

1 INTRODUCTION

The Vancouver Fraser Port Authority (Port Authority) Project and Environmental Review (PER) process has established Guidelines for Lighting (July 2015), intended to assist applicants determine outdoor lighting requirements and/or provide direction regarding whether a comprehensive Outdoor Lighting Plan is required to be submitted by a proponent.

The Port Authority has concerns that a poorly designed or installed outdoor lighting may cause concerns with residents and or community groups, create an unsafe and unpleasant conditions, impair the productive use of port authority property and tenants' facilities, or may result in unnecessary use of electric power.

The guidelines provide information and guidance relating to the design, installation and operation of lighting proposed through the Port Authority's PER process.

RVYC retained Sokulski Engineering Limited (Sokulski) to upgrade the existing lighting associated with the Coal Harbour Marina Expansion Project. Sokulski has a long-standing relationship with RVYC having been responsible for the upgraded electrical transformer undertaken in 2011, approved by the Port Authority. The recent transformer upgrade exceeds the electrical needs of the proposed marina expansion (of which the related municipal permits have been secured by Westpac Electrical Contractors EP 2017-07435 from the City of Vancouver) and includes best practices and LED design to ensure that the intent of the Port Authority lighting guidelines have been met, specifically noting:

- Lighting has been designed to promote member safety, security, and productivity;
- Reduction of unwanted light spill and other impacts on adjacent properties and communities (i.e., nearest residences 300 m away, whereas the Stanley Park pedestrian trail is 150 m away); and
- Conserve electrical energy and reduce unnecessary use of electrical power.

2 PRELIMINARY LIGHTING PLAN OVERVIEW

The Lighting Plan submitted as part of this review has considered in its development (presented on Exhibit 27 of the Project Description (CV 227)) means to minimize glare, light trespass, energy conservation and to ensure member safety and security.

The requirement for a Lighting Plan will be confirmed in the preliminary review phase and preliminary details are presented herewith, supported by specifications associated with the proposed lighting.

The Preliminary Lighting Plan prepared by Sokulski Engineering is illustrated in the Project Description Exhibit 27, includes the following:

- Location of all current and proposed exterior lighting fixtures on the premises, as well as the location of the proposed power source;
- Type of illuminating devices, fixtures, lamps, supports, reflectors, and other devices including the cut-off characteristics;
- Lamp source type (e.g., high-pressure sodium, LED, etc.), lumen output, and wattage; expected change in wattage for site;
- Mounting height with distance noted to the nearest property line for each fixture, with orientation noted; types of timing devices used to control the hours set for illumination, as well as the proposed hours when each fixture will be operated;
- Cumulative lighting consumption data for the overall lighting installation including design power consumption, average illumination, and uniformity levels; and
- The Lighting Plan should clearly indicate the regulations and standards applied in designing, selecting, and/or locating exterior lighting in proposed projects.

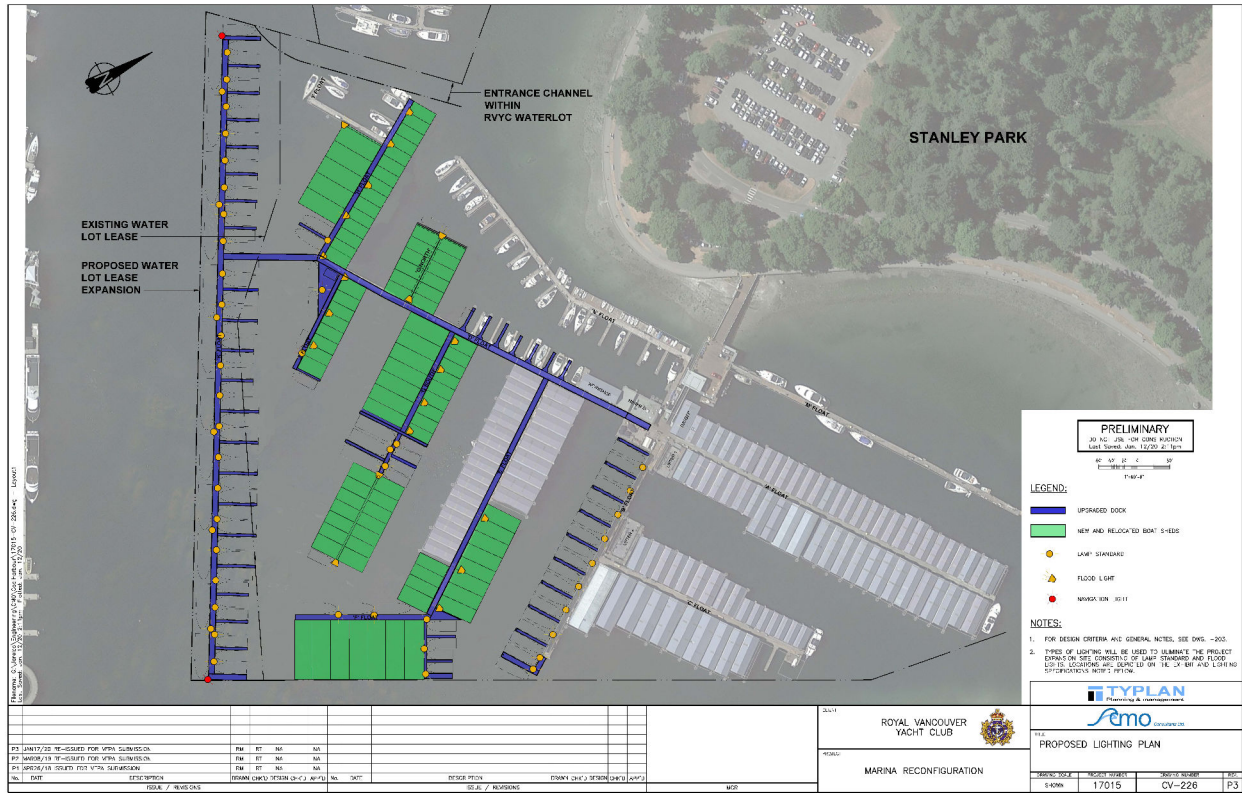
All lighting conforms to the Building Code of Canada and the Illumination Engineering Society of North America. Lighting is designed from a safety perspective and focused to illuminate internally within the marina and limited glare to the surrounding land uses. In total 28 light standards (3 ft. in height) will be used along K float, 21 others used internally to illuminate the marina. Additionally, 18 floodlights (to illuminate within and along the existing dock) to provide lighting when walking on the dock has been designed not to produce any glare beyond the walkways. Lighting technology utilized complies with the VFPA standards regarding cut-off and light trespass. LED efficient lights are specified to ensure smart use of electricity on site. Wall mounted LED fixtures mounted on the boat sheds with integral photocell I control. Low level LED lighting incorporated into the power pedestals and post top cut-off LED fixtures mounted on the dock to illuminate dock intersections. Bollard lights and post top lights will be controlled by photo cells. Lights will be shut off during the day.

In accordance with the port authority lighting guidelines general considerations, RVYC provides the following responses as to how the guidelines general considerations are being met.

Table 1: Port Authority Lighting Guidelines General Considerations

Lighting Plan General Considerations	Lighting Plan Information to be provided to VFPA
Enough light provided to address safety and regulatory requirements.	The Coal Harbour marina is open to members 24/7 and provision of adequate lighting for membership is critical. The design of the lighting plan builds upon the existing plan (in which no complaints were registered by members), ensures that all members are provided adequate light in accordance with regulatory requirements.
Proposed Lighting must conform to applicable legislation and regulations.	The lighting conforms to the Building Code of Canada and the Illuminating Engineering Society of North America (IESNA) Lighting Handbook.
Lighting designed for safety and minimize harsh contrasts.	The lighting has been designed from a safety perspective providing members lighting along all docks and improves direct accessibility to moored vessels for boarding.
All exteriors lighting should be properly maintained.	Maintenance of the lighting is the responsibility of the Harbour Master for Coal Harbour and the RVYC Asset Manager. Annual maintenance reviews are required, and on-site security (24/7) ensures that all lighting is maintained.
<p>Lighting fixtures should be energy efficient providing minimum levels of illumination and personal safety and must consider Best Available Technology for most efficient lighting</p> <p>Preference for LED technology.</p> <p>Exterior lighting shut off during daytime hours.</p>	<p>Lighting technology utilized complies with port authority standards regarding cut off and light trespass. LED efficient lights are specified to ensure smart use of electricity on site.</p> <p>The LED technology proposed for this site review include:</p> <p>Wall mounted LED fixtures mounted on the boat sheds with integral photocell control. Low level LED lighting incorporated into the power pedestals and post top cut-off LED fixtures mounted on the dock to illuminate dock intersections. Bollard lights and post top lights will be controlled by photocells.</p> <p>Lighting is shut-off during the daytime to limit the use of electricity used.</p>
<p>Lighting must not interfere with the visibility of existing or planned navigational lighting.</p> <p>Waterfront locations must consider any navigational aids.</p>	The lighting design for the marina is focused internally within the Marina layout sited along the docks and main internal pedestrian walkway. Lighting will be based on cut-off technology to minimize glare and spill. Navigational lighting is not impacted (as lighting design is internally oriented) in relation to the navigational channel aids within Coal Harbour.
Ensure that appropriate and reasonable measures are taken to reduce the impact of lighting on adjacent tenants and residents and no projection of light into neighbouring properties is achieved.	<p>The objective of the Lighting Plan as shown is limit sky glow and glare (to avoid conflicts with aeronautical use, residencies (300 m away) and pedestrian, cycling and vehicular transits in Stanley Park.</p> <p>All lighting figures /fixtures are designed to be perpendicular to the dock.</p>
Lighting should not cause any undue glare to motorists and pedestrians and no projection of lights into neighbouring properties.	No glare impacts are expected because of the lighting do to the distance of the lighting source from various sensitive receptors (i.e., residences and those transiting Stanley Park).
Where feasible shield exterior fixtures that do no emit any light directly at any vertical and more than ninety degrees from straight down LED lights.	No vertical light will be emitted from the lighting proposed for the project except for the navigational beacons on the NW and SW corners or the new exposed dock. These navigational lights will be a red globe mounted vertically on a post.

The Lighting Plan is presented on the exhibit below.



3 CONCLUSIONS

Based on the Lighting Plan and detail presented herewith, and the responses provided to confirm that all that the general guidelines have been met in relation to the proposed expansion of the Coal Harbour Marina.