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 m^2 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.


STANLEY PARK
ROYAL VANCOUVER YACHT CLUB
VANCOUVER ROWING CLUB
DEADMAN'S ISLAND
NAVIGATIONAL CHANNEL
WEST GEORGIA ST
PROPOSED EXPANSION
BURRARD INLET
VANCOUVER
PRELIMINARY
DO NOT USE FOR CONSTRUCTION
Last Saved: Dec. 18/19 11:32am
200' 100' 0 200'
1"=200'-0"
TYPLAN Planning & management
Memo Consultants Ltd.
ROYAL VANCOUVER YACHT CLUB
MARINA RECONFIGURATION
LOCATION PLAN
DRAWING SCALE: SHOWN
PROJECT NUMBER: 17015
DRAWING NUMBER: CV-201
REV: P5

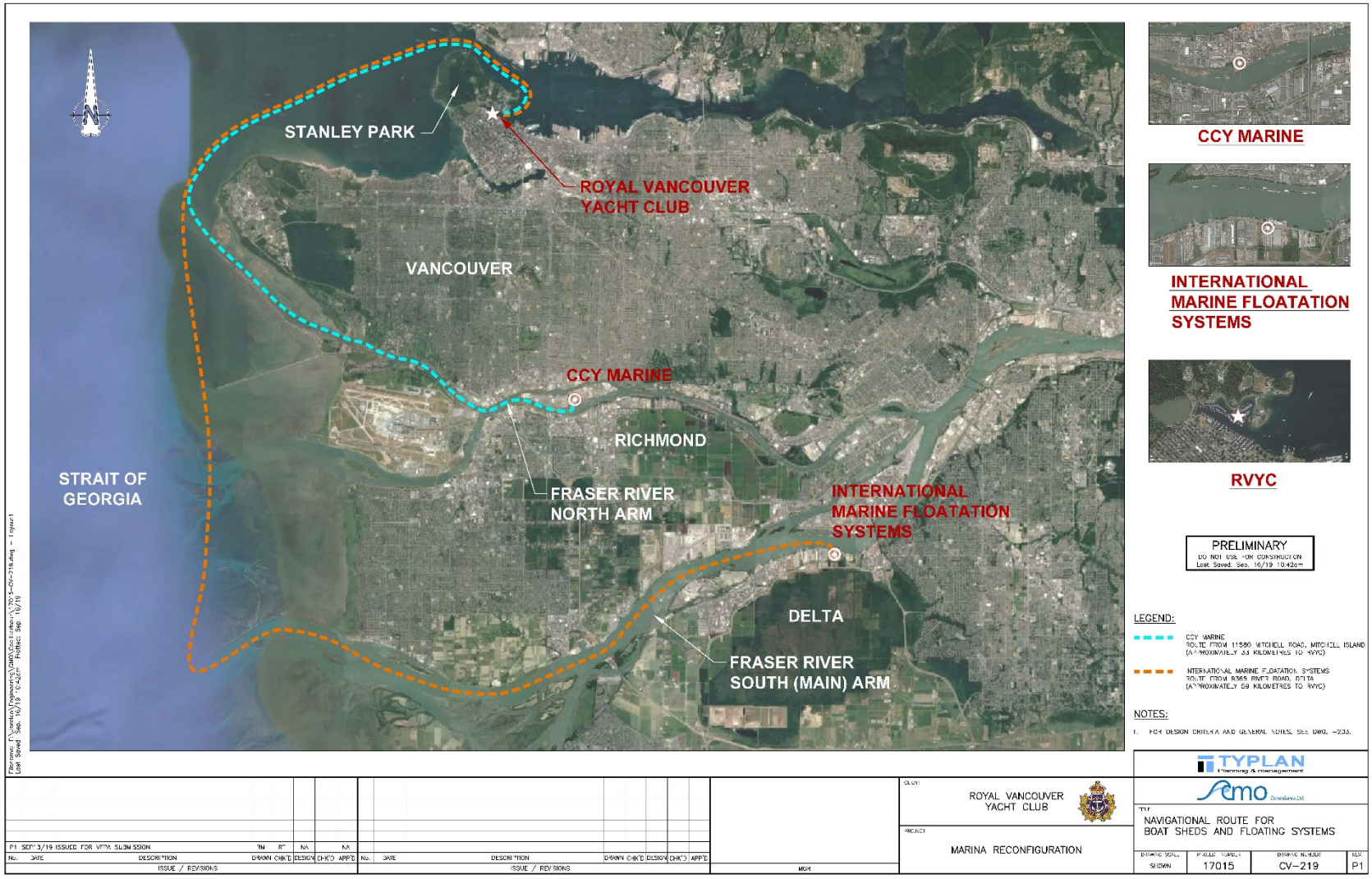
Project Construction and Marina Assembly: Overview

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).


STANLEY PARK
ROYAL VANCOUVER YACHT CLUB
VANCOUVER
CCY MARINE
RICHMOND
STRAIT OF GEORGIA
FRASER RIVER NORTH ARM
INTERNATIONAL MARINE FLOATATION SYSTEMS
DELTA
FRASER RIVER SOUTH (MAIN) ARM
CCY MARINE
INTERNATIONAL MARINE FLOATATION SYSTEMS
RVYC
PRELIMINARY
DO NOT USE FOR CONSTRUCTION
LEGEND:
CCY MARINE
ROUTE FROM 11580 MITCHELL ROAD, MITCHELL ISLAND
(APPROXIMATELY 53 KILOMETRES TO RVYC)
INTERNATIONAL MARINE FLOATATION SYSTEMS
ROUTE FROM 8365 RIVER ROAD, DELTA
(APPROXIMATELY 69 KILOMETRES TO RVYC)
NOTES:
1. FOR DESIGN CRITERIA AND GENERAL NOTES, SEE DWG. -205.
TYPLAN
Planning & management
ROYAL VANCOUVER YACHT CLUB
MARINA RECONFIGURATION
NAVIGATIONAL ROUTE FOR BOAT SHEDS AND FLOATING SYSTEMS
SHOWN
17015
CV-219
P1

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.

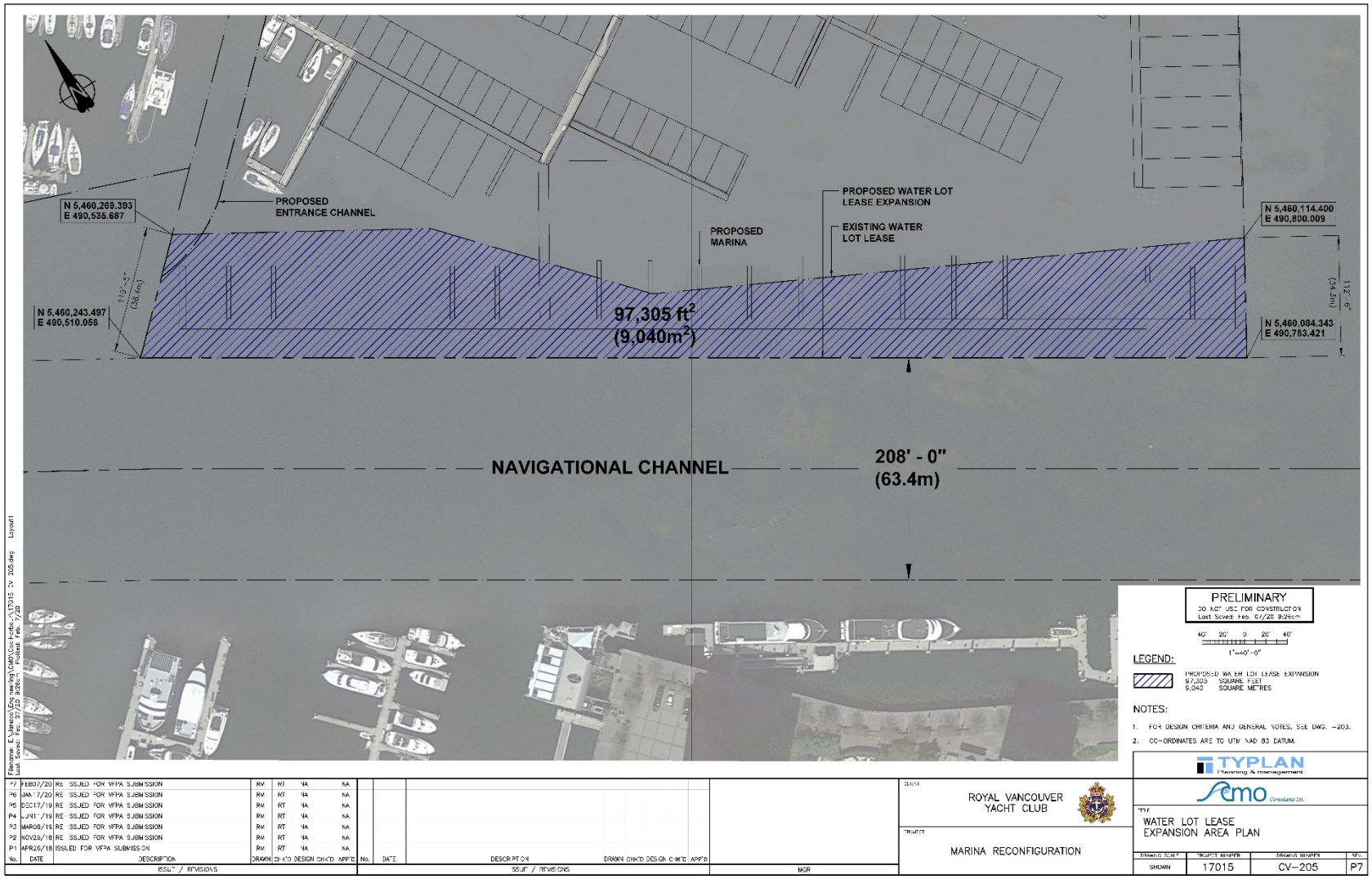
As identified in the Project Description document, a Preliminary Eight Stage Phasing Plan was outlined for consideration. The eight phased program illustrates the intended approach to undertake the three main project construction/assembly activities:

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.

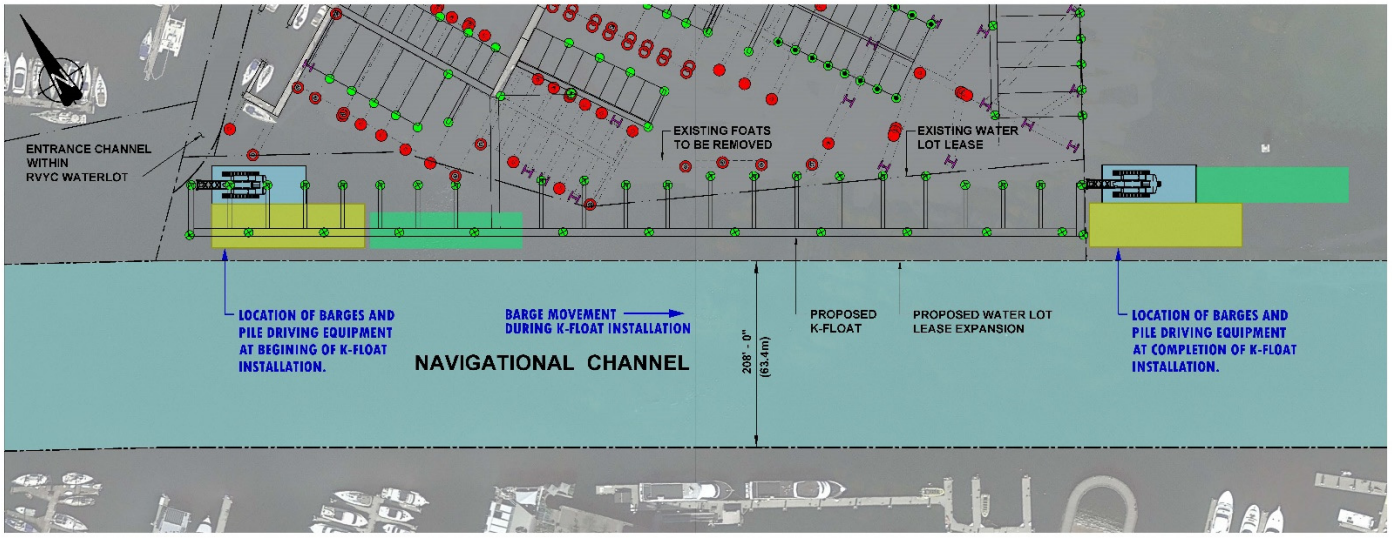

PROPOSED ENTRANCE CHANNEL
N 5,460,269.393
E 490,535.687
PROPOSED MARINA
PROPOSED WATER LOT LEASE EXPANSION
EXISTING WATER LOT LEASE
N 5,460,114.400
E 490,800.009
N 5,460,243.497
E 490,510.056
97,305 ft²
(9,040m²)
N 5,460,084.343
E 490,783.421
NAVIGATIONAL CHANNEL
208' - 0"
(63.4m)
PRELIMINARY
DO NOT USE FOR CONSTRUCTION
LEGEND:
NOTES:
1. FOR DESIGN CRITERIA AND GENERAL NOTES, SEE DWG. -203.
2. CO-ORDINATES ARE TO UTM NAD 83 DATUM.
ROYAL VANCOUVER YACHT CLUB
MARINA RECONFIGURATION
WATER LOT LEASE EXPANSION AREA PLAN
17015
CV-205
P7

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"ø STEEL PIPE PILE LOCATION
- PROPOSED 12.75"ø STEEL PIPE PILE LOCATION
- PROPOSED 10.75"ø STEEL PIPE PILE LOCATION
- CREOSOTE TIMBER PILES TO BE REMOVED
- STEEL PIPE PILES TO BE REMOVED
- STEEL H-PILES 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"=60'-0"

PRELIMINARY
DO NOT USE FOR CONSTRUCTION
Last Saved: Feb. 04/20 11:46am

NOTES:
1. FOR DESIGN CRITERIA AND GENERAL NOTES, SEE DWG. –203.
2. CO-ORDINATES ARE TO UTM NAD 83 DATUM.

No	DATE	DESCRIPTION	DRAWN	CHK'D	DESIGN	CHK'D	APP'D
5	FEB07/20	RE-ISSUED FOR VFPA SUBMISSION	RM	RT	NA		NA
4	JAN17/20	RE-ISSUED FOR VFPA SUBMISSION	RM	RT	NA		NA
3	AUG20/19	RE-ISSUED FOR VFPA SUBMISSION	RM	RT	NA		NA
2	JUN24/19	RE-ISSUED FOR VFPA SUBMISSION	RM	RT	NA		NA
1	APR26/18	ISSUED FOR VFPA SUBMISSION	RM	RT	NA		NA

ISSUE / REVISIONS

No.	DATE	DESCRIPTION	DRAWN	CHK'D	DESIGN	CHK'D	APP'D

ISSUE / REVISIONS

MGR

CLIENT: ROYAL VANCOUVER YACHT CLUB

PROJECT: MARINA RECONFIGURATION

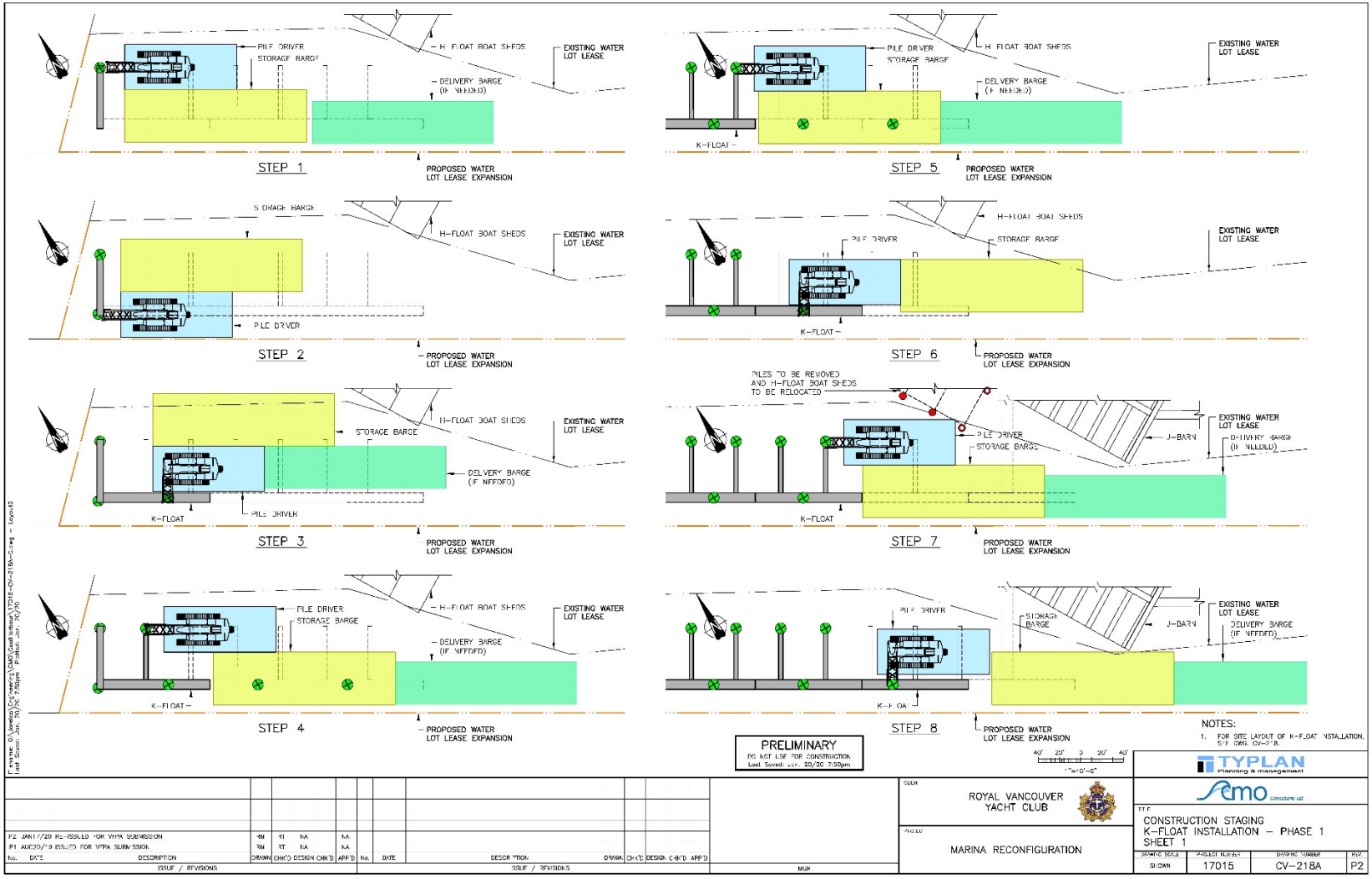
TYPLAN Planning & management

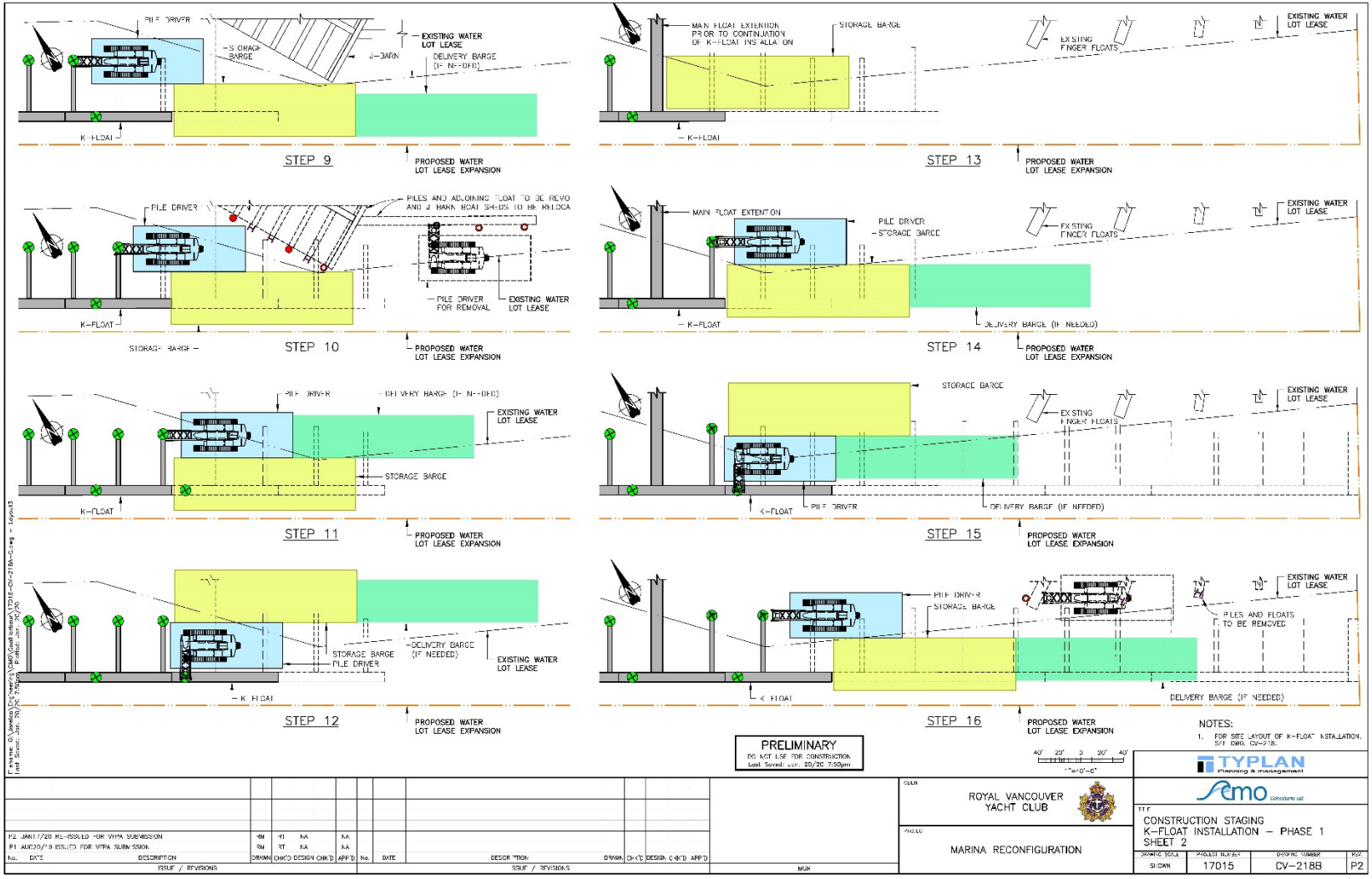
Semo Consulting Ltd.

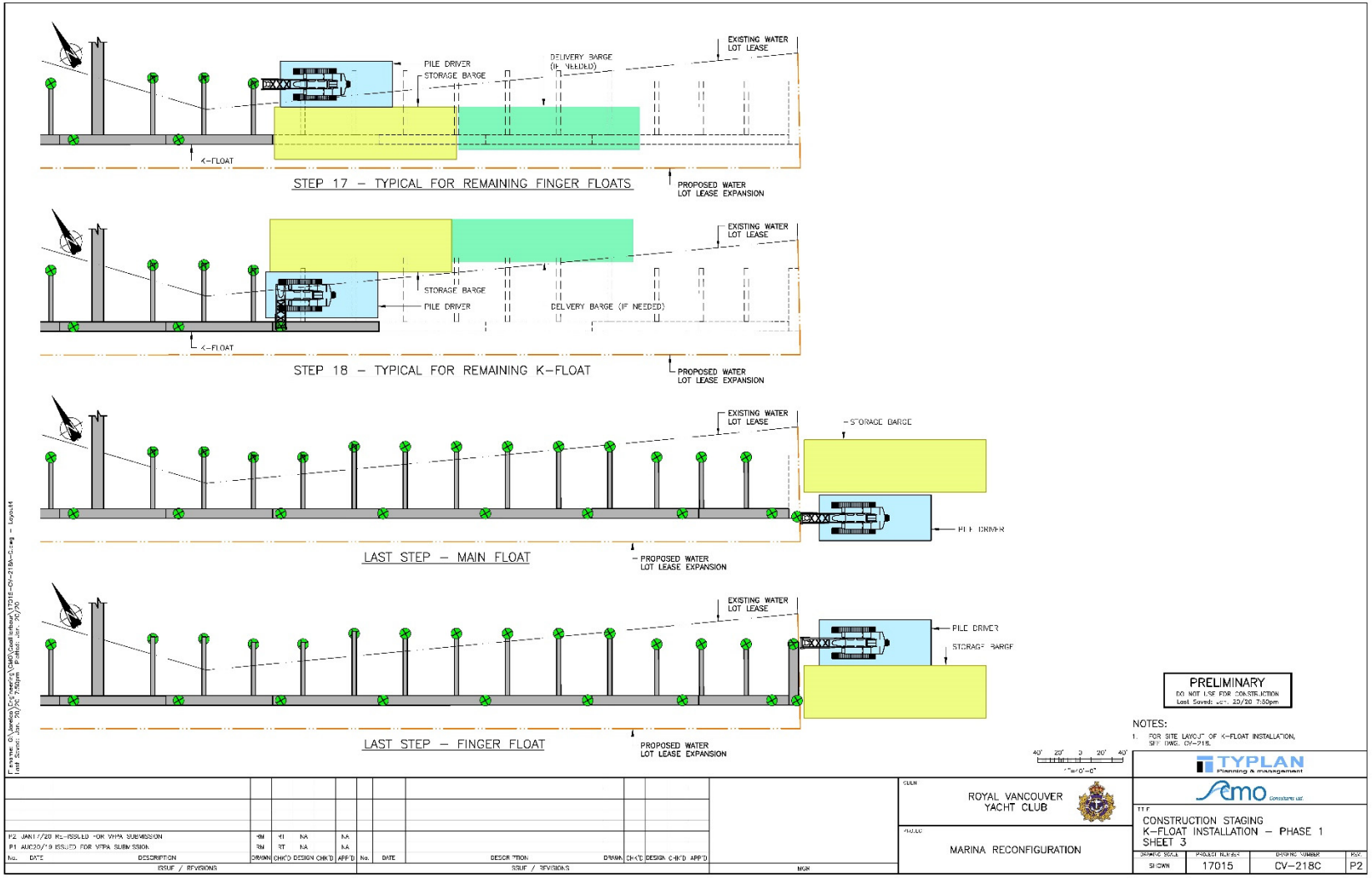
TITLE: CONSTRUCTION STAGING
K–FLOAT INSTALLATION – PHASE 1
GENERAL ARRANGEMENT

DRAWING SCALE	PROJECT NUMBER	DRAWING NUMBER	REV.
SHOWN	17015	CV–218	P5

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.


STEP 1
PILE DRIVER
STORAGE BARGE
H-FLOAT BOAT SHEDS
DELIVERY BARGE (IF NEEDED)
EXISTING WATER LOT LEASE
PROPOSED WATER LOT LEASE EXPANSION
STEP 2
STORAGE BARGE
H-FLOAT BOAT SHEDS
PILE DRIVER
EXISTING WATER LOT LEASE
PROPOSED WATER LOT LEASE EXPANSION
STEP 3
H-FLOAT BOAT SHEDS
STORAGE BARGE
DELIVERY BARGE (IF NEEDED)
K-FLOAT
PILE DRIVER
EXISTING WATER LOT LEASE
PROPOSED WATER LOT LEASE EXPANSION
STEP 4
PILE DRIVER
STORAGE BARGE
H-FLOAT BOAT SHEDS
DELIVERY BARGE (IF NEEDED)
K-FLOAT
EXISTING WATER LOT LEASE
PROPOSED WATER LOT LEASE EXPANSION
STEP 5
PILE DRIVER
STORAGE BARGE
H-FLOAT BOAT SHEDS
DELIVERY BARGE (IF NEEDED)
K-FLOAT
EXISTING WATER LOT LEASE
PROPOSED WATER LOT LEASE EXPANSION
STEP 6
H-FLOAT BOAT SHEDS
PILE DRIVER
STORAGE BARGE
K-FLOAT
EXISTING WATER LOT LEASE
PROPOSED WATER LOT LEASE EXPANSION
STEP 7
PILES TO BE REVOVED AND H-FLOAT BOAT SHEDS TO BE RELOCATED
PILE DRIVER
STORAGE BARGE
J-BARN
DELIVERY BARGE (IF NEEDED)
K-FLOAT
EXISTING WATER LOT LEASE
PROPOSED WATER LOT LEASE EXPANSION
STEP 8
PILE DRIVER
STORAGE BARGE
J-BARN
DELIVERY BARGE (IF NEEDED)
K-FLOAT
EXISTING WATER LOT LEASE
PROPOSED WATER LOT LEASE EXPANSION
PRELIMINARY
DO NOT USE FOR CONSTRUCTION
NOTES:
1. FOR SITE LAYOUT OF K-FLOAT INSTALLATION, SEE DWG. CV-2.1B.
ROYAL VANCOUVER YACHT CLUB
MARINA RECONFIGURATION
CONSTRUCTION STAGING
K-FLOAT INSTALLATION – PHASE 1
SHEET 1
SCALE: AS SHOWN
PROJECT NUMBER: 17015
DRAWING NUMBER: CV-218A
REV: P2


STEP 9
STEP 10
STEP 11
STEP 12
STEP 13
STEP 14
STEP 15
STEP 16
PROPOSED WATER LOT LEASE EXPANSION
EXISTING WATER LOT LEASE
PRELIMINARY
DO NOT USE FOR CONSTRUCTION
NOTES:
1. FOR SITE LAYOUT OF K-FLOAT INSTALLATION, SEE DWG. CV-218.
ROYAL VANCOUVER YACHT CLUB
MARINA RECONFIGURATION
CONSTRUCTION STAGING
K-FLOAT INSTALLATION - PHASE 1
SHEET 2
17015
CV-218B
P2


EXISTING WATER LOT LEASE
PILE DRIVER
STORAGE BARGE
DELIVERY BARGE (IF NEEDED)
K-FLOAT
STEP 17 – TYPICAL FOR REMAINING FINGER FLOATS
PROPOSED WATER LOT LEASE EXPANSION
EXISTING WATER LOT LEASE
STORAGE BARGE
PILE DRIVER
DELIVERY BARGE (IF NEEDED)
K-FLOAT
STEP 18 – TYPICAL FOR REMAINING K-FLOAT
PROPOSED WATER LOT LEASE EXPANSION
EXISTING WATER LOT LEASE
STORAGE BARGE
PILE DRIVER
LAST STEP – MAIN FLOAT
PROPOSED WATER LOT LEASE EXPANSION
EXISTING WATER LOT LEASE
PILE DRIVER
STORAGE BARGE
LAST STEP – FINGER FLOAT
PROPOSED WATER LOT LEASE EXPANSION
PRELIMINARY
DO NOT USE FOR CONSTRUCTION
NOTES:
1. FOR SITE LAYOUT OF K-FLOAT INSTALLATION, SEE DWG. CV-215.
TYPLAN Planning & management
ROYAL VANCOUVER YACHT CLUB
MARINA RECONFIGURATION
CONSTRUCTION STAGING
K-FLOAT INSTALLATION – PHASE 1
SHEET 3
17015
CV-218C
P2

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.