

Royal Vancouver Yacht Club

Coal Harbour Marina Expansion Project: Construction Environmental Management Plan (CEMP)

Prepared for:

**TyPlan Planning and Management
1461 Ioco Road City, BC
V3H 2X3
604.461.6664**

Prepared by:

**Erika Paradis, MSc, RPBio
Vancouver, BC
604.396.1459**

February 2020

TABLE OF CONTENTS

Table of Contents	2
1.0 Introduction	5
2.0 Project Information.....	6
2.1 Location.....	6
2.2 Project Description.....	6
2.2.1 Project Phases	6
2.2.2 Project Activities	9
2.3 Project Schedule	10
2.4 Site Description	10
3.0 Contacts and Responsibilities	12
3.1 Key Project Personnel	12
3.2 Environmental Monitor Responsibilities.....	13
3.3 Permit Holder/Contractor Responsibilities.....	14
4.0 Relevant Environmental Legislation	15
5.0 Project Mitigation Measures and Environmental Specifications	17
5.1 General Practices	17
5.2 Site Access, Mobilization and Laydown Areas	17
5.3 Air Quality	19
5.4 Noise and Vibration	19
5.5 Machinery and Equipment.....	20
5.6 Marine Works	20
5.6.1 Pile Removal and Pile Driving.....	21
5.7 Archaeological Resources	23
5.8 Sensitive Habitat Features and Species	23
6.0 Emergency Preparedness and Response Plan	24
6.1 Emergency Communication	24
6.2 Environmental Emergency Plan	24
6.2.1 Fire Preparedness and Response	25
6.3 Spill Response Plan.....	25
6.3.1 Spill Preparedness.....	25
6.3.2 Spill Response Procedures	25

6.3.3 Spill Reporting	26
7.0 Fuel Management Plan	27
8.0 Waste Management	28
9.0 REFERENCES.....	29

LIST OF FIGURES

Figure 1 Project Location	7
Figure 2 Proposed Navigational Route for boat sheds and floating systems	18

LIST OF TABLES

Table 1 Summary of Construction Phases and Activities.....	8
Table 2 Proposed Project Schedule	10
Table 3 Key Project Personnel	12
Table 4 Federal, Provincial, Regional District, and Municipal Legislation and Legal Requirements.....	15
Table 5 Emergency Contact Numbers.....	24

LIST OF APPENDICES

Appendix A	Construction Plan Phase 1-8
Appendix B	Pile Removal/Driving Plan
Appendix C	Content for Environmental Monitoring Reports
Appendix D	List of Environmental Permits, Licences and Approvals
Appendix E	Declaration for Project-Related Contractor Construction Equipment
Appendix F	Best Management Practices for Pile-Driving and Related Operations
Appendix G	RVYC Emergency Response Plan

LIST OF ABBREVIATIONS AND ACRONYMS

BMPs	Best Management Practices
CDC	Conservation Data Centre
CEMP	Construction Environmental Management Plan
DFO	Department of Fisheries and Oceans Canada
EM	Environmental Monitor
EMA	Environmental Management Act
HWM	High Water Mark
LLW	Low Low Water
MOE	BC Ministry of Environment
MSDS	Material Safety Data Sheets
PM	Project Manager
QEP	Qualified Environmental Professional
RVYC	Royal Vancouver Yacht Club
SARA	Species At Risk Act
Port authority	Vancouver Fraser Port Authority
WHMIS	Workplace Hazardous Materials Information System

UNITS

kPa	Kilopascal
m	Metre
m ²	Square metre
NTU	Nephelometric Turbidity Unit

1.0 INTRODUCTION

This Construction Environmental Management Plan (CEMP) describes mitigation measures and Best Management Practices (BMPs) to be implemented during construction at the Royal Vancouver Yacht Club's proposed Coal Harbour Marina Expansion Project (the project). The Royal Vancouver Yacht Club (RVYC) is committed to conducting its operations in a safe and environmentally responsible manner. This CEMP follows the guidelines established in the Vancouver Fraser Port Authority *Project & Environmental Review Guidelines – Construction Environmental Management Plan (CEMP)* (port authority, 2018).

The prime objective of this CEMP is the protection of environmental resources that could be potentially impacted during the construction works. The intent the CEMP is to provide the construction Contractor(s) with sound environmental protection planning and BMPs; this plan is a living document and may be subject to modification where construction practices are upgraded or adapted to address changing site conditions.

The Proponent (RVYC) will be responsible for compliance with environmental protection measures. All sub-contractors are subject to the same rules and regulations as the Contractor(s) and must abide by the conditions of permits and/or authorizations obtained by RVYC for the individual components of the project, including any commitments generated as part of the application and approval process. This CEMP applies to all project personnel, whether working for the Contractor(s), sub-contractors or observing/monitoring on-site during construction activities.

Work procedures in this CEMP must be reviewed with and understood by all staff, and compliance should be fostered throughout the project. Up-to-date copies must be kept on the project site, where they will be available to workers and visitors at all times.

2.0 PROJECT INFORMATION

2.1 Location

Coal Harbour Marina (i.e., the project site) is located in Coal Harbour, Vancouver, BC (**Figure 1**). The existing marina and lease expansion area are located within the port authority's jurisdictional boundaries. The geographical coordinates at the project's approximate centre are 49°17'41" North and 123°07'40" West.

2.2 Project Description

The project will retrofit and improve the marina's floats, replace older float and boat sheds, remove 85 old creosote-treated piles and upgrade utilities. Construction of the concrete docks and boat sheds will be undertaken off site, the primary focus on site will be assembly. The expansion will add 47 slips, improve the current layout, and allow facilities upgrade (based on worldwide BMPs) to promote environmental sustainability.

2.2.1 Project Phases

The project will proceed according to the following eight (8) phases:

- Phase 1 - Installation of the new K float specific to the expansion of the marina into the water lot;
- Phase 2 - Removal of all floats on the south side that do not meet today's standards;
- Phase 3 - Shifting of G float east. Install new G float east and add new concrete corner to the end of D float and new concrete fingers at the end of G float. Relocate existing J boat sheds to the end of G float;
- Phase 4 - Add new concrete float to end of E float. Relocate existing H boat sheds to end of E float. Add new concrete fingers to the east of E float;
- Phase 5 - Removal of old G boat sheds. Add new J float and tow in new replacement J boat sheds. Install new concrete fingers on east side of K float. Install new float to connect south end of D float to K float;
- Phase 6 - Shift existing fingers east on D float. Tow in new replacement G boat sheds. Install new H float. Relocate existing B float boat sheds to new H float;
- Phase 7 – Tow in new replacement H boat sheds and install new concrete finger on H float. Install new fingers;
- Phase 8 – Install new concrete fingers on the existing B float and add one new on south end of B float. Tow in new replacement boat sheds on the south side of E float. Tow in new replacement boat sheds on the north side of E float. Place new fingers on the expansion areas.

Most of the works will occur within the boundaries of the current water lot lease and/or proposed expansion area (i.e., internal to RVYC Coal Harbour Operations); however, some activities such as barge access and staging (during Phase 1), and boat shed towing/relocation (during Phase 6) may occur outside these boundaries. Pile driving will be conducted throughout most phases. Upgrading of dock utilities and safety features will also be completed during the phased construction. **Table 1** provides a summary of project phases and associated activities. Detailed plans for each project phase are presented in **Appendix A**.

Figure 1 Project Location

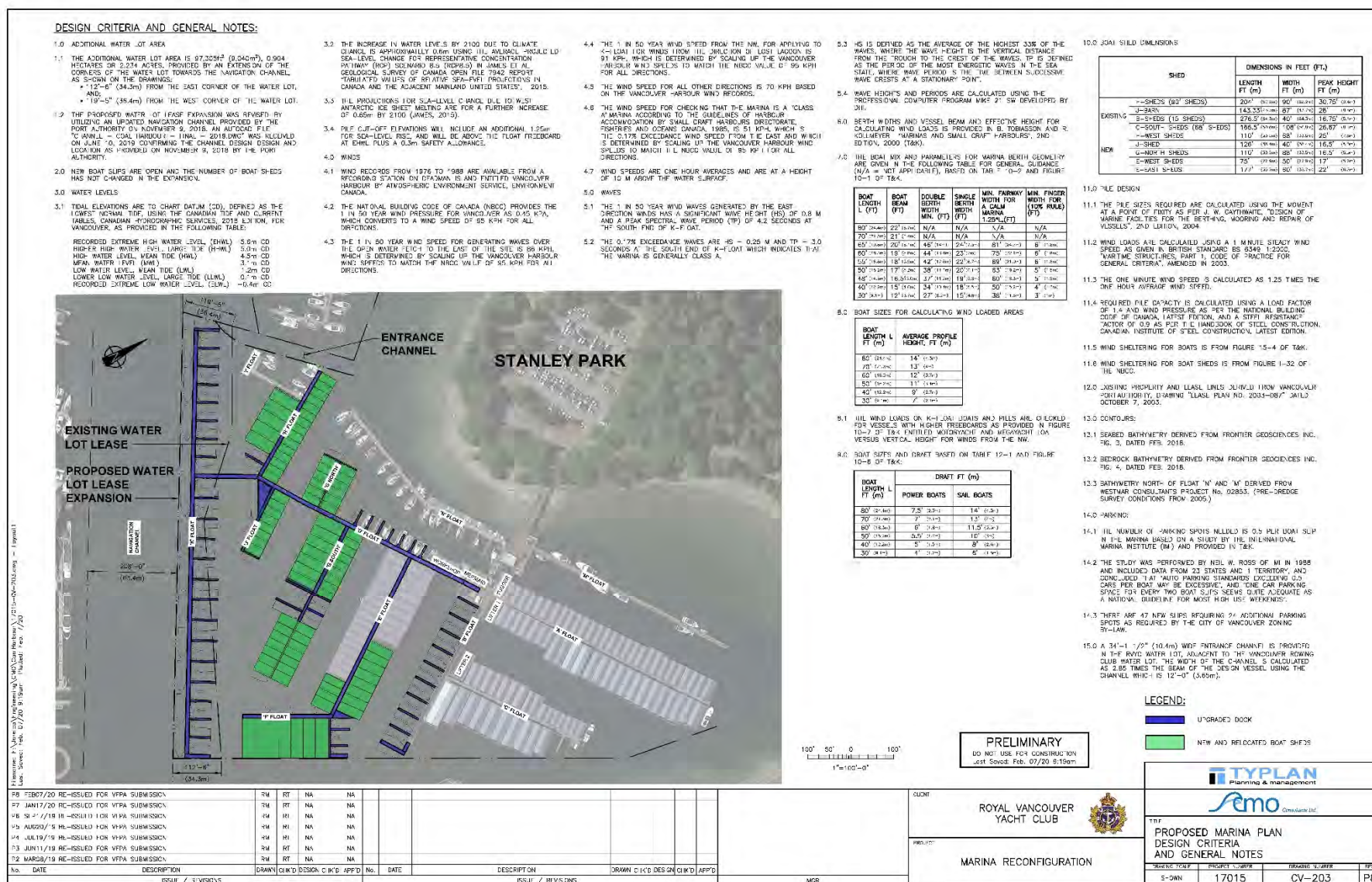


Table 1 Summary of Construction Phases and Activities

Phase	Description	Activities
1	<ul style="list-style-type: none"> • Installation of the new K float • Replacement of D and E floats 	<ul style="list-style-type: none"> • Demolition- pile removal • Pile driving • Demolition- float removal • Installation of concrete float
2	<ul style="list-style-type: none"> • Removal of older/ poorly aligned floats and boat sheds in southeast project area 	<ul style="list-style-type: none"> • Demolition- boat sheds removal • Pile driving
3	<ul style="list-style-type: none"> • Relocation of J boat shed to end of G South • Shifting of D boat shed • Installation of new corner float at end of D float • Installation of new floats at end of G South float 	<ul style="list-style-type: none"> • Pile driving • Relocation/towing of boat sheds • Shifting of boat sheds • Installation of concrete corner and float
4	<ul style="list-style-type: none"> • Relocation of H boat shed to end of E float • Installation of new F float/fingers 	<ul style="list-style-type: none"> • Pile driving • Relocation- towing of boat sheds • Installation of concrete float/finger
5	<ul style="list-style-type: none"> • Removal of G North, H and portion of I floats • Removal of G North and remaining H boat sheds • Installation of new floats/fingers along K float • Installation of new J float and boat shed 	<ul style="list-style-type: none"> • Pile driving • Floats removal • Installation of concrete float/finger • Installation of boat sheds
6	<ul style="list-style-type: none"> • Relocation of B boat shed to H float • Removal of end of B float • Shifting of “D” float fingers • Installation of new “D” float 	<ul style="list-style-type: none"> • Pile driving • Relocation- towing of boat shed • Float removal • Shifting of finger • Installation of boat sheds
7	<ul style="list-style-type: none"> • Installation of new H float and boat sheds • Installation of fingers along H and K floats 	<ul style="list-style-type: none"> • Pile driving • Installation of boat sheds • Installation of concrete finger
8	<ul style="list-style-type: none"> • Installation of new E float and boat sheds • Installation of new float/fingers along B float 	<ul style="list-style-type: none"> • Pile driving • Installation of boat sheds • Installation of concrete float/finger

2.2.2 Project Activities

All activities in relation to the project will be conducted from the water (i.e., none from land), and no upland staging/ laydown area is required for this project. The following activities are associated with the various phases of the project (as per **Table 1**):

Demolition - boat shed removal: Dismantling of old floats and boat sheds to be replaced. Removed structures will be loaded onto a support barge for subsequent off-site disposal (see below).

Demolition - pile removal: A total of 85 old creosote-treated wooden piles and 23 H steel piles will be removed either by vibratory extraction or direct pull. Removed creosote piles will be loaded on to a support barge for subsequent off-site disposal. A total of 24 cylindrical steel piles will be removed either by vibratory extraction or direct pull and stored on a support barge for subsequent on-site reuse.

Pile driving: All new/reused piles will be driven with either a vibratory or drop hammer, from a barge. A total of 129 piles will be installed (see plan in **Appendix B**):

- 48 16-inch cylindrical steel piles
- 24 12.75-inch cylindrical steel piles (reused)
- 35 12.75-inch cylindrical steel piles
- 22 10.75-inch cylindrical steel piles

Shifting of float/finger/boat shed: Shifting (i.e., repositioning) of existing components will involve only limited movement of each component to its new/proposed location.

Relocation - towing of boat shed: Relocation of boat sheds will involve towing the component over a short distance to its new/proposed location. Towing of all but one boat shed will occur within the boundaries of current water lot and/or lease expansion area; relocation of the B float boat shed to H float will require towing along the outside of the new K float.

Installation of concrete float/finger/corner: All new concrete floats, fingers and corners will be constructed off-site and brought to the project site by barge (detail in **Section 5.2**) to be installed at their proposed locations. No concrete works will be conducted on-site. Float design is available in the *Coal Harbour Marina Expansion Project: Project Description* (TyPlan, 2018).

Installation of boat sheds: All new boat sheds will be constructed off-site and brought to the project site by barge (detail in **Section 5.2**) to be assembled at their proposed locations. The boat sheds will be constructed by CCY Marine in Richmond, to BC Float Home Standards (Province of BC, 2003).

Upgrading of dock utilities and safety features: These include upgrades to plumbing, electrical and lighting systems. The upgrading/reconfiguration of dock facilities will be phased in with dock construction. Detailed design plans are available in *Docks and Floats*, IMFS (2017); *New Electrical Distribution Layout Drawings*, Sokulaki Engineering (2018); *Water Supply and Fire Protection Drawings*, Sokulaki Engineering (2018); *Lighting Plan*, TyPlan (2018).

Off-site disposal: All removed creosote-treated wooden piles, old floats and boat sheds will be barged from the project site and delivered to an approved disposal site.

2.3 Project Schedule

The project is expected to commence August 16, 2020 (subject to regulatory approval) and be completed by February 28, 2022. A proposed schedule is presented in **Table 2**. Currently the general contractor has yet to be selected however more detailed scheduling will be provided within the next two months (presented in July 2018). Noted extended lead time is required to procure and to construct the boat sheds and floats prior to construction. Where practical, in-water work will take place during the fisheries work window of least risk for Burrard Inlet (Area 28 – Vancouver); August 16 to February 28 (DFO, 2014). A general contractor will be retained to complete the project and provide detailed construction schedule. At this time two years have been identified however the contractor may be capable of undertaking all works within the one-year period. Once selected detailed plans will be provided to the port authority.

Table 2 Proposed Project Schedule

Task	Proposed Dates
Development and Environmental permitting	December 2019
Final detailed design	January 2020
Off-site construction of floats and boat sheds	2019 - 2021
Phase 1-8 construction (all in-water works)	August 16, 2020 – February 28, 2021 August 16, 2021 – February 28, 2022
Completion of construction	February 2022

2.4 Site Description

Coal Harbour Marina is located west of Deadman’s Island (site of HMCS Discovery Naval Reserve Division) and east of the Vancouver Rowing Club. It is bounded by Stanley Park to the north (including the Seawall pedestrian walkway and Stanley Park Drive), and by the Coal Harbour Navigation Channel to the south (and beyond, a section of the city’s waterfront). The marina is well-protected from wave action and provides 320 slips, along with other mooring amenities and services. Refer to *Coal Harbour Marina Expansion Project: Project Description* (TyPlan, 2018) for a detailed description of the site history and current marina facilities. Construction will be limited to the area west of B float (**Figure 1**); total proposed project water lot expansion is 9,040 m².

As all project activities will occur on the water – below the Low Low Water (LLW) mark - and none are expected to affect upland areas, a backshore survey was not required. The closest vegetated area to the project site (i.e., trees along the north side of Stanley Park Drive) is over 70 m away and is not expected to be impacted by project activities.

The marine environment observed in the project area was typical of protected basins, with low species diversity and abundance (Seacology, 2018). Substrate was dominated by unconsolidated fine-grained sediments (i.e., silt/mud/clay), representing 73% of the observed substrate. Limited boulder and cobble were seen throughout the site. Anthropogenic debris was also limited and included: broken wood piles, steel beam piles, corrugated aluminium sheets, smaller metal objects, rope, cable/wire, glass jars/bottles and various small plastic items.

Diatoms were abundant throughout the site (representing >70% average cover), forming a thin layer on the sediment. Macroalgae (i.e., seaweeds) were observed in limited abundance and were mainly restricted to hard substrates, with the exception of the unattached red spaghetti alga, which was seen throughout the site (average of 1.4% cover/m²). No canopy-forming kelps were observed. No eelgrass beds were observed inside the project area; a single shoot was seen during the marine survey (between floats E and G South). A small patch of eelgrass (approximately 25 m² in size) was observed at the northwest boundary of the project site, but outside the project area (Seacology, 2018).

Few marine invertebrates were observed in the project area during the marine survey (Seacology, 2018). Dungeness and red rock crabs were present throughout the site (0.2/m² and 0.01/m², respectively), along with a few California sea cucumbers and mottled sea stars. Other invertebrates included: hermit crabs, barnacle shells, chitons, limpets, hydroids, and a few plumose anemones. Observed bivalve molluscs included: fat and Pacific gapers, butter clams, soft shell clams, cockles and Pacific blue mussels (dislodged from float and pile structures). Average bivalve density for the entire site (based on siphon count) was 0.5/m², with the highest density observed along B float (1.5/m²). An invasive tunicate species, the harbour star ascidian, was also observed on wooden piles.

Only a few fish were observed during the marine assessment: a single juvenile left-eyed flounder, an adult flounder, and two unidentified sculpins (probably padded sculpin). Two small fish egg clusters (probably from padded sculpins) were also noted. Other fish taxa, such as salmonids, lingcod, perches and spiny dogfish may occur in Coal Harbour at different time of the year. No commercial fisheries are conducted in Coal Harbour. Although limited recreational fisheries may occur, bivalve shellfish harvesting is not permitted (year-around closure) due to sanitary contamination concerns in Burrard Inlet and Vancouver Harbour (DFO, 2017).

A few sea birds were noted, including: bufflehead, goldeneye, and mallard ducks, as well as double-crested cormorants and a single great blue heron. No marine mammals were observed within the project site or adjacent areas during the marine assessment. The great blue heron (*fannini* subspecies) is designated Schedule 1, "Special Concern" under SARA and the double-crested cormorant is Blue-listed (i.e., Special Concern) under the provincial Red and Blue lists (CDC, 2018). No other listed marine species were observed within the project site or adjacent areas during the marine assessment, and no other species have been identified (based on known distribution and habitat preferences) with a reasonable likelihood to occur in the project area (CDC, 2018).

No critical and/or sensitive fish habitat was observed within the project area.

3.0 CONTACTS AND RESPONSIBILITIES

The following section identifies key project personnel and outlines the roles and responsibilities of the Environmental Monitor (EM) and Permit Holder/Contractor for achieving environmental compliance with applicable legislation, permits, licenses, or approvals during construction of the project. As noted, this cannot be completed until such a time as the preferred contractor has been selected.

3.1 Key Project Personnel

Effective communication among key project personnel (**Table 3**) will be essential for the success of the project.

Table 3 Key Project Personnel

Name	Role	Company	Contact Information
Chris Barnett	Marine Asset Manager	Royal Vancouver Yacht Club (RVYC)	TBD
Marcus D'Aubin	Harbour Master		604 688 4578
Carmen Derricott	General Manager		604 224 1344
TBD	Environmental Programs Department	port authority	TBD
TBD	Other		TBD
Russ Tyson	Prime Consultant	TyPlan Planning and Management	TBD
TBD	Supervisor	TBD	TBD
Doug Swanston	Environmental Monitor	Seacology	604 987 4675
TBD	Project Manager	Contractor: Pile driving (TBD)	TBD
TBD	Site Foreman		TBD
TBD	Engineer	TBD	TBD
TBD	Geotech	TBD	TBD
<i>Other Contacts</i>			
-	Hazardous Waste Programs	BC Ministry of Environment	250-356-5044
-	Spill or Environmental Emergencies Reporting	BC Ministry of Environment	1-800-663-3456
TBD	Environmental Protection Officer	City of Vancouver	TBD
TBD		Vancouver Parks Board	TBD
TBD		Vancouver Rowing Club	TBD
TBD		HMCS Discovery	TBD

3.2 Environmental Monitor Responsibilities

The primary responsibility of the Environmental Manager (EM) is to ensure that the environmental protection objectives of the Permit Holder, port authority, and applicable approvals/permits are met, by ensuring that the requirements of this CEMP and other applicable conditions implemented. The EM will be appropriately trained and demonstrate relevant environmental monitoring experience. The EM has the authority to modify and/or halt any construction activity at any time, if deemed necessary for the protection of the environment. Typical responsibilities of the EM include, but may not be limited to:

- Communicate the requirements of the CEMP to project members during pre-job and tailgate meetings and promote BMPs during the project;
- Be onsite as per the schedule established between parties prior to project start and will remain on-call during non-critical work periods to respond to emerging environmental issues;
- Review the contractor's work procedures to ensure functionality and compliance with the CEMP and applicable regulations, standards and BMPs;
- Attend site meetings, as required, and provide advice in preparing for work activities in a manner that mitigates adverse effects;
- Measure/assess key environmental indicators (e.g., turbidity) during routine monitoring to determine if work being conducted is in accordance with the CEMP. The frequency of the monitoring activities would be influenced by the type of construction activities and weather conditions;
- Inspect hazardous material containment, storage, transportation, and disposal to ensure compliance with applicable legislation and regulation;
- Advise project members if project activities have caused or are likely to cause an environmental incident and make recommendations for corrective action;
- Liaise directly with project members and provide technical advice to resolve situations that may impact the environment as they arise;
- Maintain complete records of activities related to the implementation of the CEMP. This should include any measurements taken, photographs and incident reports; and,
- Complete and submit environmental monitoring reports to the Permit Holder, port authority, and other parties (as required within permit/approval conditions) and report any unanticipated adverse effects to the environment. Such reports should include the nature of the effect, its cause, mitigation and/or remediation implemented, and whether a work stoppage was ordered, as well photographs, analyses, and measurements, if applicable.

The Permit Holder or EM will notify the port authority immediately in the event of a non-compliance. Example content for environmental monitoring reports is provided in **Appendix C**. Monitoring reports will be reviewed by the port authority to determine the adequacy of the monitoring and content of the reports.

3.3 Permit Holder/Contractor Responsibilities

The RVYC is committed to conducting its operations in a safe and environmentally responsible manner. During project construction, the Permit Holder/Contractor is responsible for enforcing the CEMP with all employees, sub-contractors and visitors on the project site. Typical responsibilities of the Permit Holder/Contractor include, but may not be limited to:

- Review the project CEMP with staff and sub-contractors, prior to commencing works;
- Assuring compliance with the CEMP for all employees, sub-contractors and visitors on-site, and provide appropriate training on the CEMP;
- Comply with the port authority project permit and any other agency permit/licence issued for the project, as well as all other applicable federal, provincial and municipal laws, statutes, bylaws, regulations, orders and policies;
- Work with the EM to identify and implement the most suitable BMPs for each work activity and comply with written or verbal instructions with respect to conducting activities in compliance with the mitigation measures outlined in the CEMP.
- Communicate with the EM to coordinate their visits to assure CEMP compliance and responsible environmental protection;
- Identify imminent threats to the environment and respond to EM-identified environmental issues and concerns in a timely manner; and,
- Correct deficiencies and any non-compliance issues upon direction from the EM whether written or verbal. Corrections should be made as soon as reasonably possible, ideally within 24 hours of directions. The permit holder or EM will notify the port authority immediately in the event of a non-compliance.

4.0 RELEVANT ENVIRONMENTAL LEGISLATION

Table 4 presents a list of environmental legislation and legal requirements applicable to the project.

Table 4 Federal, Provincial, Regional District and Municipal Legislation and Legal Requirements

Act, Regulation or Bylaw	Description	Applicability	Permit in Place/Forthcoming; or Requirements Met
<i>Federal</i>			
<i>Canada Marine Act</i> (port authority's legal mandate)	Provides guidance for the administration, management and control of land and water within port authority's jurisdiction.	The project is wholly located within port authority's jurisdiction.	A Project and Environmental Review process has been initiated: permit forthcoming.
<i>Fisheries Act</i> (administered by DFO)	The <i>Fisheries Act</i> is the main federal legislation providing protection for fish, fish habitat and water quality in Canada.	The project requires in- and over-water works (e.g., pile removal/ driving, float installation).	A Self-assessment will be completed by a QEP: results will determine whether a Request for Review by DFO is recommended for the project.
<i>Species At Risk Act</i> (SARA)	SARA is the main federal legislation providing protection for endangered, threatened and special concern species.	Great blue heron (SARA Schedule 1 – Special Concern) is known to occur in the project area (mainly onshore).	A SARA permit was not required for this project has the construction works are not expected to affect the species or it's habitat.
Port Authority Non-Road Diesel Emissions (NRDE) Fee ¹	The NRDE fee recovers costs associated with managing air quality and reducing diesel particulate matter emissions	The NRDE Fee is applicable to all parties granted the right by port authority to occupy lands owned, managed, or administered, by port authority.	Responsible parties must not introduce non-road diesel engines that are "non-certified" (Tier 0) or certified as "Tier 1" without prior written approval from port authority.
Port Authority Standard Hours of Construction	Standard Hours of Construction	Hours of construction will be stipulated by port authority	Hours of construction will be stipulated by port authority and outlined in the terms and conditions re approval

¹ Vancouver Fraser Port Authority, Fee Document (2018).

Act, Regulation or Bylaw	Description	Applicability	Permit in Place/Forthcoming; or Requirements Met
<i>Provincial</i>			
Spill Reporting Regulations of the BC <i>Environmental Management Act</i> (EMA)	Provides guidelines for the regulation of activities that introduce waste into the environment, store/recycle special waste.	The project involves the use of vessels and over-water machinery.	Mitigation measures suggested in Section 5.0 of this CEMP.
Hazardous Waste Regulations (HWR) of the EMA	Addresses the proper handling and disposal of hazardous wastes.	E.g. disposal of old creosote-treated wood piles.	Mitigation measures suggested in Section 5.0 of this CEMP.

Copies of all permits, licenses and approvals required for the project will be kept at the site office in a location accessible to all on-site personnel. All employees working on the project will be made aware, during their orientation training, of the location of these documents. All permits, licenses and approvals will be updated during the project as required. A list of issued documents is provided in **Appendix D**.

5.0 PROJECT MITIGATION MEASURES AND ENVIRONMENTAL SPECIFICATIONS

The Royal Vancouver Yacht Club is committed to conducting its operations in a safe and environmentally responsible manner. The potential environmental impacts that may result from project activities can be avoided or minimized through implementation of environmental standards, guidelines, BMPs and site-specific mitigation measures. The following sections provide mitigation measures and standard best practices relevant to the project construction, which may be implemented to maintain compliance with applicable environmental legislation, regulations and policies, and foster sustainable development. Applicable environmental standards, guidelines, BMPs are referenced in each section.

5.1 General Practices

A list of general practices related to the project construction includes the following:

- Complete daily safety and environmental tailgate/toolbox meetings to identify and communicate changes to risk related to hazards; discuss project status and daily working procedures.
- Confirm all contractors and site managers review this CEMP and the applicable guidelines prior to each project phase or new activity.
- Confirm contractors understand BMPs and know how to properly install any protection measures recommended on the project.
- Site managers and contractors must be prepared to change existing measures and BMPs should they fail, or additional measures be required. The EM will be notified of any changes to ensure they are adequate.
- Supervisors will review work procedures with their staff and enforce compliance throughout the project. Up-to-date copies will be kept on the project site, where they will be available to workers and visitors at all times.

5.2 Site Access, Mobilization and Laydown Areas

Access to the project site will occur by sea, via Burrard Inlet and the Coal Harbour Navigation Channel, as well as by land (for most project personnel), through Stanley Park Drive. New floats and boat sheds constructed off-site will be barged to the project site from Delta and Richmond, respectively; **Figure 2** provides the proposed route for these components.

- All applicable best practices suggested in **Section 5.0** of this CEMP should be implemented by the Sub-contractors during the mobilization of components from Delta and Richmond. The weather forecast should be consulted prior to component mobilization and all other precautions taken to ensure safe passage.
- Mobilization will be planned to minimize the number of trips to and from the site.
- A support barge will be available for the temporary storage of removed components and materials. The barge will have adequate containment protection to prevent removed materials and any associated runoffs (e.g. sediment-laden water) to leave the barge. All materials on the barge will be properly covered to avoid being blown off by winds.

Figure 2 Proposed Navigational Route for boat sheds and floating systems



5.3 Air Quality

The following BMPs are recommended to avoid or minimize impacts to air quality:

- All equipment, vehicles and stationary emission sources will be well-maintained and used at optimal loads to minimize emissions.
- Stationary emission sources (e.g., portable diesel generators, compressors, etc.) will be used only as necessary and turned off when not in use.
- Equipment and vehicles will be turned off when not in active use.
- Vehicles or equipment producing excessive exhaust will be repaired or replaced prior to being used on the project.
- Under the port authority's Non-Road Diesel Equipment Program (NRDE), all non-road diesel equipment in use during construction shall be reported in a Declaration for Project-Related Contractor Construction Equipment (**Appendix E**). For more information, see: <https://www.portvancouver.com/environment/air-energy-climate-action/cargo-handling-equipment/nrde/>.
- Dust-generating activities will be minimized as much as possible, especially during windy periods. Dust suppression agents, if used, shall be approved by the port authority for use.
- Material loads entering or exiting the site will be covered as appropriate.
- No burning of oils, rubber, tires and any other material will take place at the site.

5.4 Noise and Vibration

The following BMPs are recommended to avoid or minimize potential project effects resulting from noise:

- Construction activities that may *disturb the quiet, peace, rest or enjoyment of the public* will be limited to 8 am – 5 pm, Monday to Friday, no work will be undertaken on weekends or statutory holidays. Should construction activities be required outside these hours, the Contractor must contact the port authority to determine if exceptions are permitted.
- The affected community and host municipality will be notified of the nature and likely duration of any particularly noisy operations that may be forthcoming such as frequent vessel traffic, pile driving, and when it will be necessary to work outside daytime and early evening hours.
- All equipment will be properly maintained to limit noise emissions and fitted with functioning exhaust and muffler systems. Machinery covers, and equipment panels will be well fitted and remain in place to muffle noise. Bolts and fasteners will be tight to avoid rattling.
- Engines will be turned off when not in use or reduced to limited idle (or as appropriate to reduce air emissions).
- Noise monitoring should be conducted during particularly noisy activities to ensure the predicted impacts are not exceeded (see **Section 5.6.1** of this CEMP – Pile Removal and Pile Driving).

5.5 Machinery and Equipment

The following BMPs are recommended to avoid or minimize potential environmental impacts from machinery and equipment:

- Equipment and machinery will be in good operating condition and maintained free of leaks, excess oil and grease, invasive species, and noxious weeds. Equipment will be inspected daily for leaks or spills.
- Equipment will be operated at optimum rated loads and be turned off when not in use to minimize exhaust and noise emissions. Equipment producing excessive exhaust or noise will be repaired or replaced.
- Where possible, refueling of equipment will occur on land at least 30 m from the water. Refueling areas will have spill containment kits immediately accessible and personnel will be knowledgeable in the use of these kits (see **Section 7.0** for this CEMP - Fuel Management Plan).
- A spill containment kit will be readily accessible both on site and on each piece of equipment in the event of a release of a deleterious substance to the environment. All members of the construction team will be trained in the use of spill containment equipment/items. Any spill of a substance that is toxic, polluting, or deleterious to aquatic life of reportable quantities must immediately be reported to the Emergency Management BC Program 24-hour phone line at 1 800-663-3456 (see **Section 6.3** of this CEMP - Spill Response Plan).
- Lighting spill will be reduced by pointing lights downward and placing task lighting as close to the work area as possible.

5.6 Marine Works

The following BMPs are recommended to avoid or minimize the potential impacts to fish and fish habitat that may result from in-water construction activities:

- All project personnel shall avoid activities that may, directly or indirectly:
 - (a) deposit deleterious substances of any type in water frequented by fish, in a manner contrary to Section 36(3) of the *Fisheries Act*; or
 - (b) adversely affect fish or fish habitat in a manner contrary to Section 35(1) of the *Fisheries Act*.
- Unless otherwise approved in writing by DFO or the port authority, all construction activities occurring below the high water mark (HWM) that may impact fish or fish habitat should be scheduled during the fisheries work window of least risk for Burrard Inlet: August 16 to February 28 (DFO, 2014)². The port authority shall be notified of any DFO exemptions allowing works within the fisheries sensitive period.

² The *Best Management Practices for Pile Driving and Related Operations* (BC Marine and Pile Driving Contractors Association, 2003) indicates: “There will be no restriction of work during closure periods (the only exception being when spawning is present), provided the contractors employ an exclusion device (protective netting or geotextile material suspended in the water column around pile driving area) around the work area to prevent fish access or when required, an effective method of mitigating shock waves (bubble curtain)”.

- Equipment (e.g., heavy machinery) used in and around water will be kept clean and in good working condition (i.e., free of leaks, excess oil, and grease).
- Where possible, any hydraulic machinery used in water should use environmentally-friendly hydraulic fluids (i.e., non-toxic to aquatic life, and biodegradable).
- All materials to be used in and around water, should be certified clean (i.e. they will not present any risk of leaching contaminants or affecting water/sediment chemistry).
- Measures should be taken to provide 100% containment of all potentially deleterious materials; including fuel/ oil/ grease, chlorinated water, paint chips, cleaning products, coatings, or any other potentially deleterious materials.
- Barges or other vessels will not ground on the foreshore or seabed, or otherwise disturb the foreshore or seabed (including disturbance as a result of vessel propeller wash), with the exception of such disturbance as is reasonably required resulting from the use of barge spuds.
- No equipment will operate on the intertidal foreshore and/or disturb the seabed outside the project site.
- Appropriate measures must be implemented to prevent sediment, sediment-laden waters, or other deleterious substances entering the water during the project.
- All physical activities should be carried out in a manner that prevents induced sedimentation of foreshore and near shore areas, and induced turbidity of local waters. Turbidity should be managed in compliance with the following water quality criteria for the protection of aquatic life (MOE, 2001):
 - (a) when background³ is less than or equal to 50 nephelometric turbidity units (NTU), induced turbidity shall not exceed 5 NTU above the background values; and
 - (b) when background is greater than 50 NTU, induced turbidity shall not exceed the background values by more than 10% of the background value.
- Work shall immediately cease, and the EM and the port authority be notified, should there be reasonable grounds to believe that the project has harmed fish or fish habitat, including observation of distressed, injured, or dead fish or marine mammal. The work shall not resume until authorized by the EM and/or the port authority.

5.6.1 Pile Removal and Pile Driving

- Prior to the commencement of any work, the contractor will complete and forward a “Notice of Project” to the Department of Fisheries and Oceans (DFO).
- Should pile removal/driving occur during closure periods (as described in section above), there will be no restriction of work (the only exception being when spawning is present) provided the contractors employ an exclusion device (i.e., protective netting or geotextile material suspended in the water column around pile driving area) around the work area to prevent fish access or when

³ For the purposes of this condition, “background” means the level at an appropriate adjacent reference site (as determined to the satisfaction of the port authority) that is affected neither by physical activities at the project site, nor sediment-laden or turbid waters resulting from physical activities at the project site.

required, an effective method of mitigating shock waves (e.g., bubble curtain) (BC Marine and Pile Driving Contractors Association, 2003).

- All applicable BMPs suggested in the *Best Management Practices for Pile Driving and Related Operations* (BC Marine and Pile Driving Contractors Association, 2003; **Appendix F**) should be implemented during pile removal/ driving works to maximize environmental protection and avoid contravention to the *Fisheries Act*.
- Pile removal and pile driving works should not be conducted during unfavourable conditions (e.g., periods of high winds and/or rough waters).
- Piles should be removed by vibratory extraction (preferred method) or direct pull. Piles should be removed slowly to minimize turbidity in the water column, as well as sediment disturbance. Crane operator shall be experienced in pile removal (WADNR, 2017).
- A floating surface boom should be installed, prior to creosote-treated pile removal, to capture floating surface debris. The floating boom should be equipped with absorbent pads to contain any oil sheens (WADNR, 2017).
- Pulled piles shall be immediately placed in a containment basin to capture any adhering sediment. Piles removed from the water shall be transferred to the containment basin without leaving the boomed area to prevent creosote from dripping outside of the boom (WADNR, 2017).
- Piles should be removed completely by extracting the entire length of pile from the river/seabed. If physical conditions result in the breakage of timber piles, the remaining pile stubs should be removed with the least amount of disturbance of the seabed as possible. Particular effort shall be made to extract or reduce the height of pile stubs, which may pose a hazard to navigation. If pile stubs are left in place, the location shall be surveyed, and the coordinates provided to the port authority within five days of project completion.
- Removed creosote piles, and any associated waste materials (e.g., sediment, absorbent pads/boom, etc.) will be disposed of at an approved landfill. Creosote piles shall not be re-used.
- During pile removal and pile driving, *in situ* water turbidity should be monitored against water quality standards of 5 NTU when background is 8 - 50 NTU, or 10% when background >50 NTU (MOE, 2001). If necessary, floating silt/debris curtains should be deployed around the work area to minimize mobilization of potentially contaminated sediment and to further reduce turbidity to adjacent areas.
- Piles shall be driven with a vibratory or drop hammer. Piles shall not be installed using a diesel or hydraulic hammer or other technology such as drilling without review and authorization by the port authority.
- Sediments contained within piles after driving shall be left in place. If it is determined that they must be removed for engineering reasons, the port authority will be consulted for review and authorization prior to initiating the proposed physical activities.
- Because of the small diameter of the piles to be driven (**Section 2.2.2**), it is assumed that the energy required to drive the pile to the final point of installation will not result in shock waves in excess of 30 kPa, therefore, protective measures to reduce shock waves are not expected to be required (BC Marine and Pile Driving Contractors Association, 2003).

- If distressed, injured or dead fish or marine mammals are observed following the initiation of pile driving, work will be halted immediately and measures to reduce the sound pressure waves will be implemented before the work is resumed. Appropriate mitigating measures would include the deployment a bubble curtain over the full length of the wetted pile. This technique should reduce the shock waves to an acceptable level (BC Marine and Pile Driving Contractors Association, 2003).
- If, despite the introduction of preventive measures, further visual/hydrophone monitoring reveals unacceptable conditions (fish kill or sound pressure over 30 kPa), then the work will stop immediately, and the methods will be reviewed and corrected.
- Visual monitoring for marine mammals should be maintained by on-site personnel during pile removal/driving and when operating work vessels to avoid potential disturbance/ injury to marine mammals in the project area.

5.7 Archaeological Resources

There are no known archeological sites recorded at the project site; however, if during works a suspected archeological site is encountered, works must be halted, and the Archaeology Branch contacted for direction. The following best practices are suggested to avoid or minimize the potential impacts to archeological resources:

- If during works a suspected archeological site is encountered, immediately stop activities that might disturb the archaeological resource or the site in which it is contained;
- Do not move or otherwise disturb the artifacts or other remains present at the site;
- Stake or flag off the site to prevent additional disturbances; and
- Immediately notify the port authority and wait for further instructions.

5.8 Sensitive Habitat Features and Species

No sensitive habitat was identified inside the project boundaries. However, the following measures should be considered (in addition to the BMPs suggested in the above sections) to minimize potential negative impacts to fish and marine mammals in the project area during the construction activities, as well as to the eelgrass patch located northwest (outside) of project.

Fish and marine mammals: All appropriate measures should be implemented to minimize water turbidity, including *in situ* monitored during activities that may cause increased suspended sediments. Work will be halted immediately if distressed, injured or dead fish or marine mammals are observed in the project site or adjacent areas. Project-related vessel traffic will reduce speed and/or stop to avoid collision with any observed marine mammal in its trajectory.

Eelgrass patch located northwest (outside) of project: Barges or other vessels will not ground on the foreshore or seabed, or otherwise disturb the foreshore or seabed (including disturbance as a result of vessel propeller wash). If necessary, a marker could be deployed (Zone 10U 490596E 5460347N) to ensure protection of the eelgrass patch during low tides, for periods when work is conducted near the northwest end of the project site (**Figure 1**).

6.0 EMERGENCY PREPAREDNESS AND RESPONSE PLAN

The following sections provide general outline for an effective environmental emergency response plan. Review the project's Health and Safety Plan for other (non-environmental) emergency procedures. The comprehensive Coal Harbour Marina ***RVYC Emergency Response Plan*** (RVYC, 2018) is available in **Appendix G**.

6.1 Emergency Communication

The EM will be notified of all environmental emergencies. The EM will assess and document all incidents and recommend appropriate remedial actions. **All significant emergencies should be reported to Emergency Management BC (formerly Provincial Emergency Program) and the port authority's Operations Centre.**

Table 5 Emergency Contact Numbers

Agency Phone	Number
Emergency Services	911
RVYC – Coal Harbour	Office: 604-688-4578
RVYC – Harbour Master	Cell: 778-231-2407
RVYC – Marine Asset Manager – Chris Barnett Office:	Office: 604-688-4578
Vancouver Fraser Port Authority Operations Centre	604-665-9086
Non-emergency fire	604-665-6007
Non-emergency police	604-717-3321
St. Paul's Hospital	604-682-2344
Emergency Management BC & Spill Reporting Line	1-800-663-3456
Canadian Coast Guard	604-666-6011

6.2 Environmental Emergency Plan

Potential environmental emergencies that may occur while construction is ongoing include, but may not be limited to:

- On-site fire;
- Reportable fuel spills;
- On-water vessel collision;
- Negative wildlife interactions (e.g., with fish, marine mammals and/or sea birds);
- Observation of previously unidentified sensitive environmental features; and
- Natural events such as extreme weather (e.g., wind, snow, ice).

Section 3 of the *RVYC Emergency Response Plan* (**Appendix L**) provides a risk assessment and recommended controls for activities at the marina.

6.2.1 Fire Preparedness and Response

Section 5 of the *RVYC Emergency Response Plan (Appendix L)* provides the procedure to follow in case of a fire, and p.12 shows a figure identifying the locations of fire suppression equipment.

6.3 Spill Response Plan

6.3.1 Spill Preparedness

Section 6 of the *RVYC Emergency Response Plan (Appendix L)* provides the procedure to follow in case of hazardous spill. The Spill Response Plan should be reviewed with all construction staff in the pre-construction meeting and staff should be trained to respond to spills. When required, the Plan should be updated to include any materials of a deleterious nature that could be spilled not previously identified. The Spill Response Plan will be updated with the following project-specific information for the staff to familiarize themselves with:

- Identification of any/all hazardous materials/products, as well as waste storage and secondary containment. Material Safety Data Sheets (MSDS) will be kept on site and made available to all construction team members.
- Identification of the locations of spill response equipment and materials for containment and cleanup (i.e., spill kits and contents), as well as instruction on how to use them effectively. Locations of product/material storage and spill kits will be readily identified on a figure or map and posted in an appropriate location on site.

6.3.2 Spill Response Procedures

The following procedures should be implemented when a spill occurs:

- Assess safety – ensure unnecessary people are kept clear of the area and that people with proper training and equipment deal with the spill. Put on any required personal protective equipment and consult MSDS.
- Stop the source – if required, and when it is safe to do so, stop the spill at its source. This may simply be righting an overturned container or sealing a hole.
- Contain and control the spill – the spill should be prevented from entering the water. If the spill occurs on water, booms should be immediately deployed to prevent its spread.
- Clean up the spill – utilize appropriate absorbent pads or other materials based on the type of substance spilled. The method of disposing of the waste is dependent on the amount and type of deleterious substance that was spilled.
- Notify appropriate authority – spills of a reportable quantity⁴ must be reported to the appropriate agency. All spills should be reported to the EM, RVYC and the port authority.
- Record the incident – make a note of what, how and where the incident happened as well as what was done to clean it up. Depending on the spill, further assessment of the impact to land and water and/or additional cleanup may be required.

⁴ 'Reportable spills' are ANY spills entering the water, or when the quantity of the substance spilled is equal to/ greater than listed quantity for listed substance (Spill Reporting Regulation of the EMA [Province of BC, 2017]).

6.3.3 Spill Reporting

When reporting a spill, the caller should be prepared to provide the dispatcher with the following information, as accurately as possible:

- Name and contact phone number of the person initiating the call;
- Name and telephone number of the person who caused the spill;
- Location and time of the spill;
- Type and quantity of the substance spilled;
- Cause and effect of the spill and details of action taken or proposed;
- Description of the spill location and surrounding area;
- Names of agencies/responders on scene; and
- Names of other persons or agencies advised or to be advised concerning the spill.

7.0 FUEL MANAGEMENT PLAN

The fuel management plan provides measures to ensure the receiving environment is adequately protected from construction-related fuels and products on site. Best practices include:

- Fuel storage tanks/ containers will be clearly labelled, and their locations will be made known to all on-site personnel.
- Refueling equipment and tanks will be clean and in good working order. Fuel tanks will be situated within appropriate secondary containment (an impermeable containment facility capable of holding 110% of the storage tank contents). This may be achieved through the use of double-walled storage tanks or sit-in containers constructed out of impermeable material, such as aluminum or plastic.
- Where practical, all fuels, oils, lubricants and other petrochemical products will not be stored within 30 m of any waterbody.
- Where practical, equipment will not be fuelled within 30 m of a waterbody. If possible, one area will be designated for fuel transfer. Refueling will occur on a flat surface to minimize potential off-site runoff. A spill kit should be on-hand at the refueling site.
- Any fuel spilled will be immediately cleaned up and reported to the EM (see **Section 6.3**).

8.0 WASTE MANAGEMENT

All materials resulting from demolition (e.g., creosote piles, old floats and boat sheds), and all products and materials brought to the construction site (e.g., fuels and lubricants and their empty containers, oily rags and used spill kit products, wood, cigarette butts, coffee cups, water bottles, etc.) must be adequately disposed of. The following BMPs are recommended to deal with waste generated during the project:

- Contractors are expected to adhere to all applicable legislation with respect to the handling, transportation, and/or disposal of all materials related to this project (waste or otherwise). These regulations may include (but not be limited to) the BC Hazardous Waste Regulations, Spill Reporting Regulations, Workers Compensation Board Regulations, Transportation of Dangerous Goods Regulations, etc.
- Contractors will provide labelled separate container(s) for potentially hazardous waste, such as oily rags and hydrocarbon absorbent pads. Hazardous wastes generated could include waste petroleum products (engine oils, lubricants) from machinery and equipment, spent batteries, solvents and cleaning agents, etc.
- All hydrocarbon products and other hazardous wastes potentially present during project activities will be identified and the associated Workplace Hazardous Materials Information System (WHMIS) and Material Safety Data Sheets (MSDS) made available to all construction team members.
- Removed creosote piles must be disposed of at a facility approved to accept treated wood waste.
- All recyclable or compostable materials will be collected separately from general waste, as per Metro Vancouver Regional District requirements. All project personnel will be made aware of this practice and of the associated disposal locations (i.e., on-site waste/recycle bins).
- The Permit Holder/Contractor shall contain and collect debris and waste material in the immediate working area within the project site. The Permit Holder shall dispose of waste material at suitable upland locations and maintain records of off-site disposal.
- The Permit Holder shall develop and implement a project-specific Waste Management Plan with procedures for measuring, minimizing, reusing, recycling, and/or properly disposing waste generated during the Project. The Waste Management Plan may be integrated into the CEMP, where appropriate.

9.0 REFERENCES

- BC Marine and Pile Driving Contractors Association. 2003. Best management practices for pile driving and related operations.
- CDC (BC Conservation Data Centre). 2018. BC Species and Ecosystems Explorer. BC Ministry of Environment, Victoria, B.C. Available at: <http://a100.gov.bc.ca/pub/eswp/> (accessed May 2, 2018).
- City of Vancouver. 2016. *Noise Control By-Law NO. 6555*, amended to include By-law No. 11664 and 11667, effective November 15, 2016.
- DFO (Fisheries and Oceans Canada). 2017. Area 28 (Burrard Inlet, Indian Arm and Vancouver Harbour) - Sanitary contamination closures. Available at: www.pac.dfo-mpo.gc.ca/fm-gp/contamination/sani/a-s-28-eng.html#28.1_2265 (accessed May 2, 2018).
- DFO. 2014. British Columbia Marine/Estuarine Timing Windows for the Protection of Fish and Fish Habitat - South Coast and Lower Fraser Areas. Available at: <http://www.dfo-mpo.gc.ca/pnw-ppe/timing-periodes/bc-s-eng.html#area-28> (accessed May 1, 2018).
- MOE (Ministry of Environment). 2001. Ambient Water Quality Guidelines (Criteria) for Turbidity, Suspended and Benthic Sediments. Environmental Protection Division. Available at: <https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/wqgs-wqos/approved-wqgs/turbidity-or.pdf> (accessed May 2, 2018).
- Province of BC (British Columbia). 2017. *Environmental Management Act - Spill Reporting Regulation*. Minister Order No. M329. *Environmental Management Act*, S.B.C. 2003, c. 53, ss. 92.1 and 139.
- Province of BC. 2003. British Columbia Float Home Standard. Available at: https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/construction-industry/building-codes-and-standards/guides/2003_float_home_standard.pdf (accessed May 5, 2018).
- RVYC (Royal Vancouver Yacht Club). 2018. *RVYC Emergency Response Plan*.
- Seacology. 2018. Biophysical Survey of Subtidal Habitat at Royal Vancouver Yacht Club's, Coal Harbour Proposed Marina Reconfiguration. Prepared for Royal Vancouver Yacht Club, April 2018.
- TyPlan. 2018. Coal Harbour Marina Expansion Project: Project Description. Prepared for Royal Vancouver Yacht Club, April 2018.
- Vancouver Fraser Port Authority. 2018. Project & Environmental Review Guidelines – Construction Environmental Management Plan (CEMP). April 2018.
- Vancouver Fraser Port Authority. 2018. Fee Document. Effective January 1, 2018. Available at: <https://www.portvancouver.com/wp-content/uploads/2018/04/Port-of-Vancouver-fee-document-effective-January-1-2018.pdf> (accessed May 3, 2018).
- WADNR (Washington Department of Natural Resources). 2017. Derelict Creosote Piling Removal Best Management Practices For Pile Removal & Disposal. Available at: http://file.dnr.wa.gov/publications/aqr_rest_pileremoval_bmp_2017.pdf (accessed May 4, 2018).

APPENDIX A

CONSTRUCTION PLAN PHASE 1-8

**ROYAL VANCOUVER YACHT CLUB:
DETAILED CONSTRUCTION STAGING MEMO
CONSTRUCTION OF K FLOAT AND POTENTIAL INTERFERENCES
TO NAVIGATION
TECHNICAL MEMORANDUM**

To:	Emily Williamson (VFPA), Sean Baxter (VFPA), Dave Hart (VFPA), Elizabeth Harris (NPP)	From:	Russ Tyson
cc:	Chris Barnett (RVYC Asset Manager), Norm Allyn (CMO), Rob Muller (Jarelco)	Date:	February 10, 2020
Subject:	Construction Staging Plan	Project No:	PER 17-113

Royal Vancouver Yacht Club Coal Harbour Marina Expansion Project

The Royal Vancouver Yacht Club (RVYC) has proposed to the Vancouver Fraser Port Authority (Port Authority) and the Navigation Protection Program (NPP) of Transport Canada (TC) a project to expand the existing RVYC Marina, in Coal Harbour, to increase the number of slips in the marina by 47. To do so, a reconfiguration of the existing marina is required. The reconfiguration significantly improves the current layout and meets best practices for marina layout designs, making it more functional and operational, and an overall improvement to the navigational environment.

The area proposed for the lease expansion is 9,040 m² based on the available water lot area outside of the new navigational channel design that includes two designated rowing lanes each 13.5 m in width designed to international rowing standards.

The marina design reflects best practices as outlined in B.O. Tobiasson and R.C. Kollmeyer (T&K) "Marinas and Small Craft Harbors" (2nd edition, 2000), the current standard for marina construction.

The Marina is sited within Coal Harbour immediately west of Deadman's Island, east of the Vancouver Rowing Club (VRC) and south of Stanley Park. The diagram below sets out the current and proposed water lot. The navigational channel was designed in conjunction with the port authority in 2016. It includes for the first time two rowing lanes as well as a navigational channel based on the World Association of Waterborne Transport (PIANC) "Harbour Approach Channels - Design Guidelines" (121-2014).

We estimate construction will start in August 2020 and finish in 2022. Special steps will be taken to minimize disruption to neighbours. Specifically, it is noted that the construction of the concrete floats and boat sheds will be undertaken off-site and assembled on-site, although pile driving, and pile removal will be required.

Today 192 boat sheds reside in the marina, 37 of which will be replaced (same design, size etc.), resulting in the same number of boat sheds post project construction.



Project Construction and Marina Assembly: Overview

It is noted that the majority of construction associated with this project, that has potential to create community nuisance effects (e.g. noise, dust, odour, light) will be undertaken off site (e.g. construction of concrete floats and boat sheds) and assembled (e.g. bolted together) on site. The construction of the boat sheds (being constructed at CCY Marine) and the concrete floats (being constructed at International Marine and Floating Systems - IMFS) limit potential disturbances to local marine stakeholders within Coal Harbour site during assembly.

The majority of on-site works pertain to the placing of the floats and placement of the new boat sheds. The key construction activity impacting the area is the pile driving required on site to reconfigure the marina to meet existing marina design standards.

The Construction Environmental Management Plan (CEMP) highlights that the concrete floats and the boat sheds will be constructed at the manufacturer and then barged to Coal Harbour, based on a just in time delivery to reduce assembly time. Design of both the boat sheds and the concrete floats is familiar to both the RVYC and the port authority, as similar and recently approved works by the port authority to replace both floats and seven boat sheds have been approved (port authority Project Permit 2011-018). Similar designs and processes for installation have been used for this project.

The location of both manufacturers (CCY Marine and IMFS) are on the Fraser River, illustrated below, and the routes to access the site are noted (refer to CEMP).



Forrest Marine has been retained to provide tug support to transfer the floats and boat sheds to site for assembly. Scheduling of activities, specifically barging the prefabricated floats (complete with predesigned conduits for electrical mechanical and water hook up) and boat sheds will be based on a just in time delivery approach to prevent additional equipment being stored in the basin. Removal of materials, boat sheds will be co-ordinated with the delivery of the new floats and boat sheds and disposed of accordingly at various recycling facilities.

Detailed scheduling cannot be undertaken at this level of study and will be the responsibility of the selected contractor. A marine communication plan will be in place to inform stakeholders and users of such activities and transits.

Construction Staging Overview

The port authority and the Navigation Protection Program (NPP) of Transport Canada (TC), as part of the review and permitting process, requested RVYC provide additional detail regarding the proposed construction (more like assembly) activities associated with the proposed Coal Harbour Marina expansion project, noting specifically the construction of K float, the construction of which has the greatest potential to interfere with navigation and marine operations within Coal Harbour, whereas the other stages are internal to the existing marina. Internal discussions with RVYC members are on-going regarding internal redistribution of slips and RVYC plan to use outstations to provide temporary moorage. RVYC will be facilitating such arrangements and related activities to accommodate members.

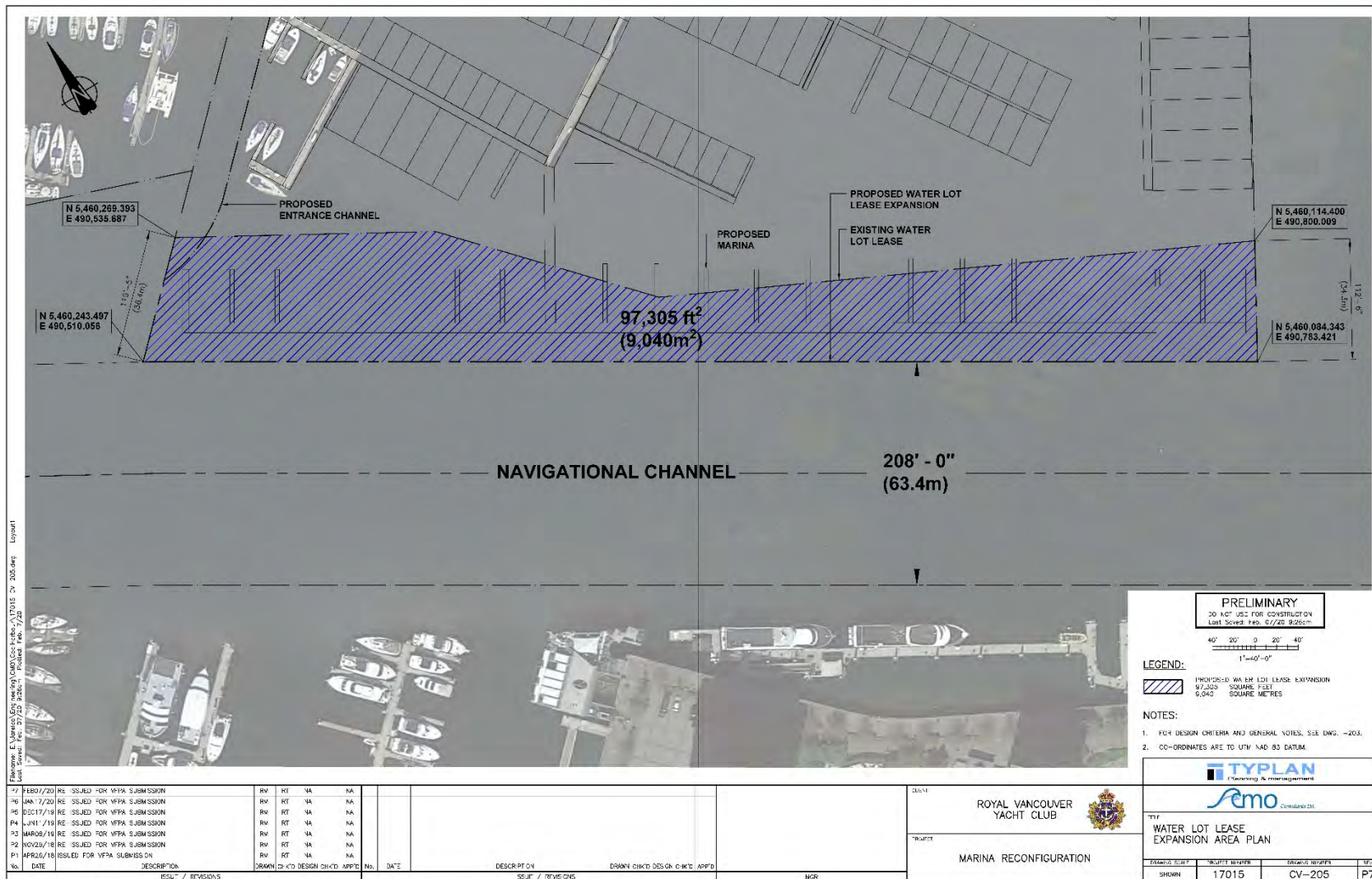
As identified in the Project Description document, a Preliminary Eight Stage Phasing Plan was outlined for consideration. The eight phased program illustrates the intended approach to undertake the three main project construction/assembly activities:

1. Removal of piles and driving of new piles
2. Removal of old floats and replacement of new floats (constructed off site)
3. Removal of old boat sheds and replacement of new boat sheds (constructed off site)

It is important to note that of the eight phases of project development (which may change slightly based on the contractor's approach) Phase 1 of the program represents the key phase that has the potential to impact marine stakeholders and users of Coal Harbour. Construction staging for Phase 1 is focused upon in this review. The key external users potentially impacted because of Phase 1 works (identified within our Consultation Plan) include:

- Vancouver Rowing Club
- Bayshore West Marina
- Harbour Cruises

As presented below (refer to construction staging exhibits) all activities and marine equipment anticipated to be utilized (e.g. removal of piles, pile driving and placement of concrete floats) for Phase 1 will be fully contained within the proposed lease expansion area and will not impact the navigational channel or the northern rowing channel. To further mitigate navigational concerns the pile driving equipment and the storage barge for piles will be sited to the north of the channel near the existing marina lease, thereby fully avoiding the potential intrusion into either the rowing lanes or the navigational channel, noted on the exhibit below.

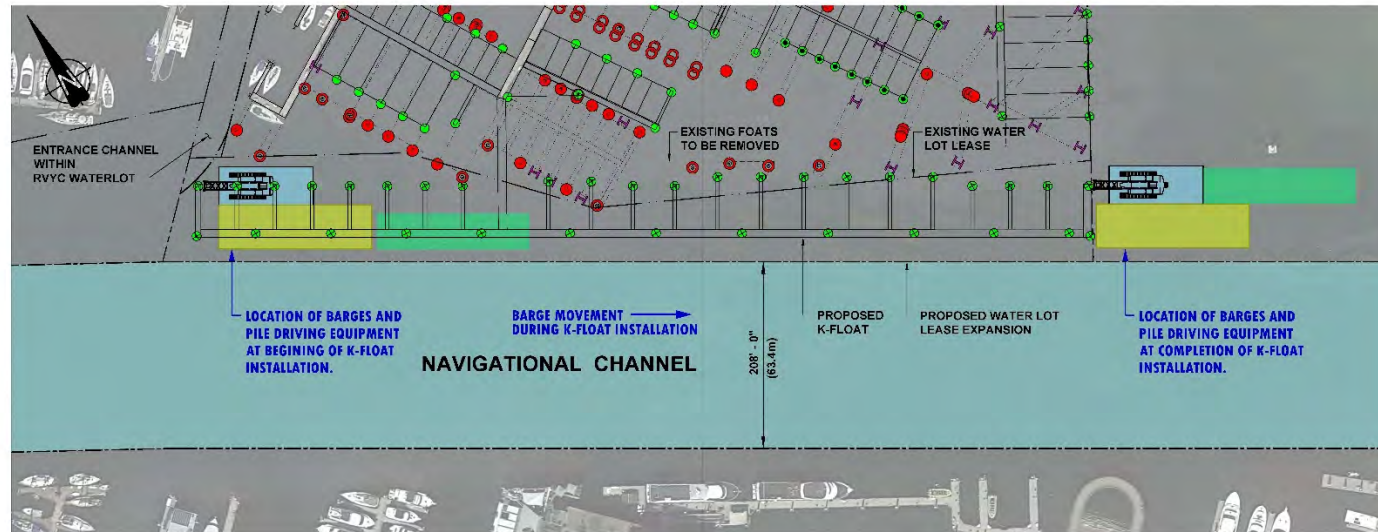


Construction of K Float

The project's potential to interfere with navigation during the construction of K float represents the key area of focus due to its proximity to the proposed rowing channels and the navigational channel. The remaining stages of construction represent internalized redistribution of member vessels and do not impact other stakeholders' ongoing marine operations. RVYC has contacted two contractors whom have provided insight regarding the types of equipment that would be required. The exhibits below illustrate the proposed positioning of the actual barges (presented to scale) in relation to the works being undertaken. It is noted that the extent of construction equipment will include a pile driving rig, a barge for piles and a third barge (potentially) to move the concrete floats into place. There may be opportunities to limit this activity via the use of a small tug used to manoeuvre the floats into place however, that will be a contractor decision.

The first exhibit highlights the following:

- All construction equipment and activities will be sited within the proposed lease expansion area and occur outside of the navigational channel and rowing lanes;
- The marine equipment includes a standard 13 m by 32 m barge from which pile driving will occur, a support barge of 15 m by 52 m to store piles and or floats (potentially);
- We have included a third barge (not currently required) pending clarification of the floats can be brought with the barge supporting the pile transport, and
- Phase 1, at the current time is scheduled to be complete all at once, however in anticipation that the contractor selected may want to undertake construction of the K float in two phases to accommodate internal circulation of vessels. Regardless the anticipated timeline in total for the construction of K float is 30 working days (six (6) weeks).



LEGEND:

- PROPOSED 16" STEEL PIPE PILE LOCATION
- PROPOSED 12.75" STEEL PIPE PILE LOCATION
- PROPOSED 10.75" STEEL PIPE PILE LOCATION
- CRODOTE TUMBER PILES TO BE REMOVED
- STEEL PIPE PILES TO BE REMOVED
- H SUPPLY MATERIALS TO BE REMOVED



42'x105' (13mx32m)
PILE DRIVING BARGE



49'x170' (15mx52m)
STORAGE BARGE



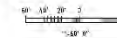
40'x170' (12mx52m)
STORAGE BARGE

PLAN - K-FLOAT INSTALLATION ALONG PROPOSED WATERLOT LEASE
1"=50' 0"

PRELIMINARY
DO NOT USE FOR CONSTRUCTION
Last Saved: Feb. 06/20 11:45am

NOTES:

1. FOR DESIGN CRITERIA AND GENERAL NOTES: SEE DWG. -203-
2. CO-ORDINATE 1% AT 10' FROM NAV. RE. BOLL.



ROYAL VANCOUVER
YACHT CLUB



MARINA RECONFIGURATION



semo

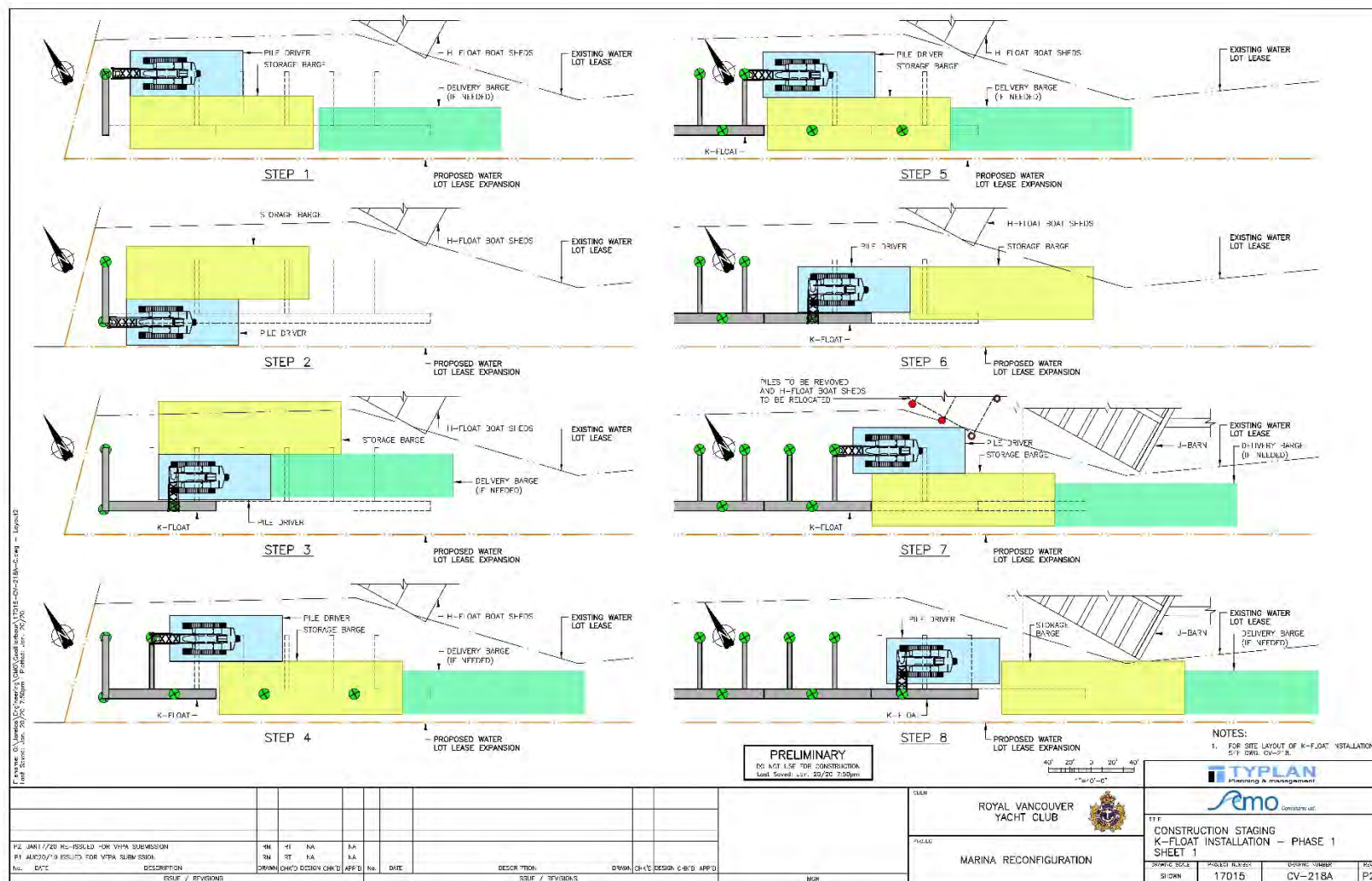
CONSTRUCTION STAGING
K-FLOAT INSTALLATION - PHASE 1
GENERAL ARRANGEMENT

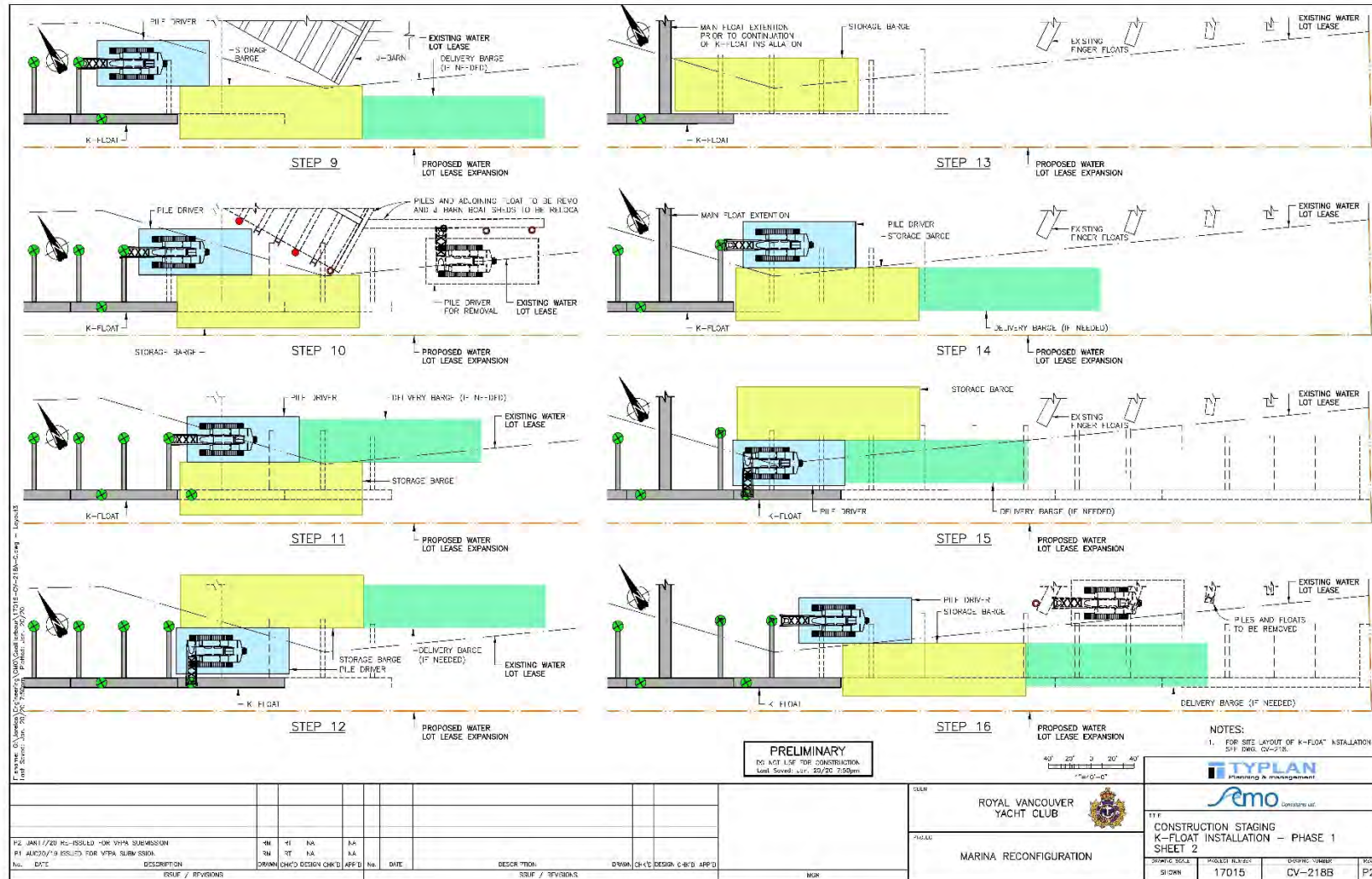
DATE OF SCALE	DATE OF SCALE	DATE OF SCALE	DATE OF SCALE
17015	17015	17015	17015

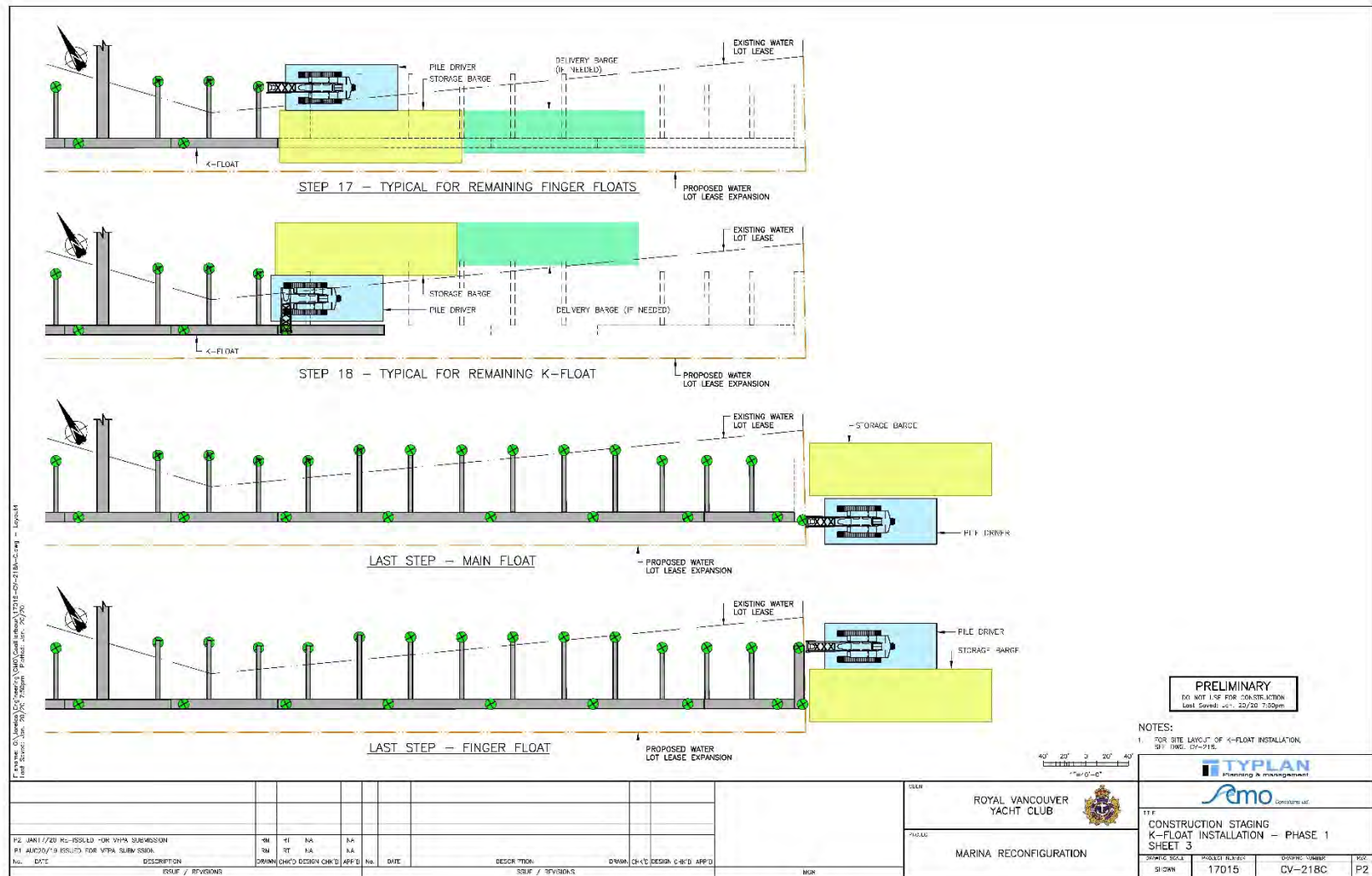
CV-218	PS
--------	----

NO.	DATE	DESCRIPTION	DRAWN	CHK'D	DESIGN	CHK'D	DATE	DESCRIPTION	DRAWN	CHK'D	DESIGN	CHK'D	DATE
1													
2	11/07/20	RE-ISSUED FOR VPPA SUBMISSION	RM	RT	NA	NA							
3	11/17/20	RE-ISSUED FOR VPPA SUBMISSION	RM	RT	NA	NA							
4	11/20/20	RE-ISSUED FOR VPPA SUBMISSION	RM	RT	NA	NA							
5	11/24/20	RE-ISSUED FOR VPPA SUBMISSION	RM	RT	NA	NA							
6	11/26/20	RE-ISSUED FOR VPPA SUBMISSION	RM	RT	NA	NA							
7	11/26/20	RE-ISSUED FOR VPPA SUBMISSION	RM	RT	NA	NA							
8	11/26/20	RE-ISSUED FOR VPPA SUBMISSION	RM	RT	NA	NA							
9	11/26/20	RE-ISSUED FOR VPPA SUBMISSION	RM	RT	NA	NA							
10	11/26/20	RE-ISSUED FOR VPPA SUBMISSION	RM	RT	NA	NA							

The remaining exhibits briefly illustrate how the equipment would be located within the lease expansion area to enable the works to be undertaken. As noted, the selected contractor will be responsible for the actual scheduling of the said works; this preliminary outline confirms its feasibility from an assembly perspective. The detailed schedule drawings illustrate the sequential construction nature of K float illustrating how the various equipment will be moved to accommodate driving of piles and placement of floats.







Marine Communication Plan

RVYC will prepare a Marine Communication Plan (MCP) specific to construction to outline marine protocols within Coal Harbour to limit potential conflicts between marine users during this time. The MCP will be a condition of approval of this project and will be the responsibility of the selected contractor.

An MCP and Marine Communication Group (MCG) will need to be established to inform marine users of related marine activities potentially infringing upon mariners right to navigate. To do so, an MCP will be a requirement of the preferred contractor. An MCG will be established to implement the MCP.

The standard components of MCP include:

- Purpose and Scope
- Project Description
- Construction Scheduling and Phasing
- Tug Assist
- Notice to Mariners and Notices to Shipping
- Recreational user posting requirements
- Marine Construction Contractors
- Marine Construction Methods and Related Equipment
- Radio Communications/Aids to Navigation

The Project will implement communications through its MCG. This will be established to inform marine users, aboriginal groups and recreational users of construction and demolition activities that may interfere with navigation through the Project site. Meetings will occur throughout construction and demolition work phases to manage information flow between marine users and the contractors. Meetings will be held monthly unless otherwise stipulated by users. Notices to shipping that provide mariners information regarding construction activities that may interfere with navigation will be issued weekly.

APPENDIX B

PILE REMOVAL/DRIVING PLAN

To be prepared by Selected Contractor

Plan to be communicated via the implementation of a Marine Communication Plan proposed as part of Project Construction.

APPENDIX C

CONTENT FOR ENVIRONMENTAL MONITORING REPORTS

CONTENT FOR ENVIRONMENTAL MONITORING REPORTS

Unless otherwise approved by the port authority, environmental monitoring reports will include, at a minimum, the following information:

- Name(s) of EM(s)
- Period covered by the report
- Date the report was submitted
- Report recipient(s)
- Contractor(s) undertaking work during the reporting period
- Overall weather conditions during the reporting period
- Description and photos of key project activities
- Summary of observations made by the EM, including a description of environmental issues or concerns raised by the EM and the measures taken to address those issues or concerns
- A summary of environmental incidents that may have occurred during the reporting period

Additional content which may be applicable to the project includes:

- A summary of environmental monitoring data collected, and all results received during the reporting period, such as water and sediment sampling
- A map showing the location of the monitoring activities and the area of active construction
- An organized checklist or table of key mitigation requirements of the CEMP and/or applicable permit conditions verifying implementation and effectiveness at the relevant stages of the project
- A list of meetings and other communications and a summary of key issues discussed
- An overview of marine mammal, fish or wildlife observations, and potential negative interactions with construction activities

APPENDIX D

LIST OF ENVIRONMENTAL PERMITS, LICENCES AND APPROVALS

To be prepared by Selected Contractor

Note it is the responsibility of the Selected Contractor to confirm and secure all related environmental permits, licenses and approvals in accordance with port authority terms and conditions and municipal and provincial requirements.

APPENDIX E

DECLARATION FOR PROJECT-RELATED CONTRACTOR CONSTRUCTION EQUIPMENT

Construction Staging Plan references industry standard spud and support barge sizes for context. Actual dimensions of construction related equipment cannot be determined until a preferred contractor is selected.

APPENDIX F

BEST MANAGEMENT PRACTICES FOR PILE-DRIVING AND RELATED OPERATIONS

Best Management Practices for Pile Driving and Related Operations – BC Marine and Pile Driving Contractors Association - March, 2003

The BC Marine and Pile Driving Contractors Association and Fisheries and Oceans Canada (DFO) have developed a Best Management Practices Policy for pile driving operations and related activities when working on the water within the province of British Columbia.

The Pile Driving Industry utilizes many different construction methods, equipment and materials in order to complete the contractual obligations for its client. Hammers; including drop, diesel, air, vibratory and hydraulic, vibroflot, and rotary, air and churn drills are the primary instruments in a pile driving operation. These hammers and drills are supported by a wide variety of heavy equipment, including a range of conventional cranes (truck mounted, crawler and pedestal mounted), spud scows, support barges and other water borne equipment. The piling types include treated timber (primarily creosote), concrete and steel (pipe, h-beam and sheet). Construction projects have the potential to utilize a number of different combinations of equipment and materials. It is the purpose of this document to examine the characteristics of each potential combination and develop a Best Management Practices Policy that will meet the following criteria:

- Maximize environmental protection
- Avoid contravention of the Fisheries Act
- Provide construction services economically

1) Basic Rules of Operation

When in an aquatic environment, contractors will employ the following BASIC Best Management Practices:

- All equipment will be maintained in good proper running order to prevent leaking or spilling of potentially hazardous or toxic products. This includes hydraulic fluid, diesel, gasoline and other petroleum products.
- Storage of fuels and petroleum products will comply with safe operating procedures, including containment facilities in case of a spill.
- Pile cut-offs, waste or any miscellaneous unused materials will be recovered for either disposal in a designated facility or placed in storage. Under no circumstances will materials be deliberately thrown overboard.
- Contractors will have emergency spill equipment available whenever working near or on the water.
- Contractors, where possible, will position their water borne equipment in a manner that will minimize damage to identified fish habitat (i.e. eelgrass). Where possible, alternative methods will be employed (i.e.: use of anchors instead of spuds). In the event that circumstances will not allow an alternative, contractors will minimize the

damage and where required restore habitat to its original state at the completion of the project.

- Prior to the commencement of any work, the contractor will complete and forward the attached “Notice of Project” to the Department of Fisheries and Oceans. Letters of advice or Habitat Authorizations may be required, depending on the scope of work proposed.
- If contractors are working and a herring (or other fish) spawning occurs, the work will be temporarily suspended and the appropriate DFO contact notified.
- There will be no restriction of work during closure periods (the only exception being when spawning is present), provided the contractors employ an exclusion device (protective netting or geotextile material suspended in the water column around pile driving area) around the work area to prevent fish access or when required, an effective method of mitigating shock waves (bubble curtain).
- Whenever shock wave monitoring (hydrophone) is performed at a marine construction site and the findings are available to the contractor, the data will be forwarded to the BC Marine and Pile Driving Contractors Association and Svein Vagle at the Institute of Ocean Sciences in Sidney, BC. It is hoped that a database can be built that will catalogue work procedures and reflect the safest and most economical approach to protecting the fish and their habitat.

2) Timber Piling (creosote)

When driving timber piling, the following Best Management Practices will be employed to minimize/prevent impact to marine fish and their habitat:

- Where possible, new timber piles will comply with the best Management Practices for the use of treated wood in aquatic environments as developed by the Canadian Institute of Treated Wood and the Western Wood Preservers Institute and the DFO document “Guidelines to Protect Fish and Fish Habitat from Treated Wood Used in Aquatic Environments in the Pacific Region”.
- Where the above is not possible creosote piling will stand (weather) for a minimum of 45 days prior to installation.
- These requirements are for new piling only. Reused piling will not be subject to any additional treatments, however, pilings with excessive creosote should be avoided.
- Timber piling is normally driven using a drop hammer, a diesel/air impact hammer or a small vibratory hammer. Because of the relatively small diameter of the timber pile, and its excellent energy absorbing quality, there is little threat of sound pressure impacts to fish and their habitat when driving timber piles.
- Environmental monitoring of sound pressure impacts is not required.
- When demolition is required on timber pile structures, the contractor will remove the piling by mechanical means and avoid breaking the piling at the mud line or below. All demolition operations should be monitored in order to control and contain the construction debris and to determine whether there are any effects on fish.

3) Concrete Piles

When driving concrete piles, regardless of which hammer is being used, the following Best Management Practices will be employed to minimize/prevent impacts to fish habitat:

Less than 24 inch diameter

- The physical design of 24 inch concrete pile dictates that: 1/ the energy required must be controlled in order to prevent the pile from breaking and 2/ the concrete construction of the pile will absorb the energy. These two factors are expected to result in low level shock wave emission (less than 30 kPa.) and minimal or no effects to fish and their habitat should result.
- Environmental monitoring of sound pressure levels is generally not required.

Greater than 24 inch diameter

- When driving concrete piles with a diameter greater than 24 inches using an impact or hydraulic hammer, the following Best Management Practice will be employed to minimize the impact on fish habitat:
- Visual and hydrophone monitoring of the impact on fish by the sound waves emitted will be required. If sound pressures over 30 kPa is measured or a fish kill is evident, the contractor will introduce effective means of reducing the level of the shock waves. Appropriate mitigating measures would be the deployment of a bubble curtain over the full length of the wetted pile. This should reduce the shock waves to an acceptable level.
- If, despite the introduction of preventive measures, further visual/hydrophone monitoring reveals unacceptable conditions (fish kill or sound pressure over 30 kPa), then the work will stop immediately, and the methods will be reviewed and corrected.

4) Steel Pipe Piles

Less than 18 inch diameter

When driving steel piles 18 inches in diameter and less, regardless of the type of hammer being used, the following Best Management Practices will be employed to minimize/prevent impacts to fish habitat:

- Because of the small diameter of the pile it is assumed that the energy required to drive the pile to the final point of installation will not result in shock waves in excess of 30 kPa, therefore, protective measures to reduce shock waves are not expected to be required.

- If, however, ground conditions during pile installation cause a fish kill, work will cease and contractors will be responsible for introducing effective means of reducing the level of shock waves or will introduce measures that will prevent fish from entering the potentially harmful shock wave area. Appropriate mitigating measures would include the deployment a bubble curtain over the full length of the wetted pile. This technique should reduce the shock waves to an acceptable level.
- If, despite the introduction of preventive measures, further visual/hydrophone monitoring reveals unacceptable conditions (fish kill or sound pressure over 30 kPa), then the work will stop immediately, and the methods will be reviewed and corrected.

Greater than 24 inches in diameter

When driving steel pipe piles with a diameter greater than 24 inches using impact or hydraulic hammers, the following Best Management Practices will be employed to minimize/prevent impacts to fish habitat:

- Hydrophone and visual monitoring of the effects of the shock waves on fish will be required. If a fish kill occurs, the contractor will introduce effective means of reducing the level of the shockwave. Appropriate mitigating measures would be the deployment of a bubble curtain over the full length of the wetted pile.
- If, despite the introduction of preventive measures, further visual/hydrophone monitoring reveals unacceptable conditions (fish kill or sound pressure over 30 kPa), then the work will stop immediately, and the methods will be reviewed and corrected.

5) Steel Sheet Piles and H-piles

When driving steel sheet piles and H-piles with a drop hammer, an impact hammer or a vibratory hammer, the following Best Management Practices will be employed to minimize the impact on fish habitat:

- It is anticipated that the driving of these types of piles will not generate shock waves in excess of 30kPa, therefore, mitigating measures are not expected to be required.
- If, however, ground conditions during pile installation cause a fish kill, work will cease and contractors will be responsible for introducing effective means of reducing the level of shock waves or will introduce measures that will prevent fish from entering the potentially harmful shock wave area. Appropriate mitigating measures would include the deployment a bubble curtain over the full length of the wetted pile. This technique should reduce the shock waves to an acceptable level.
- If, despite the introduction of preventive measures, further visual/hydrophone monitoring reveals unacceptable conditions (fish kill or sound pressure over 30 kPa), then the work will stop immediately, and the methods will be reviewed and corrected.

6) STONE COLUMN CONSTRUCTION

When installing stone column using a vibroflot, the following Best Management practices will be employed to minimize/prevent impacts to fish habitat:

- The vibrating action and air flush associated with the operation of the probe results in a high degree of turbidity. When this level exceeds the criteria as outlined in the British Columbia Approved Water Quality Guidelines, the contractor will introduce containment methods that are designed to isolate the contaminated area and to prevent fish from entering the contaminated area. Silt curtains and netting are two methods that can provide the necessary protection.
- When supplying the aggregate to the probe, the contractor will ensure that spillage is prevented, thereby providing additional protection to fish habitat.
- An independent environmental consultant will be used to monitor turbidity levels.

7) Underwater Drilling and Blasting

When performing underwater drilling and blasting the following Best Management Practices will be employed to minimize/prevent impacts to fish habitat:

Underwater Drilling

- Generally, drilling underwater is a process that has very little impact on fish or fish habitat. The procedure does not generate shock waves.
- Contractors will ensure that all attachments (hydraulic connections and couplings) are in good operating order and inspected prior to the start of every day. Spill kits and containment booms must be maintained on-site in case of spills.
- Depending on soil conditions and the potential for turbidity, drill cuttings will be deposited adjacent to the operation, contained on the sea bed or pumped to the surface for deposit into containment skiffs or scows for land disposal when it is determined that the drill cuttings are unsuitable for return to the environment.

Underwater Blasting

Contractors required to perform blasting underwater will provide the following protection to minimize/prevent impacts to fish habitat:

- Because of the potential for harmful shock waves resulting from a blast, a protection shield will surround the immediate blast area. This would be in the form of an air-induced bubble curtain, which has the primary purpose of absorbing the shock wave and a secondary purpose of preventing fish from entering the blast area.
- In order to protect against flying rock, mats (rubber) will be placed over the blasting area. The placement of the mats may also provide protection for any fish swimming in the immediate area.

- Monitoring of fish movement and concentrations will be conducted using a sounder to determine if fish herding or scaring techniques (seal bombs) can be utilized to reduce the presence of fish in the blast area.

8) Cleaning out Pipe Piles

When cleaning out pipe piles (i.e.: air lifting) the following Best Management Practices will be employed to minimize/prevent impacts to fish habitat:

- Generally, sediment contained in the pipe is will be pumped to the surface and processed through an approved containment system and disposed of at an approved landfill site.
- In exceptional circumstances, if the sediment is non-toxic, fish are not present in the area, and adjacent fish habitats are not a concern (contact DFO) it may be acceptable to:
 1. Pump the sediment through a discharge tube and allowed it to settle in the immediate area with or without a silt curtain to contain the sediment.
 2. Pump the sediment through a discharge tube and additional flex hosing and redirect it back to the base of the pile.

9) Containment of Concrete Residue and Water Run Off

When placing concrete in form work over or in water, the following Best Management Practices will be employed to minimize/prevent the impacts to fish habitat:

Pouring concrete

- Spills: When pouring concrete all spills of fresh concrete must be prevented. Concrete is toxic to fish due its high pH. If concrete is discharged from the transit mixer directly to the formwork or placed by wheelbarrow, proper sealed chutes must be constructed to avoid spillage. If the concrete is being placed with a concrete pump, all hose and pipe connections must be sealed and locked properly to ensure the lines will not leak or uncouple. Crews will ensure that concrete forms are not filled to overflowing.
- Sealing forms: All concrete forms will be constructed in a manner which will prevent fresh concrete or cement-laden water from leaking into the surrounding water.

Curing concrete

- When fresh water is used to cure concrete, the run-off must be monitored for acceptable pH levels. If the pH levels are outside the allowable limits then the run off water must be contained and neutralized.

Grinding concrete

- When grinding cured concrete, the dust and fines entering the water must not exceed the allowable limits for suspended solids. When grinding green or incompletely cured concrete and the dust or fines are entering the water, pH

monitoring will be conducted to ensure allowable ranges are maintained. In the event that the levels are outside the acceptable ranges, preventative measures will be introduced.

This may include introducing silt curtains to contain the solids and prevent fish from entering a contaminated area or constructing catch basins to recover the run-off and neutralizing it prior to disposal.

Patching concrete

- Spills: When patching concrete, all spills must be contained and prevented from entering the water.

Washing hand tools, pumps and transit mixer

- All tools, pumps, pipes, hoses and trucks used for finishing, placing or transporting fresh concrete must be washed off in such a way as to prevent the wash water and excess concrete from entering the marine environment. The wash water will be contained and disposed of upland in an environmentally acceptable manner.

Whenever there is the possibility of contaminants entering water, the contractor will monitor pH levels to ensure acceptable levels.

APPENDIX G

RVYC EMERGENCY RESPONSE PLAN



ROYAL VANCOUVER
YACHT CLUB

EMERGENCY RESPONSE PLAN

Royal Vancouver Yacht Club – Coal Harbour Station

950 Stanley Park Drive
Vancouver, British Columbia
Canada V6G 3E2

Phone: 604-688-4578

www.royalvan.com



TABLE of CONTENTS

1	IMPORTANT CONTACT INFORMATION.....	3
1.1	ADDRESS	3
1.2	DIRECTIONS	3
1.3	LATITUDE / LONGITUDE	3
1.4	EMERGENCY CONTACT NUMBERS.....	3
2	HEALTH, SAFETY & ENVIRONMENTAL POLICY.....	4
3	RISK ASSESSMENTS.....	5
4	EMERGENCY EQUIPMENT.....	8
4.1	FIRST AID KITS	8
4.2	AUTOMATED EXTERNAL DEFIBRILLATOR (AED).....	8
4.3	SPILL RESPONSE KITS.....	8
4.4	FIRE FIGHTING EQUIPMENT	8
4.5	FALL-IN LADDERS	8
4.6	ELECTRICAL & WATER SHUTOFFS.....	8
4.7	PANIC BUTTONS	8
5	IN CASE OF FIRE	9
5.1	IMMEDIATE.....	9
5.2	SECONDARY.....	9
6	HAZARDOUS SPILLS	12
6.1	IMMEDIATE.....	12
6.2	SECONDARY.....	12
6.3	DISPOSAL OF USED OIL ABSORBENTS	12
7	BOAT SINKING.....	13
7.1	IMMEDIATE.....	13
7.2	SECONDARY	13
8	MEDICAL EMERGENCIES & EVACUATIONS.....	14
8.1	IMMEDIATE.....	14
8.2	SECONDARY.....	14
9	SEVERE STORM WARNING	16
9.1	PREPARATION.....	16
9.2	DURING STORM	16
10	APPENDICES	
10.1	APPENDIX A - ROAD ACCESS.....	18
10.2	APPENDIX B – GATE ACCESS & DOCK OFFICE.....	20
10.3	APPENDIX C – HARBOUR MASTER OFFICE/MERMAID INN.....	21
10.4	APPENDIX D – DOCK MAINTENANCE SHOP & STAFF ROOM.....	22
10.5	APPENDIX E – WORK SHOP/KITCHEN STORAGE.....	24
10.6	APPENDIX F – PORTABLE FALL-IN LADDERS.....	25
10.7	APPENDIX G – ELECTRICAL SHUT OFFS	26



1 IMPORTANT CONTACT INFORMATION

1.1 ADDRESS

The address of the RVYC – Coal Harbour Station is:

- 950 Stanley Park Drive
Vancouver, BC V6G 3E2

1.2 DIRECTIONS

Directions to the RVYC – Coal Harbour Station include:

1. Take exit into Stanley Park off West Georgia Street; and,
2. RVYC – Coal Harbour is in the south-east end of the park.

1.3 LATITUDE / LONGITUDE

The latitude & longitude of the RVYC are:

- Latitude: 49 17.744 N
- Longitude: 123 07.602 W

1.4 EMERGENCY CONTACT NUMBERS

Coal Harbour Dock Office (24/7)	604-688-4578
Harbour Master – Marcus D’Aubin (24/7)	778-231-2407
Marine Asset Manager – Chris Barnett (24/7)	604-834-9492
Fire Department	Emergency: 911 Non-Emergency: 604-665-6007 (15 gross ton Trestle Allowance)
Police	Emergency: 911 Non-Emergency: 604-717-3321
Ambulance	911
Canadian Coast Guard	VHF Ch. 16 Cell: #727 Phone: 1-800-889-8852
Provincial Emergency Program	1-800-663-3456
Nearest Hospital	St. Paul’s Hospital – 604-682-2344 1081 Burrard Street Vancouver, BC V6Z 1Y6
Electrician – Wespac Office	604-522-1322
Plumber – Leo’s Plumbing	604-734-4515
Diver – Sea to Shore (Randy)	778-316-9061



2 HEALTH, SAFETY & ENVIRONMENTAL POLICY

The Royal Vancouver Yacht Club is committed to conducting its operations in a safe and environmentally responsible manner.

In order to meet this commitment, the Club, its members, and its employees will:

- Comply with all applicable laws and regulations, and require the same of our contractors;
- Prevent or reduce possible adverse consequences from our operations;
- Be prepared for emergencies;
- Train our employees to be meet their responsibility for protection of health, safety, and the environment;
- Integrate health, safety, and environmental protection measures into the Club's business;
- Use resources efficiently and effectively.



3 RISK ASSESSMENTS

Risk Category:	Condition:	Control:	Effectiveness Assessment:
Public and personnel	Medical Emergency	<ul style="list-style-type: none">• First Aid Kit and AED• Emergency Phone• Emergency location lights• Signage	
	Trips & Falls	<ul style="list-style-type: none">• Regular inspection for hazards• Maintain cleanliness• Proper work practices when working from height & boat lift• Slime and ice control on docks, ramp• Chains and wharf ladder (by crane) properly hooked up and secure	
	Immersion	<ul style="list-style-type: none">• Emergency Ladders• Emergency location lights	
	Member Vessels	<ul style="list-style-type: none">• Undergo Safety Inspections every 2 years• Must comply with mooring rules for safety & environment preservation	
Property	Fire	<ul style="list-style-type: none">• Regular inspection• Fire-fighting equipment• Fire alarms• Signage• Emergency Response Plan (ERP) per below	
	Boat Sinking	<ul style="list-style-type: none">• ERP per below	
	Subsidence Into Water	<ul style="list-style-type: none">• Annual structural inspections• Active management of storm water run-off• Shoreline bank enhancement• 15 Gross ton allowance on Trestle	
	Storm Damage	<ul style="list-style-type: none">• Regular Dock connection inspections	



		<ul style="list-style-type: none"> • Annually check tall trees for signs of instability and rot • Maintain roof structures, hurricane clips as appropriate • ERP per below 	
	Snow loads	<ul style="list-style-type: none"> • Monitor weather alerts • Issue snow advisory to boaters • Snow removal on docks and ramps • Snow removal from boat house roofs as necessary 	
	Earthquake / Tsunami	<ul style="list-style-type: none"> • Regular dock connection inspections • ERP per below 	
	Dock / crane damage failure	<ul style="list-style-type: none"> • Annual inspection of dock as required • Annual inspection of crane is required 	
Environment	Boat Sinking	<ul style="list-style-type: none"> • Regular patrol • Transport Canada Safety Inspection • ERP per below 	
	Discharge of Waste	<ul style="list-style-type: none"> • Prohibition of activities • Provision of waste and recycling receptacles • Direction to nearest pump-out • Directions for recycling for waste oil, batteries, glycol • Clean bilge education, make absorbent cloths available • ERP per below 	
	Discharge of oil	<ul style="list-style-type: none"> • Regular patrols & inspections • Provision of waste and recycling receptacles • Directions for recycling for waste oil, batteries, glycol • Clean bilge education, make absorbent cloths available • ERP per below 	



	Facility Impacts on Wildlife	<ul style="list-style-type: none">• Plan to replace un-encapsulate foam and creosote piles• Use of open grating on docks where possible• Parking lot spill controls with porous surface & swales	
	Habitat Enhancement	<ul style="list-style-type: none">• Shoreline buffer vegetation• Stewardship of shoreline in areas near facility• Species specific bird feeders	



4 EMERGENCY EQUIPMENT

The following emergency equipment is kept at the RVYC:

4.1 FIRST AID KITS

First aid kits can be found at the following locations:

- Access gate office (See Appendix B)
- Dock Tool Shop (See Appendix D)

4.2 AUTOMATED EXTERNAL DEFIBRILLATOR (AED)

An AED can be found at the following location:

- Access gate office

4.3 SPILL RESPONSE KITS

Spill response kits can be found at the following locations:

- Mid-way on docks A, C, D, E, F, H, J, M, N & K (See Map P. 15)

4.4 FIRE FIGHTING EQUIPMENT

Fire-fighting equipment can be found at the following locations:

- All docks under signage (See Maps P. 10-11)

4.5 FALL-IN LADDERS

Fall-in ladders can be found at the following locations:

- Fixed ladders the ends of various berths on all docks (See Map P. 15)
- Portable ladders at Dock office, and J-Float access point (See Appendix F)

4.6 ELECTRICAL & WATER SHUTOFFS

Electrical and water shut-offs can be found at the following locations:

- Electrical Connection Shut off; 1_Main 600v disconnect on trestle by the Seawall - shuts off entire property and M-Float, 2_Marina Distribution at the bottom of the Main Ramp on Main Landing Float – shuts off marina floats by section (See Appendix G).

4.7 PANIC BUTTONS

Panic Buttons can be found at the following locations:

- Berths A42, B8, E1, H6, G13, J1, H6 (See Map P. 15).



5 IN CASE OF FIRE

In case of fire, please follow the procedures below:

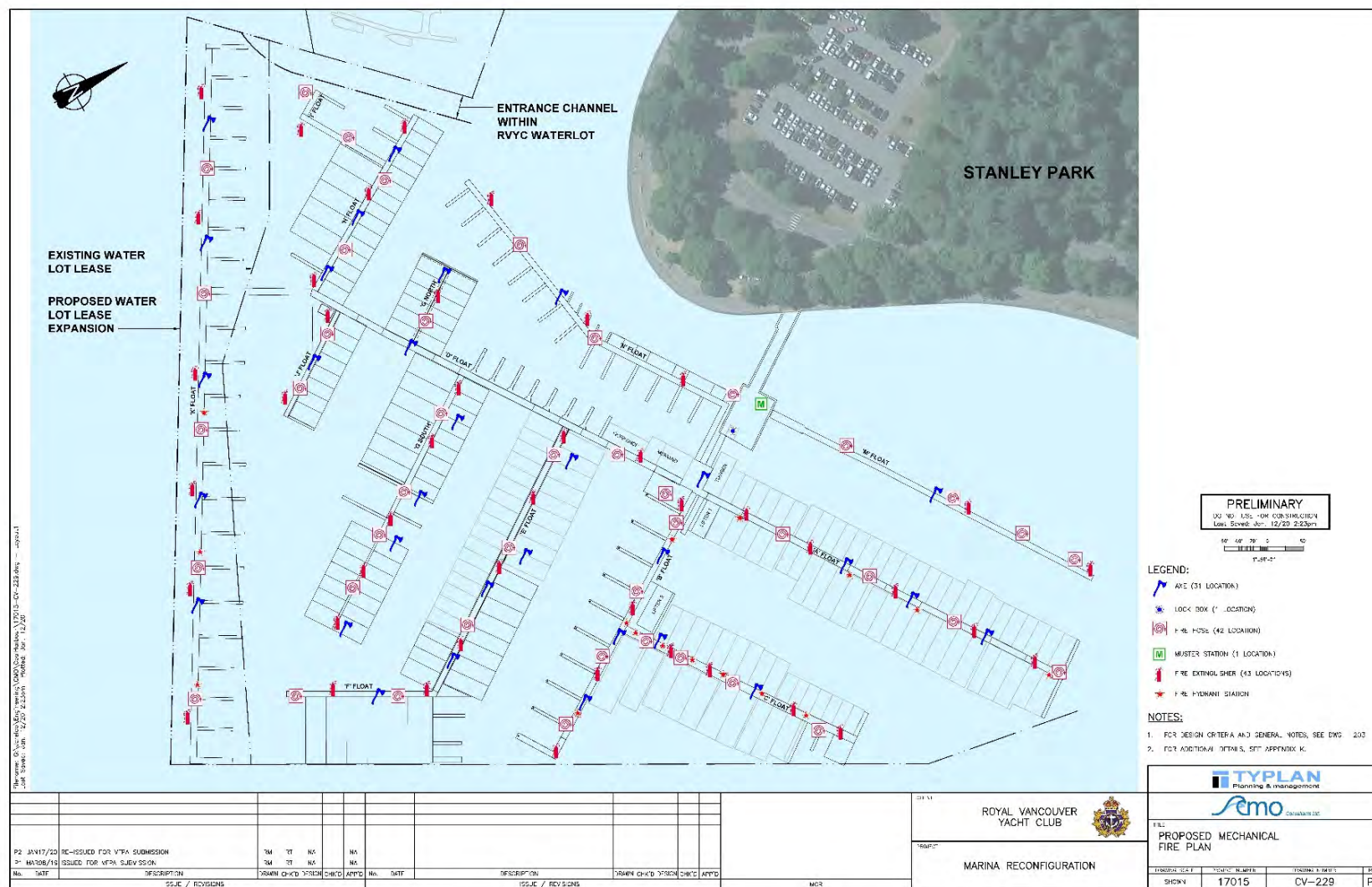
5.1 IMMEDIATE

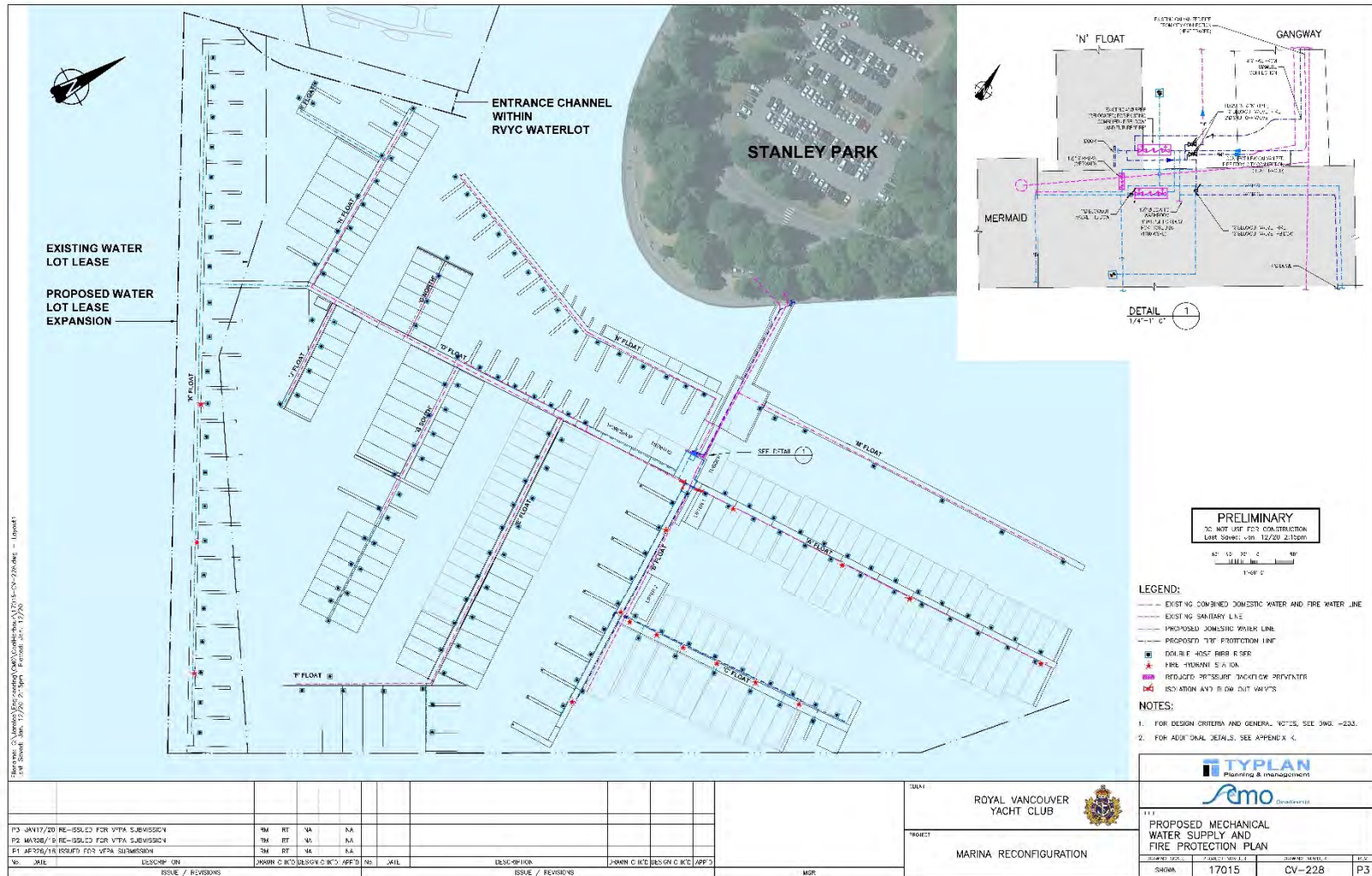
1. Call 911 or assign a person to call 911 and request Fire/Rescue Services and other first responders as necessary. Instruct the assigned person to stand-by on Stanley Park Drive and guide first responders to location of the emergency. If no one is available, make sure access gate is open, and return to emergency response procedure.
2. Evacuate everyone out of buildings or off the burning vessel, adjacent vessels, and area surrounding the fire, or on-shore buildings as appropriate. Keep by-standers away from area.
3. shut down shore power to area including vessel.
4. Relocate adjacent vessels away from fire ONLY if safe to do so.

5.2 SECONDARY

1. Fight fire with available equipment ONLY if you can do so without endangering yourself or others.
 - Fire Extinguishers
 - Fire hoses
 - Portable emergency pumps
2. Remove any combustibles and vehicles from the area.
3. Any fire involving fuels etc. that may spill into the environment must be reported to the Provincial Emergency Program 1-800-663-3456.
4. Contact Harbour Master 778-231-2407.
5. Contact Marine Asset Manager 604-834-9492

Note: All vessels may have hazardous materials on board (gasoline, diesel, propane, and flammables from cleaning and paint products).







6 HAZARDOUS SPILLS

In case of hazardous materials spills, please follow the procedures below:

6.1 IMMEDIATE

1. Call Harbour Master who will make the appropriate calls to Coast Guard, 911, etc... and proceed on Harbour Master's instructions.
2. Coast Guard = VHF CH 16 or 1-800-889-8852. Call Provincial Emergency Program 1-800-663-3456.
3. Identify and stop the flow of fluid (fuel, oil, etc.) if possible.
4. Ensure there is no source of spark or ignition that may cause fire. This includes energized electrical equipment and operating engines or machinery.
5. If leak is coming from a vessel, contact the owner

6.2 SECONDARY

1. Contain spill with absorbent sheets / pads / cloth etc.:
 - Spill response kits are located on all floats throughout marina.
2. Deploy absorbent boom if available to contain spill.
3. Evacuate and/or relocate adjacent vessels.
4. Complete a spill incident report for review by others

6.3 DISPOSAL OF USED OIL ABSORBENTS

- All absorbent materials used in spill prevention and response will be collected in drums in the designated oil disposal area.
- When container is full, make arrangements for pick-up and proper disposal by environmental contractor.
- Advise staff if drum is full to arrange for pick up.

Note: All drums and barrels to have adequate secondary containment trays.



7 BOAT SINKING

In the case of a sinking boat, please follow the procedures below:

7.1 IMMEDIATE

1. Ensure that no one is in immediate danger and evacuate vessel if necessary.
2. Assist to halt further sinking if possible (bailing, bilge pumps, etc.):
 - Use emergency boat pumps on yellow dollies located in pump room and in tugger shed.

7.2 SECONDARY

1. Contact Member (use RVYC yearbook to find contact number)
2. Deploy spill containment boom around vessel.
3. Suspend/attach vessel to dock if feasible to prevent complete submersion, or tow to shallow water.
4. Deploy additional spill containment measures if possible. (Absorbent pads/sheets etc.)
5. Call the Coast Guard 1-800-889-5582 or VHF Ch 16. If the sinking results in a spill,
also call the Provincial Emergency Program 1-800-663-3456
6. Contact Marcus D'Aubin 778-231-2407

Note: RVYC has two boats (Swifter and Northwest) available for emergency response.



8 MEDICAL EMERGENCIES & EVACUATIONS

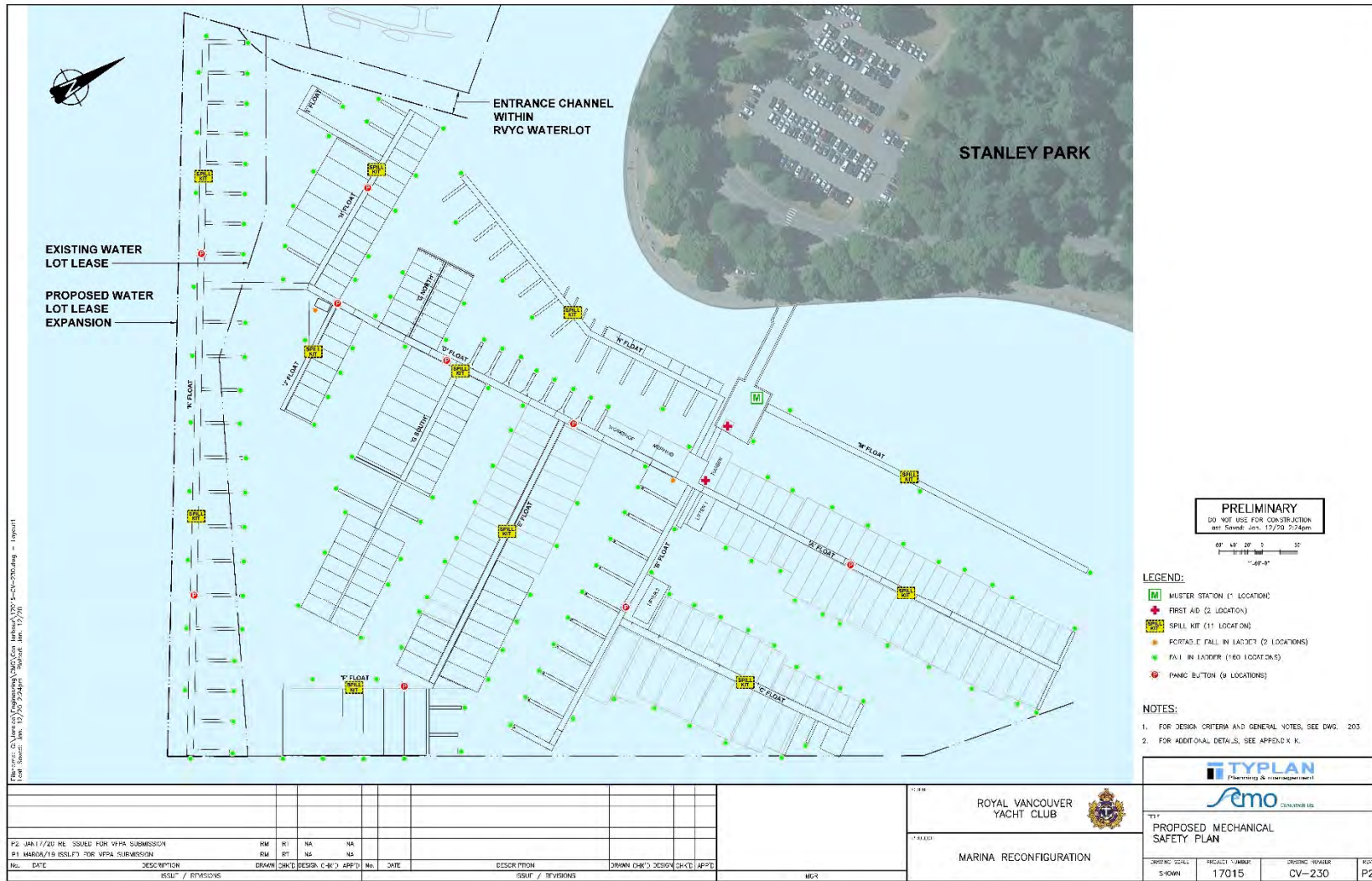
In the case of a medical emergency, please follow the procedures below:

8.1 IMMEDIATE

1. Call 911 or assign a person to call 911 and request Fire/Rescue Services, Ambulance and other first responders as necessary. Instruct the assigned person to stand-by on Stanley Park Drive and guide first responders to the location of the emergency. If alone, make sure access gate is open and return to emergency response procedure.
2. Ensure that injured and by-standers are not in immediate danger;
3. Do not move injured unless absolutely necessary. Make comfortable with blankets.
4. Have a qualified person perform First Aid as necessary.
5. First Aid kit is located in the Dock Office and Tugger Shed Entrance.
6. AED device is located in the Dock Office.

8.2 SECONDARY

1. Remain with injured until first responder personnel arrive.
2. If staff or member transports injured to hospital, another member or staff should accompany.
3. Contact Harbour Master 778-231-2407
4. Contact Marine Asset Manager 604-834-9492





9 SEVERE STORM WARNING

In the case of a severe storm warning, please follow the procedures below:

9.1 PREPARATION

1. Be aware of and monitor weather forecasts for Extreme Wind events.
2. Winter moorage Owners should be advised to deploy extra mooring and spring lines and additional bumpers. Loose deck gear to be secured.
3. Dinghies, kayaks and any small craft to be strapped down.

9.2 DURING STORM

1. Shut down water and electrical service to the docks.
2. "No Dock Access" sign to be put up in the event of severe winds to keep the public off the dock. – NO ONE is to go onto dock without approval of Dock Supervisor or their designate.
3. Emergency connectors, rope and fenders are located in the Tugger shed.
4. After storm has passed: check docks over for structural damage, water leaks and soundness.
5. Update Harbour Master 778-231-2407.
6. Update Marine Asset Manager 604-834-9492



ADDITIONAL EMERGENCY RESPONSE COMMUNICATION SYSTEMS;

- Group email messaging;
 - When an emergency is underway and people need to be notified AS SOON AS POSSIBLE, group Email Messages can be sent from an 'MS Outlook' or similar contact list
 - E.g. Dock A, berths 1-10, 11
- Posted emergency name and phone call list in Harbour Masters Office cross referenced to berth number

IN THE EVENT OF THE FOLLOWING EMERGENCIES

- Earthquake & Tsunami
 - Crane failure on main dock
 - Fire in car park
 - Break-in and/or violent confrontation
 - Bomb threat
-
1. Immediately call 911 and inform the appropriate authorities of the situation. Follow any given instructions.
 2. Contact Harbour Master 778-231-2407
 3. Contact Marine Asset Manager 604-834-9492



APPENDIX A

ROYAL VANCOUVER YACHT CLUB - COAL HARBOUR ROAD ACCESS MAP





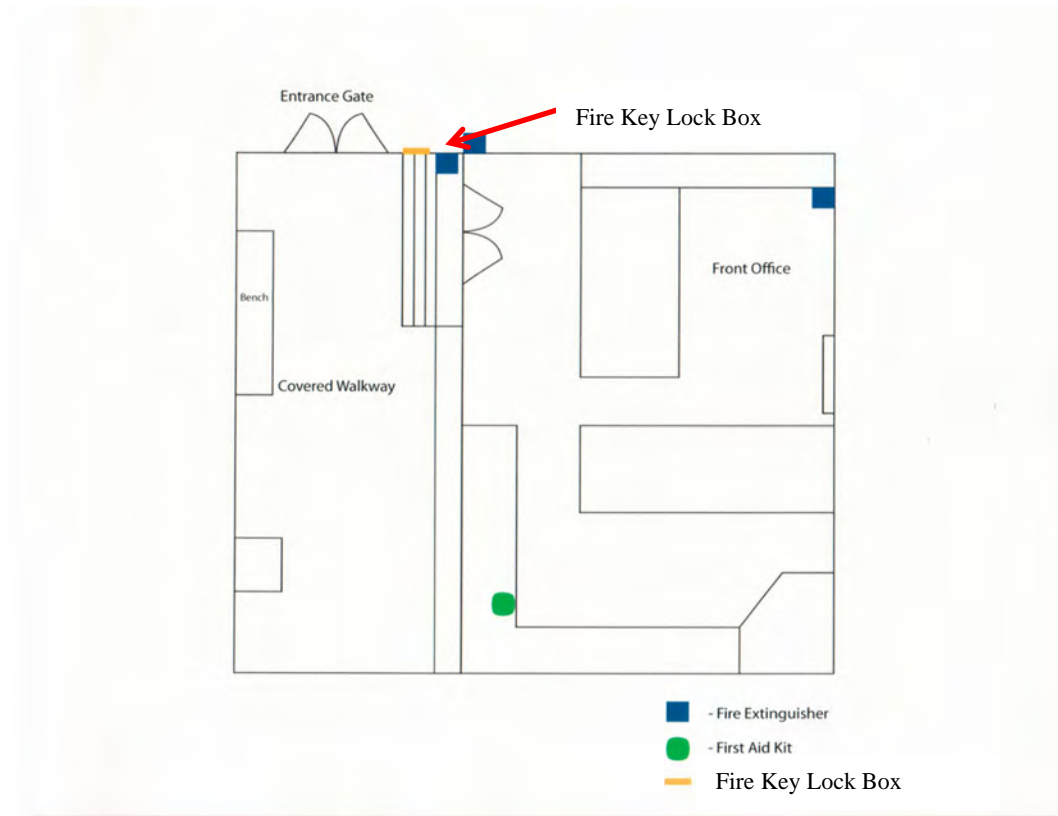
ROYAL VANCOUVER YACHT CLUB - COAL HARBOUR ENTRANCE FROM STANLEY PARK





APPENDIX B

GATE ACCESS & DOCK OFFICE



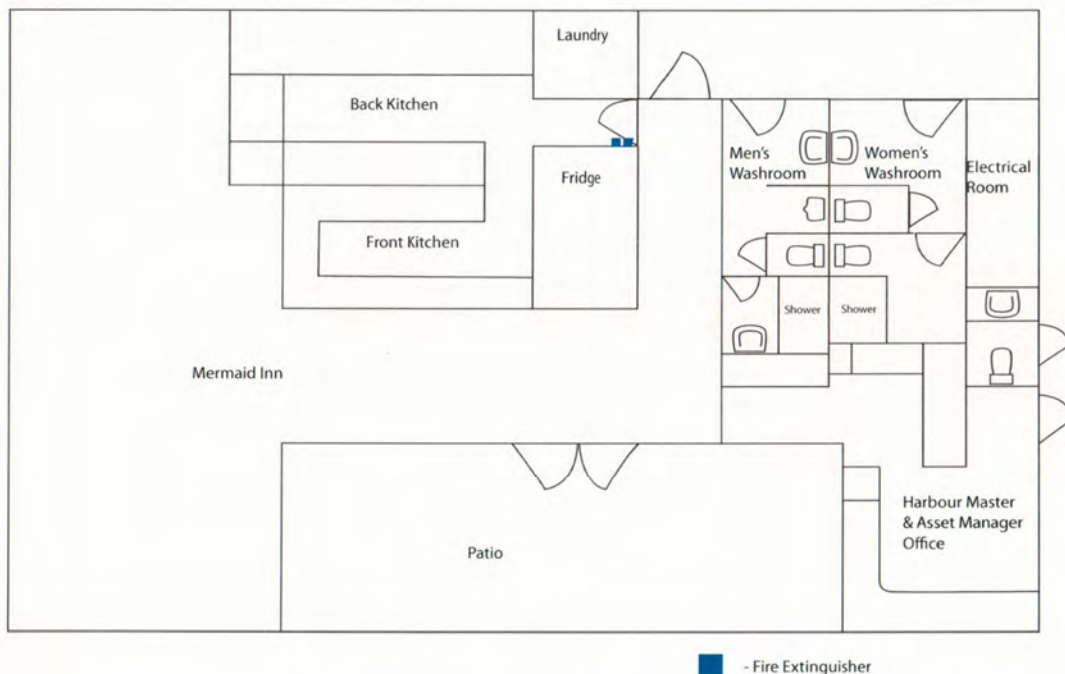
Fire Key Lock Box





APPENDIX C

HARBOUR MASTER'S OFFICE, WASHROOMS & MERMAID INN



Harbour Master	Marcus D'Aubin	778.231.2407
Restaurant Manager	Bonnie Pringle	604.818.7933
Emergency Contact	Coal Harbour Dock Office	604.688.4578
Hours of Operation	9 – 4 Daily	



APPENDIX D

DOCK MAINTENANCE SHOP & STAFF ROOM

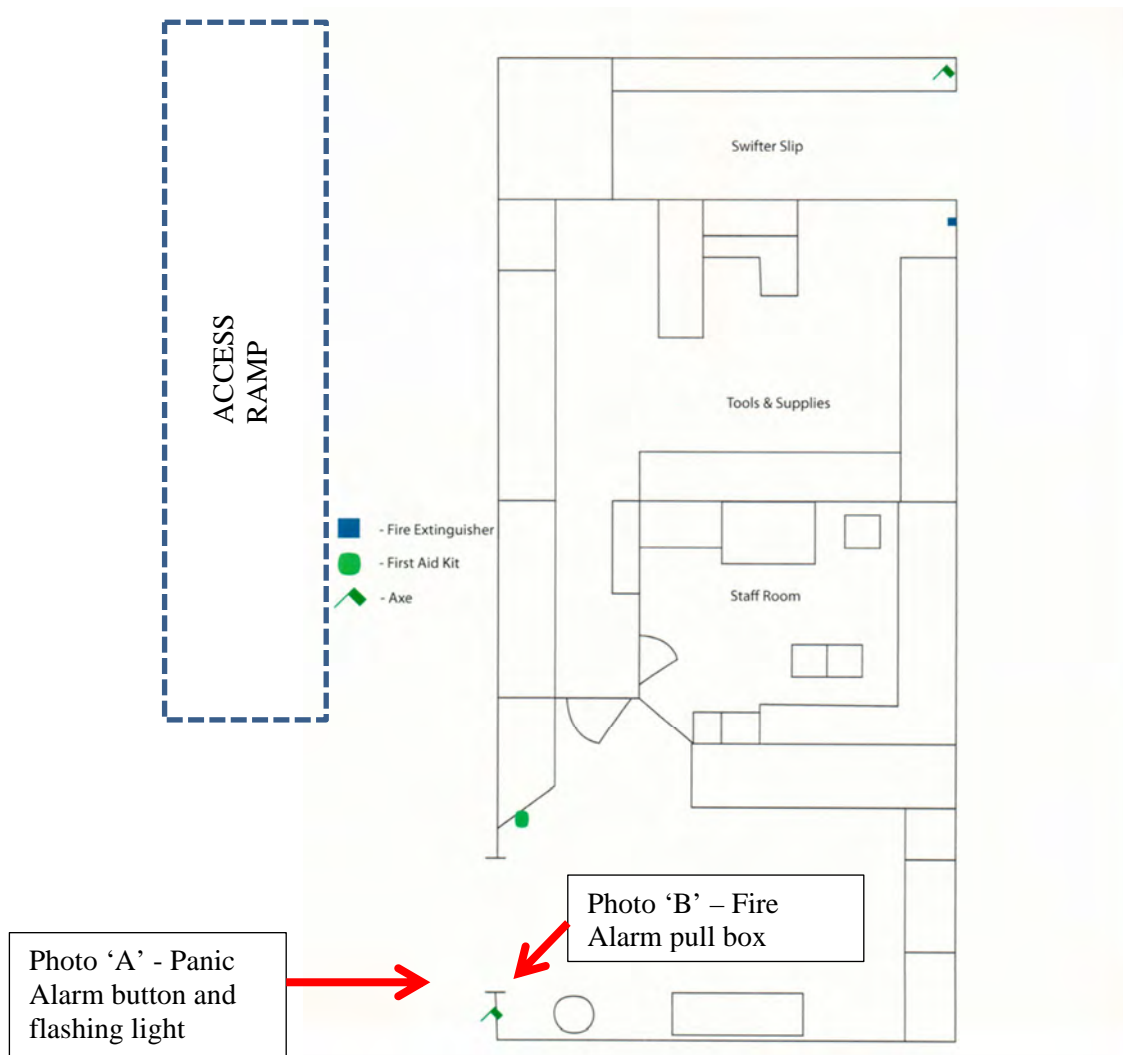




Photo 'A'

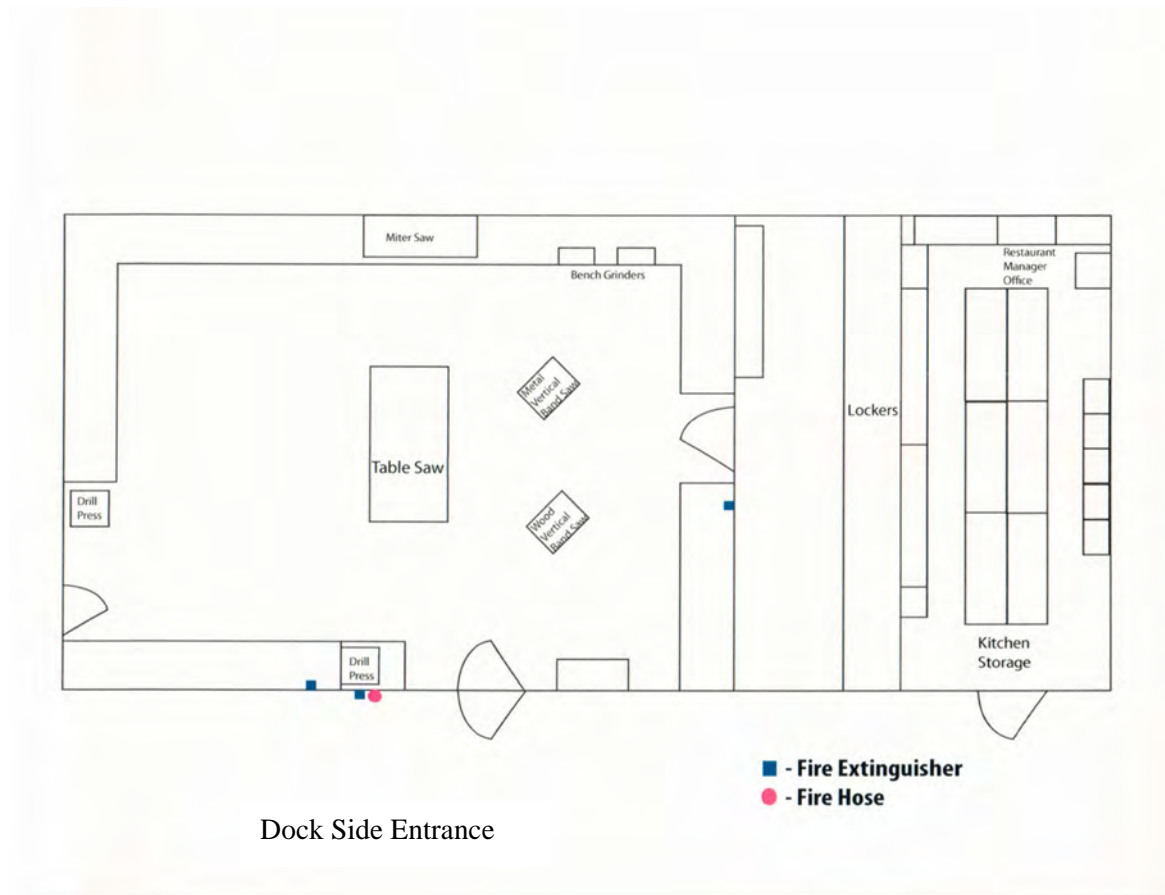


Photo 'B'

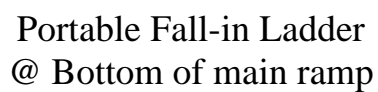


APPENDIX E

WORK SHOP & KITCHEN STORAGE

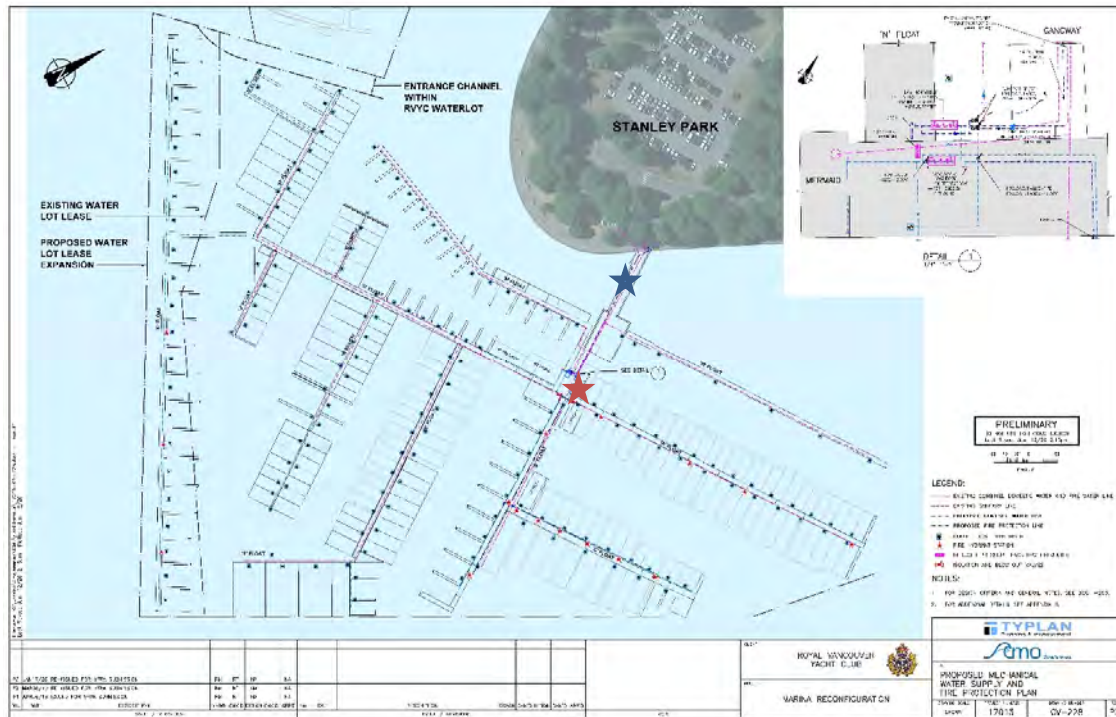


Harbour Master	Marcus D'Aubin	778.231.2407
Mermaid Restaurant Manager	Bonnie Pringle	604.818.7933
Emergency Contact	Coal Harbour Dock Office	604.688.4578
Hours of Operation	24 -7	





APPENDIX G ELECTRICAL SHUT OFFS



★ Electrical Shut Offs by Float



★ Electrical Shut Off to Marina

