APPENDIX C
Electrical Report

CRYSTAL POOL
FACILITIES ASSESSMENT REPORT - ELECTRICAL SYSTEMS

Prepared for:

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LIMITING CONDITIONS AND SEAL

This report has been prepared for The City of Victoria on behalf of CEI Architecture Planning Interiors. It is based upon observations made during site investigations, discussions with the building operator, and review of photographs. The conclusions presented in this report represent professional opinions at Applied Engineering Solutions Ltd. in light of the terms of reference, scope of work, and any limiting conditions noted herein. Any use that a third party makes of this report, any reliance on the report, or any decisions based upon the report, are the responsibility of those third parties unless authorized in writing by Applied Engineering Solutions Ltd. Applied Engineering Solutions Ltd. accepts no responsibility for damages suffered by any unauthorized third party as a result of decisions made or actions taken based on this report.

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Table of Contents

1.0 INTRODUCTION

Applied Engineering Solutions Ltd. was retained to assess the condition of existing electrical systems and prepare an assessment report on the Crystal Pool and Fitness Centre located at 2275 Quadra Street, Victoria, BC. The purpose of the assessment is to determine whether or not the existing electrical systems conform to present codes and standards and to provide a professional opinion on the condition of existing electrical equipment.

In addition, existing available documentation on the facility and existing studies, reports and previous assessments were reviewed as part of this project. Where applicable, comments were also provided regarding previous studies and reports on the facility's existing electrical systems.

We understand that the City's benchmark for renovation projects is to achieve LEED Silver as a minimum. Assessments and recommendations for upgrades will take this information into consideration.

2.0 EXISTING ELECTRICAL SYSTEMS

2.1 POWER DISTRIBUTION

2.1.1 The main electrical room is also the termination point for the communications (PA), data and telephone systems. The current electrical code does not permit communications and other systems to be located in high voltage electrical vaults.

2.1.2 The entire distribution system has been in close proximity to and subjected to the corrosive atmosphere of the pool environment for at least 40 years. Corrosion is evident on most of the panels and motor control centres and rust, decay and complete degradation of this equipment was found in the mechanical spaces.

2.1.3 Many circuit breakers have been replaced. The delicate tripping mechanisms of these devices were never designed for prolonged exposure to corrosive atmospheres.

2.1.4 Rigid galvanized steel conduit was used and cast in place in the pool concrete slabs. No bonding conductors were pulled in these conduits and corrosion will reduce the conductivity of their bonding paths. Some of the conduits in mechanical spaces were completely rusted away at the floor line. Current code requires bonding conductors in every

conduit and that conduits be of PVC or other corrosion resistant type. Photographs of this are in section 3 of the report prepared by Emery Electrical on July 14th 2008.

2.1.5 At the time of the original installation, there was no standard for seismic restraint. The distribution equipment anchoring method will have to be brought up to current standards.

2.1.6 During our survey, the remote disconnecting means for the boilers was not found. Circuit breakers in the CDP located in the high voltage vault have been designated as emergency shutdown devices. Access to these breakers should be by qualified personnel only.

2.2 GROUNDING AND BONDING

2.2.1 The grounding and bonding system for the pool and pool deck is now 40 years old. All of the metal pool components and reinforced steel were tied together with bond wires and connectors. The continuity of the pool bonding system has now been tested and has met the requirements of the Canadian Electrical Code.

2.3 EMERGENCY LIGHTING SYSTEM

2.3.1 The emergency lighting system has a main battery bank and charger located in the main high voltage vault. Additional self contained emergency lighting units have been added throughout the complex in mechanical spaces.

2.3.2 The quantity of DC heads located in the public spaces is approximately one half the amount of heads required by today's standard.

2.3.3 Many of the DC remote heads and housings are corroded and rusting.

2.3.4 Many of the DC remote heads are poorly placed and have been partially obscured by location behind equipment or furnishings. The result is non code compliant emergency lighting at the floor level.

2.3.5 The exit signage throughout the building was replaced about nine years ago and is in good to fair condition.

2.4 LIGHTING

2.4.1 Lighting fixtures in mechanical spaces tend to corrode quickly due to the corrosive atmosphere in these spaces. The use of corrosion resistant luminaire is recommended.

2.4.2 The metal halide fixtures located over the pool are in good to fair condition. These were replaced approximately 9 years ago. Lighting levels in the aquatics area of the facility meet and exceed the required 20 foot-candles of illumination stated in the Vancouver Island Health standards for aquatic facilities.

2.4.3 The pot lights and decorative lighting is the incandescent type and are in various stages of decay and neglect.

2.4.4 We were unable to determine the number of lighting fixtures that have proper seismic restraint cables attached and the condition of the cables and crimps in the pool environment.

2.5 FIRE ALARM SYSTEM

2.5.1 The fire alarm panel is located in the high voltage vault and is original equipment. The fire alarm system and equipment is inadequate by today's standards and obsolete. The control panel has four (4) bell circuits, three (3) zones and one (1) trouble output. The battery bank and charger are mounted beside the panel. This system is obsolete and not code compliant. The system should be replaced with a complete new addressable fire alarm system. In addition, there should be one zone for each floor, one zone per stairwell, a zone for each proposed sprinkler zone. If any dry sprinkler zones are proposed, these will require a zone indication on the fire alarm system and the dry sprinkler compressor will require pressure monitoring.

2.6 FIRE ALARM PULL STATIONS

2.6.1 Fire alarm pullstations are located in stairwells and lobbies where they do not comply with current standards. Additional pull stations are required at all outside exit doors.

2.6.2 The building is not sprinklered and some rooms have no heat detectors in them. These rooms should have detectors installed. Following are the rooms observed as requiring heat detectors:

.1 The main electrical room **(Now Completed)**

.2 The small storage rooms **(Now Completed)**
.3 The stairwells

2.6.3 Some rooms that require heat detectors have them installed:

.1 Mechanical rooms have some but not enough to meet code requirements
.2 The fitness room
.3 The storage rooms adjacent to the fitness room
.4 The NW fan room

2.7 TEL / DATA AND COMMUNICATIONS

2.7.1 The Tel data and communications system is located in the main high voltage vault behind the unit substation.

2.7.2 The data cables have been suspended below the conduit racks using Velcro and Tyraps. This is common and acceptable practice.

2.7.3 None of the data cable runs have been properly fire-stopped. Fire stopping is required in many locations.

2.8 SOUND SYSTEM AND PA SYSTEM

2.8.1 The sound system rack is located in the high voltage vault on the north side of the unit substation. This system is old, obsolete and in poor condition. Furthermore, this system should be installed in another room since access and work in the main electrical room should only be performed by a qualified F-SRA electrician. It is likely that work on the sound system is not performed by a person qualified to be in the main electrical room.

3.0 CONCLUSIONS

3.1. Any renovation of the building electrical system would require the relocation of the other systems such as the sound system and data voice patch panels and switches to an area outside of the high voltage electrical room. The high voltage electrical room should only be accessed by a qualified electrician.

3.2. With regards to the corrosive atmosphere for the equipment in the mechanical spaces, this problem would require the relocation of panels and starters to dry pressurized rooms outside of the mechanical spaces.

3.3. Some panels require relocation to a dry space and all six (6) motor control centres should be replaced.

3.4 Remediation would require removal of existing conductors (usually rusted in place) and re-pulling new circuit conductors complete with bond wire in each conduit in the slab. Some circuits could be restored using surface conduits or tech cables.

3.5 Anchoring of equipment for seismic restraint would be expensive because concrete slabs were not thickened or reinforced to today's standards.

3.6 Remote tripping for breakers and a remote trip for the boilers should be located at an exterior exit or the fire alarm annunciator.

3.7 All electrical and mechanical spaces need to be firestopped to today's standards. Firestopping would also reduce the transfer of corrosive gasses from one space to another.

3.8 The entire pool bonding system needs to be checked and tested regularly for resistance and continuity.

3.9 The emergency lighting system needs to be upgraded and its capacity increased to meet the quantity of additional DC heads required.

3.10 Existing DC heads and housings need to be replaced.

3.11 Additional DC heads are required in mechanical spaces and areas where existing heads are obscured by equipment or location.

3.12 T12 fluorescent lamp type fixtures need to be upgraded to energy efficient T5 and T8 models in various locations inside the facility.

3.13 Metal halide fixtures over the pool can be cleaned and re-lamped. Seismic restraints should be checked at each re-lamping.

3.14 Pot lights should be replaced with energy efficient LED units.

3.15 All T-Bar mounted fixtures should be checked for proper seismic restraints.

3.16 The fire alarm panel needs to be upgraded to meet current standards. This requires a new fire alarm control panel, a new remote annunciator panel, a replacement of all existing heat and smoke detectors and pull stations, and the addition of smoke detectors in the stairwells. The location of pull stations at stairwells also need to be changed. The existing system does not have the required number of conductors to permit reuse, therefore, a complete new wiring system is required.

3.17 If the building remains un-sprinklered the quantity and location of heat detectors needs to be increased.

3.18 The quantity of pullstations needs to be increased and some existing pull stations need to be relocated.

3.19 The Tel data and communications systems need to be relocated outside the high voltage vault area to meet current code requirements.

3.20 The data cables need to be suspended independently by trays conduits or J-hooks.

3.21 All data cables entering or leaving the electrical room need to be properly fire stopped.

3.22 The sound system rack needs to be relocated outside the high voltage vault area to meet current code requirements.

End of Report

APPENDIX A