Plan include:

- Minimizing exposed soils
- Covering soil stockpiles
- Temporary and Permanent Stabilization of disturbed areas (e.g. hydroseed or straw mulch)
- Sediment barriers such as silt fencing or fiber rolls
- Drainage channel stabilization
- Sediment settling ponds
- Wheel washes
- Stabilized working pads (shot rock)
- Installing pollution traps for storm drain/street curb inlets

Release of uncured concrete and associated by-products from site should be prevented. Waste concrete should be placed and cured in a contained area, and any runoff generated should be pH adjusted and filtered or settled to reduce total suspended solids before discharge. Concrete wash water should be subject to similar treatment. Oversight may be necessary to prevent illicit dumping of raw concrete in offsite areas, or washing of concrete mixers/trucks to municipal storm drainage systems or water courses.

5.4 IMPLEMENTATION AND MONITORING REQUIREMENTS

5.4.1 IMPLEMENTATION AND MONITORING

The tenant/applicant should develop implementation and monitoring requirements as a component of the SPPP. The implementation and monitoring component should address the following key points:

- Define when stormwater pollution prevention actions or measures are required, including timing, triggers and responses;
- Designate a responsible person to act as the SPPP Manager to oversee implementation of the SPPP and ensure compliance with its requirements;
- Identify training requirements for personnel: who should be trained, when training should occur, their level of responsibility, and their roles in stormwater pollution prevention;
- Define required maintenance activities, frequency and documentation;
- Define a monitoring or oversight process to track SPPP effectiveness;

- Define response and adaptive actions in the event of a failure in the implementation of the SPPP or of a recommended mitigation measure; and
- Define triggers for adaption or modification of the SPPP in the face of changing conditions, activities or pollution risks to stormwater.

Construction phase SPPPs should be incorporated into construction contract documents to ensure they are enforceable, and that they apply to all contractors, subcontractors and vendors working on site during construction phase activities. Specified actions and/or penalties should be included in the contract documents in the event of non-compliance that is not addressed as directed by the designated SPPP Manager.

In addition, the SPPP should be reviewed on a regular basis during construction to identify required revisions and ensure it remains effective.

5.4.2 ADAPTIVE MANAGEMENT MEASURES

The SPPP process may require adaptive management. Adaptive management is a planned and systematic process for continuously improving environmental management practices by learning about their outcomes. Adaptive management provides flexibility to identify and implement new mitigation measures or to modify existing ones during the life of a project. There may be unanticipated changes in environmental conditions, changes in material use or activities on site, inaccurate predictions, or subsequent information that might affect the goal of stormwater pollution prevention. If follow-up monitoring identifies potential weaknesses of the stormwater pollution prevention infrastructure, adapting to address these weaknesses may be necessary. Adaptive management can help determine whether mitigation measures are cost effective and if the predicted effects occurred. If the actual effects are not what were predicted, adaptive management can help determine actions to avoid stormwater pollution.

Adaptive management ensures the stormwater pollution prevention plan is working effectively. There may be further opportunities for continuous improvement for management practices that may impact stormwater quality.

If the Vancouver Fraser Port Authority requires a SPPP of the tenant/applicant, then the port authority will help to determine whether adaptive management measures are required. If the development of a SPPP is being conducted as part of a tenants/applicants own due diligence, then a qualified environmental professional can help the tenant/applicant to determine whether adaptive management may be required.

5.5 REPORTING REQUIREMENTS

5.5.1 REPORTING

The SPPP should be submitted as a written report, following the outline presented in this guidance document. In addition to each of the components presented above, the SPPP should also clearly present the background data that has been used, staff interviews conducted, as well as any key design assumptions that have been made. Appendix B provides a sample table of contents for a SPPP.

The report should include an overview map or plan of the site to highlight the following features:

- The boundaries for each sub-catchment,
- Unique identifiers for each sub-catchment,

- Pollutant occurrence within each sub-catchment,
- The stormwater drainage infrastructure,
- The stormwater drainage collection points,
- The stormwater drainage release points from the site,
- Location of treatment units,
- Downstream receiving water bodies, and
- Special features within the site.

The SPPP should also detail the operation and maintenance activities required as part of the management strategy. These may include regular surface sweeping, treatment unit maintenance intervals, and ongoing operations/processes. The implementation and monitoring component should include identification of key personnel, their responsibilities and contact information.

A spill response plan should be included within the SPPP by reference or direct incorporation, and should be reviewed in the context of the SPPP.

Included in the SPPP should be an organizational chart indicating the role of the professional(s) responsible for managing, maintaining and ensuring stormwater pollution prevention. Where more than one role is involved, a brief summary of their key duties and role in stormwater pollution prevention should be provided.

5.5.2 QUALIFIED PROFESSIONAL

The SPPP should be completed by a qualified professional with expertise in stormwater management and water quality issues. This may include professionals in engineering, environmental sciences, and/or other disciplines as required. The qualified professional should oversee all aspects of the SPPP, and should take professional responsibility for the work.

The development and implementation of construction phase SPPPs should include a qualified environmental professional with erosion and sediment control expertise.

5.5.3 SUBMISSION TIMELINES

The SPPP development should parallel overall site design and planning. Preliminary or draft SPPPs should be submitted in conjunction with corresponding design submissions and should be refined and finalized following the same processes as the overall design.

Review of the SPPP will be concurrent with reviews of overall site planning and design as part of the Vancouver Fraser Port Authority's Project and Environmental Review process. The SPPP should be submitted to the port authority for review and approval. Tenants and applicants may need to respond and incorporate comments from the port authority before finalizing their SPPP.

In general SPPP required features or practices should be identified and included in the site design and planning process at an early stage and not be treated as an add-on after other site functions have been finalized.

If the SPPP is being developed as part of an overall environmental management strategy for an existing site, when a lease is being renewed, or in response to identified stormwater pollution, the port authority will work with tenants and applicants on an appropriate timeline.

6. DEFINITIONS

Adaptive management	Adaptive management is a planned and systematic process for continuously improving environmental management practices by learning about their outcomes
Consequence	Indicates how significant the impact would be if the pollutant were released to the environment
Discharge points	Outfall or drainage point
Hydrologic assessment	An activity completed in a Stormwater Pollution Prevention Plan which relies on local site conditions to estimate the stormwater runoff response for various rainfall events, including peak flow rates and runoff volumes
Mitigate	An activity completed in a Stormwater Pollution Prevention Plan to reduce probability and consequence of stormwater pollution through prevention, containment/reduction, and/or treatment
Pollutant	A substance that contaminates stormwater
Pollution	The presence or introduction of a pollutant into the environment that has harmful or detrimental effects on stormwater; may occur as a result of accidental spills and leaks, or from construction, operation or decommissioning activities
Prevention	A mitigation measure which avoids the release or presence of potentially polluting materials
Primary activity	An activity to service the core business (examples include materials handling, transit shipping and storage, manufacturing processes, and servicing activities)
Probability	The likelihood of each type of pollutant being released into stormwater (i.e. how frequently an event is expected to occur)
Qualified environmental professional	The SPPP should be completed by a qualified environmental professional with expertise in stormwater management and water quality issues, and may include professionals in engineering, environmental sciences, and other relevant disciplines as required.
Rational Method	A simple technique used to determine peak discharge (greatest amount of stormwater runoff at any one time) for small, uncomplicated sites
Reduction	A mitigation measure which minimizes the area where potentially polluting activities take place and limits the quantity of polluted stormwater produced; also referred to as containment
Secondary activity	An activity which is needed for business operations but is not directly related to the core business (examples include fueling of equipment and vehicles, routine servicing of equipment, and occasional repair and maintenance activities)

Technical Performance Standards	Provides the set of documented requirements to be satisfied by a material, design, product, or service, to treat stormwater pollution risks (e.g. Stormceptor operational manual)
Treatment	A mitigation measure which removes pollutants from stormwater through chemical and/or biological processes.

7. NOTES/LINKS TO OTHER DOCUMENTS

These guidelines may be used in conjunction with the Vancouver Fraser Port Authority's Project and Environmental Review Application Guide. As discussed in section 5.1, SPPP include consideration of construction activities. Pollution prevention from construction activities are also the focus of Construction Environmental Management Plans (CEMP). The port authority will provide guidance when a CEMP is required instead of a SPPP. A CEMP Guidance Document is also available for reference on the port authority website at www.portvancouver.com (under Project and Environmental Review).

8. CONTACT INFORMATION

For clarification, or assistance with this guideline, please contact Vancouver Fraser Port Authority Environmental Programs:

Phone: 604-655-9082 Environmental Programs Department

Email: EnvironmentalPrograms@portvancouver.com

9. UPDATES

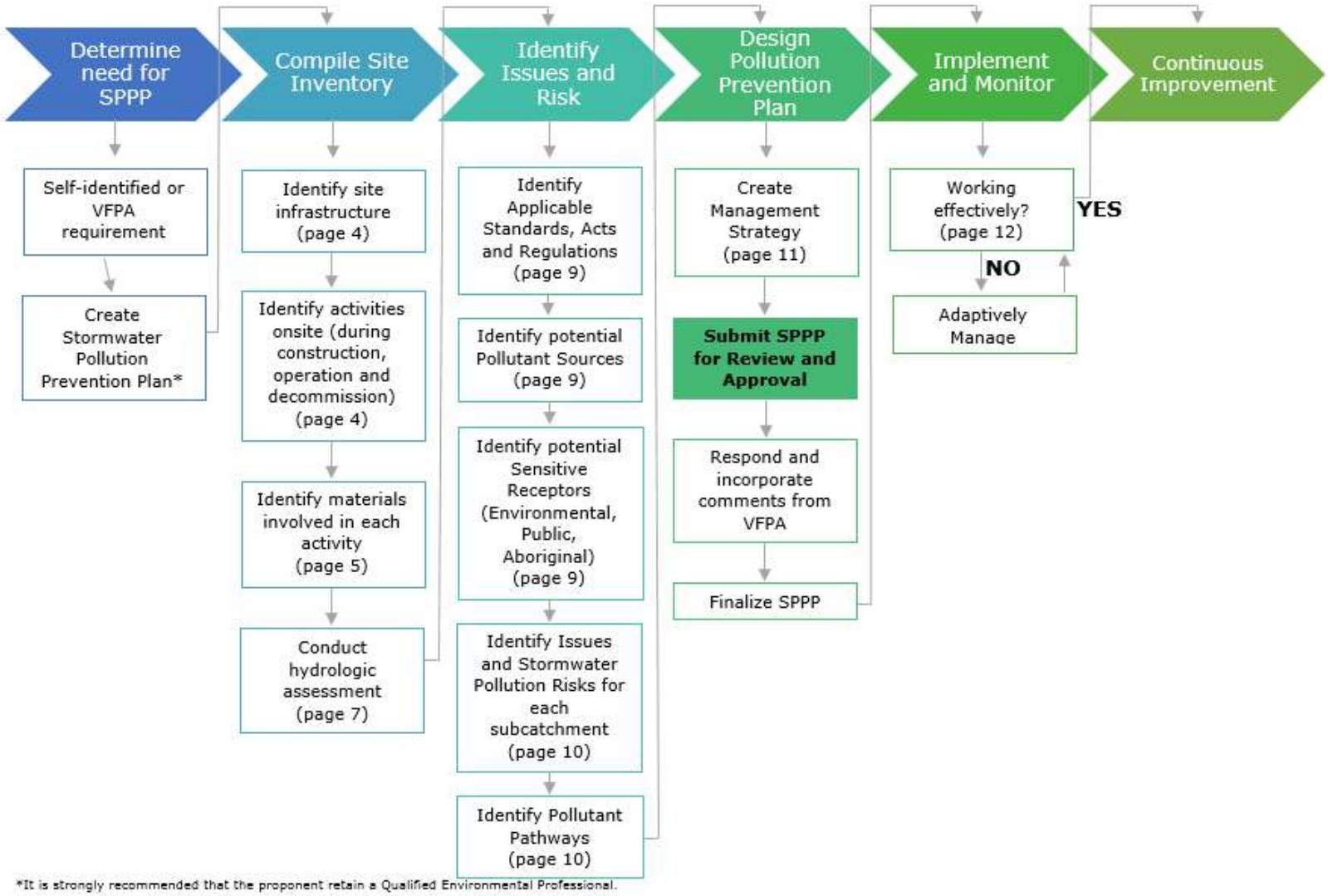
This guideline will be updated from time to time and is available on the the port authority's website at www.portvancouver.com under Project and Environmental Review. To ensure that you are referring to the most up-to-date document please reference the version date clearly indicated on the front page.

10. ATTACHMENTS/APPENDICES

Appendix A: Overview of Steps to Develop Your Stormwater Pollution Prevention Plan (SPPP)

Appendix B: Sample Table of Contents for Stormwater Pollution Prevention Plan

Appendix A: Overview of Steps to Develop Your Stormwater Pollution Prevention Plan (SPPP)



Appendix B: Sample Table of Contents for Stormwater Pollution Prevention Plan