August 28 2013

REQUEST FOR QUOTATION (RFQ) PACKAGE NO.2

SCOPES OF WORK AVAILABLE FOR QUOTATION VIA BC BID/ CITY OF SURREY

ADDENDUM NO.6

Closing date remains as previously established and

Quotation is to be submitted by: August 29, 2013 at 2:00:00 pm (PST)

Project:	Grandview Heights Aquatic Centre (EllisDon Project #7364) 16855-24th Avenue, Surrey, BC
Owner:	City of Surrey
Architect:	Hughes Condon Marler Architects
Construction Manager:	EllisDon Corporation **#**150-13775 Commerce Parkway Richmond, BC V6V 2V4

Description: This Addendum No.6 consists of the following revisions/ clarifications:

- Response to RFI #7

RFQ Documents consist of the subject Addendum No. 6, all previously issued Addenda, RFQ Instructions, Drawings, Specifications and other related documents. To access the RFQ Documents go to www.ellisdon.plansource.ca and enter your login and password. If you don't have a login and password click on the "Sign Up Here" link and enter your information. Once you have logged in enter the following project key **FUNQEMQQ** in the registration box and a blue Project Authorization link will appear on the left hand side of the main page. For Technical Service call 1-866-294-6557

NOTE:

This Addendum is to be read in conjunction with all previously issued RFQ Documents and forms an integral part of the RFQ Documents for the above-referenced project. Please acknowledge receipt of this Addendum in the appropriate space in the RFQ Form.

Please direct specific questions about the RFQ or Addendum to Shailesh Balachandran, Pre-Construction Manager by Email: sbalachandran@ellisdon.com

Request for Quotation (RFQ) Package No.2
Request For Information #7

Request for Information (RFI) # 7	
Date:	August 27, 2013
	Response August 28, 2013
To:	Eyad Ali (TCSL), Melissa Higgs (HCMA), Dare Peklenik (TCSL)
To:	
Cc:	Aiden Callison (HCMA), Shailesh Balachandran(ED),
Cc:	

	Questions
1	Please confirm who is responsible for the solid plastic benches in the millwork scope of work?
2	Please confirm who is responsible for the solid surface surrounds on the center locker/bench units in the universal change room? (see 2/A5.18)
3	In RFI #6, Rev 1, Response #9, Is the 400 kN reaction per side or total?
4	LEED requires a minimum of 50% of the wood based material to be FSC certified in order to realize the credit. Is a minimum of 50% FSC material in the glulam acceptable?
5	In architectural spec section 06 40 00 "Architectural Woodwork", paragraph 1.1.I, it reads, "Provide alternate price for inclusion of one (1) year AWMAC Guarantee Certificate in lieu of two (2) years." Please confirm this requirement is to be deleted as AWMAC offers a two year warranty only, per AWMAC rules.
6	Additional information is required for Silva Cell install. Please supply a topographical plan of the location of the decks, as well as section details relative to the two sizes of tree grates.
7	We require the factored tension force for the splice connection at location detail B, sheet S4.12
7	We require the factored tension force for the splice connection at location detail B, sheet S4.12
8	There are concerns over the 2 coat polyurethane producing toxic emissions in the plant. Please confirm if one-coat is acceptable or provide an alternate system that would be acceptable.
9	In the hardware spec for openings 142 & 143 there is a note of a custom wood pull but no mention of any specification. Please clarify what type of pull is required.
10	The door schedule is in a mix of soft and hard metric i.e. 915mm X 2150 can you please clarify what the job will be done in , either soft (915 X 2135) or Hard metric (900 X 2150)
11	The following openings are missing required information for pricing: 024 - is on the floor plan but has no hardware group in the hardware index 035 - in not labeled on the plans , however there is a door in that area with no door number (please confirm) 101F - This opening is on the Door schedule but not on the plans or the hardware index (do I need to account for this door or delete from project) 101G – This opening is on the Door schedule but not on the plans or the hardware index (do I need to account for this door or delete from project) 220A – This opening is on the Door schedule but not on the plans or the hardware index (do I need to account for this door or delete from project) 040 – is on the floor plan but has no hardware group in the hardware index 040B – is on the hardware index schedule but not on the door schedule or the plans 043 – is on the hardware index schedule but not on the door schedule or the plans 101A – is on the hardware index schedule but not on the door schedule or the plans 101E – is on the door schedule but not on the floor plans or in the hardware Index, no information in the door schedule either. 101H – is on the floor plan but has no hardware group in the hardware index and no information in the door schedule

	120 - shows a single leaf on the floor plans . shows as a pair of doors on the door schedule. please clarify if single or pair of doors. 138 – not labeled on plans but there is a door un marked in the area 152 – not on hardware index 152A – not on door schedule or plans but is on hardware index , may have been mislabeled and should be for door 152 220 - not on door schedule or plans but is on hardware index , may have been mislabeled and should be for door 220A 220A – not on hardware index R – is on the hardware index schedule but not on the door schedule or the plans.
12	There is a mention of the requirement for G-90 material in certain frames in the specification section , but there is no clarification as to which frames and or doors would fall under this requirement, please clarify.
13	Please confirm all windows on the project are aluminum and PSF window frames are not included.
14	Pool drawings shows Base slab as foundation, structural shows strip footings.
15	The foundation plans do not have elevation tag for the underside of the footings. Please confirm they are to be -450mm from floor elevation.
16	Corner Guards are not indicated on the floor plan A2.10A-A2.12B. as specified Section 10 99 00, 2.2 A. Please confirm intent.
17	Please confirm if the supports for the waterslide are to be from the floor or suspended from the ceiling?
18	Please confirm if the supports are to be painted, or left as galvanized steel finish?
19	Per conversation with EllisDon – provide clarification on the hybrid metal lockers
20	Per conversation with EllisDon – provide Commissioning requirements for Electrical scope
21	Per conversation with EllisDon - revisions are required to extent of sod and hyrdoseed as described in Landscape Addendum No. 2 issued via Addendum No. 3

	Response
1	Response to be provided by EllisDon EllisDon response: To be provided by Arch Woodwork/ Millwork trade contractor
2	Response to be provided by EllisDon EllisDon response: To be provided by Arch Woodwork/ Millwork trade contractor
3	400 kN is total for each pair of glulams (200 kN per glulam).
4	Given that there are other FSC wood products being used on the project, it is up to the contractor to ensure at least 50% of the total wood cost is FSC certified in order to achieve the LEED credit. Also contractor must be aware of the different FSC categories and if a product is FSC Mix (xx%) with a percent value, only the percent listed can be claimed as FSC, not the entire wood cost on the invoice.
5	Revise 06 40 00 Architectural Woodwork Item 1.1.I to read as follows: Provide alternate price for deletion of two (2) year AWMAC Guarantee Certificate.
6	-
7	Same forces as in Item 3.
8	Revise Section 09 90 00 Painting and Coating Item 2.3.K as follows: Delete “polyurethane” and replace with “Napier Biowash Supernatural.” Add “touch-ups to be made on site as required” after “environment.”
9	Intention would be to replace the typical off-set pull handle used at glazed aluminum doors with a wooden pull. As these doors are located at the sauna and steam rooms, the use of wood is to prevent users burning their hands on an aluminum handle. Trade to include for a handle that meets this intent, to be reviewed by

	Consultant.
10	Doors are to be sized using soft metric (e.g. 915x2135) with the exception of: • Doors in curtain walls • Doors where openings require site measurement (e.g. sliding glass doors) • Doors that are coordinated within established design datums and/or modules, as follows: Doors 131, 132, 133, 134, 136 (Solid Core Wood doors in aluminum frame), Doors 160 and 161, Doors 210 and 211. Revise door heights as follows: 137 Door height to be reduced to 2135mm S3-1 Door height to be reduced to 2135mm 213 Height to be reduced to 2135mm
11	024 – To be hardware group #13 (same as door 023) 035 – Is to be included and is located on the west wall of the room Vestibule 035 101F – Do not account for this door as it is a toilet partition 101G – Do not account for this door as it is a toilet partition 040 – Hardware group to be #20 040B – Has been changed to door 040A. Revise hardware schedule to replace door 040B with 040A 043 – Has been revised in the project to door 040. Revise hardware schedule to replace door 043 with 040 101 - Revise hardware group to #25 101A – Has been deleted from the plans. Delete reference to door 101A from hardware schedule 101B - Revise hardware group to #22 101C - Revise hardware group to #26 101E – Delete from door schedule. This is a gate and is indicated on millwork drawings A8.01 and A8.02 with hardware requirements as noted on drawings. 101H – Revise hardware group to #24 120 – Clarification that it is double door as per door schedule and A2.51 Enlarged Plans – Changerooms 138 - Is to be included and is the unmarked door on the south wall of Pool Control& Wet Office Room 138. 152 – Included as per door schedule. Hardware group to be #41 152A – Door deleted. Delete reference to door in hardware schedule. 220A – Replace door number 220A with 220. Hardware group for door 220 to be #67 as per hardware schedule. R – Delete reference to door R in the hardware schedule.
12	The requirement for G-90 per the specification applies to any doors that are located in Rooms identified as “Wet Areas” or “High Impact Areas” in the Room Finish Schedule - Column Finish Notes, as revised in RFI 3 Item 9.
13	All windows are aluminum.
14	Pool Perimeter walls are supported on strip footings, Pool base is on slab on grade.
15	7,8/S3.01 show the footings with a 150 gap between the underside of the SOG and the top of footing, for F1 footings in the typical basement this would give 525mm to underside of footing from T/O concrete floor. Depth will vary with footing type/grade/floor elevation/soil conditions.
16	No corner guards required.
17	Supports are from the floor as indicated on architectural drawings 1, 3/A5.10, 1/A7.55 and structural drawings S2.01 and S2.11.

18	Finish is to be as indicated in Section 09 90 00 Item 2.3.E
19	Revise Specification Section 10 51 00 Lockers Item 2.8 A Materials Item 1 to read: 1. Sides, backs and tops: 24 gauge galvanneal steel. Shelves and bottoms to be stainless steel, flanged on all sides and fastened to the locker back and side panels with tamperproof fasteners. Revise Item 4 to read: 4. Venting: Ventilation provided by flanged and ventilated locker back Delete Item 2.9 Accessories Item C Revise Item 2.9 D to read: D. Hinges to be stainless steel, self closing spring loaded hinges. Hinge pins to be non-removable. Minimum 2 hinges per door, three hinges per full height door. **Note by EllisDon**: Lockers will be tendered directly by City of Surrey. Successful contractor will be assigned to EllisDon. EllisDon's RFQ #2 package does **not** seek stipulated sum prices for the supply & install of Lockers.
20	Add attached Specification Section 26 00 10 Common Work Results – Electrical to electrical specifications.
21	Grass area to the east of the building and south of the parking lot is to be changed from “Hydroseeded Grass” to “Sodded Lawn” Carry a strip of sodded lawn 5 metres wide instead of hydroseeded grass along the entrance drive from 25th Avenue up to the sodded grass area north of the plaza

PART 1 GENERAL

1.1 DESCRIPTION

.1 The purpose of this section is to specify Division 26 responsibilities in the commissioning process

.2 An independent firm (CES Engineering Ltd) specializing in building systems commissioning type of work has been retained by the Owner to act as the project Commissioning Authority (CA). This firm will be responsible to manage and administer the commissioning process on this project.

.3 The systems to be commissioned are listed in Section 01 91 13, Part 1.7.

.4 Commissioning requires the participation of Division 26 to ensure that all systems are operating in a manner consistent with the Contract Documents. The general commissioning requirements and coordination are detailed in Section 01 91 13: Commissioning – General Requirements. Division 26 shall be familiar with all parts of Section 01 91 13, Section 01 91 14: Commissioning Plan, and Section 01 91 15: Commissioning – Training, and shall execute all commissioning responsibilities assigned to them in the Contract Documents.

1.2 RESPONSIBILITIES

.1 Electrical Contractor: The commissioning responsibilities applicable to the electrical contractor are as follows (all references apply to commissioned equipment only):

.1 Construction and Acceptance Phases

.1 Include the cost of participating in the commissioning process as outlined in the specifications in the total contract price.

.2 In each purchase order or subcontract written, include requirements for submittal data, O&M data and training.

.3 Attend a commissioning scoping meeting and other necessary meetings scheduled by the CA to facilitate the Cx process.

.4 Contractors shall provide normal cut sheets and shop drawing submittals to the CA of commissioned equipment.

.5 Provide additional requested documentation, prior to normal O&M manual submittals, to the CA for development of start-up and functional testing procedures:

.1 Typically this will include detailed manufacturer installation and start-up, operating, troubleshooting and maintenance procedures, full details of any owner-contracted tests, fan and pump curves, full factory testing reports, if any, and full warranty information, including all responsibilities of the Owner to keep the warranty in force clearly identified. In addition, the installation and checkout materials that are actually shipped inside the equipment and the actual field checkout sheet forms to be used by the factory or field technicians shall be submitted to the Commissioning Authority.

.2 The Commissioning Authority may request further documentation necessary for the commissioning process.

.3 This data request may be made prior to normal submittals.

.6 Provide a copy of the O&M manuals submittals of commissioned equipment, through normal channels, to the CA for review and approval.

.7 Contractors shall assist (along with the design consultants) in clarifying the operation and control of commissioned equipment in areas where the specifications, control drawings or equipment documentation is not sufficient for writing detailed testing procedures.

.8 Provide limited assistance to the CA in preparing the specific functional performance test procedures as specified in Section 01 91 13 and in this section. Subs shall review test procedures to ensure feasibility, safety and equipment protection and provide necessary written alarm limits to be used during the tests.

.9 Develop a full start-up and initial checkout plan using manufacturer's start-up procedures and the prefunctional checklists from the CA for all commissioned equipment. Submit to CA for review and approval prior to startup. Refer to Section 01 91 13 and this section for further details on start-up plan preparation.

.10 During the startup and initial checkout process, execute and document the electrical-related portions of the pre-functional checklists provided by the CA for all commissioned equipment.

.11 Perform and clearly document all completed startup and system operational checkout procedures, providing a copy to the CA.

.12 Address current A/E punch list items before functional testing.

.13 Provide skilled technicians to execute starting of equipment and to execute the functional performance tests. Ensure that they are available and present during the agreed upon schedules and for sufficient duration to complete the necessary tests, adjustments and problem-solving.

.14 Perform functional performance testing under the direction of the CA for specified equipment in Section 01 91 13. Assist the CA in interpreting the monitoring data, as necessary.

.15 Correct deficiencies (differences between specified and observed performance) as interpreted by the CA, GC and A/E and retest the equipment.

.16 Prepare O&M manuals according to the Contract Documents, including clarifying and updating the original sequences of operation to as-built conditions.

.17 During construction, maintain as-built red-line drawings for all drawings and final CAD as-builts for contractor-generated coordination drawings. Update after completion of commissioning (excluding deferred testing).

.18 Provide training of the Owner's operating personnel as specified.

.19 Coordinate with equipment manufacturers to determine specific requirements to maintain the validity of the warranty.

.2 Warranty Period

.1 Execute seasonal or deferred functional performance testing, witnessed by the CA, according to the specifications.

.2 Correct deficiencies and make necessary adjustments to O&M manuals and as-built drawings for applicable issues identified in any seasonal testing.

.2 Electrical Consultant

.1 Refer to Section 01 91 13 for the responsibilities of the Electrical Consultant.

1.3 RELATED WORK

.1 Refer to Section 01 91 13, Part 1.4 for a listing of all sections where commissioning requirements are found.

.2 Refer to Section 01 91 13 Part 1.7 for systems to be commissioned and Section 01 91 13 Part 3.6 for functional testing requirements

PART 2 PRODUCTS

2.1 TEST EQUIPMENT

.1 Division 26 shall provide all test equipment necessary to fulfill the testing requirements of this Division.

.2 Refer to Section 01 91 13 Part 2.1 for additional Division 26 requirements

PART 3 EXECUTION

3.1 SUBMITTALS

.1 Division 26 shall provide submittal documentation relative to commissioning as required in this Section Part 1, Section 01 33 00, Section 01 91 13 and 01 91 14.

3.2 STARTUP, PREFUNCTIONAL CHECKLISTS AND INITIAL CHECKOUT

.1 The electrical contractors shall follow the start-up and initial checkout procedures listed in the Responsibilities list in this section and in 01 91 13 and 01 91 14. Division 26 has start-up responsibility and is required to complete systems and sub-systems so they are fully functional, meeting the design objectives of the Contract Documents. The commissioning procedures and functional testing do not relieve or lessen this responsibility or shift that responsibility partially to the commissioning authority or Owner.

.2 Functional testing is intended to begin upon completion of a system. Functional testing may proceed prior to the completion of systems or sub-systems at the discretion of the CA and GC. Beginning system testing before full completion does not relieve the Contractor from fully completing the system, including all prefunctional checklists as soon as possible.

.3 Phase 1 - System and Equipment Readiness

.1 Before starting up any systems or equipment, provide written verification stating that the specific system or item of equipment is ready for starting and the following conditions have been met.

.2 Copies of all tests and certificates have been submitted to the Consultant and/or CA.

.3 All safety controls have been installed, wired, dry tested, and are fully operational.

.4 The permanent electrical wiring connections have been made to all equipment and that power is available.

.5 Qualified operating personnel are available and ready to operate the plant.

.6 All systems have been checked and are physically complete and ready to operate, including all wiring and controls.

.7 Check that proper overload protection has been provided for all motors, controls, and control circuits.

.8 All equipment lubrication and pre-start checks have been carried out.

.9 All control and alarm functions have been checked and are operational.

.10 Any self diagnostic packaged control systems have been checked and are operational.

.11 All startup verification checks by manufacturers representatives for switchgear, transformers, sub-meters, etc., have been carried out.

.12 All deficiencies shall be recorded and reviewed by the commissioning team, and shall be corrected and verified prior to proceeding to the next commissioning phase.

.4 Phase 2 - System Activation, Testing and Balancing: This phase shall include, but not necessarily be limited to the following:

.1 Activation of all systems, sub-systems, and equipment.

.2 Check out operation of all equipment and machinery. Check rotational direction of all moving equipment.

.3 Check for any abnormal equipment vibration and noise. Determine cause and rectify.

.4 Set up and calibrate all controls, instruments, and operators. Place controls systems in operation. Check out sequence of operation step by step.

.5 Testing and adjusting of all systems and equipment.

.6 Testing and adjusting of all controls, control equipment, alarms, interlocks, etc.

.7 Adjust vibration isolators and seismic restraints as required.

.8 Verification of water tightness of all roof and exterior wall penetrations.

.9 Testing and verification of fire alarm systems.

.10 Complete all system identification, labels, nameplates, pipe identification, colour coding, flow arrows, sprinkler signs, hydraulic data plates, etc.

.11 All deficiencies shall be recorded and reviewed by the commissioning team, and shall be corrected and verified prior to proceeding further.

.12 If, in the opinion of the Consultant and/or CA, field operations and testing indicates that any item of equipment or machinery does not meet the specifications, the Owner may request that testing of the equipment in question be carried out by an independent testing laboratory or testing agency. In the event that the tested equipment or machinery proves to meet the specification, the Owner shall pay for the independent lab testing. If the equipment or machinery does not meet the specification the Contractor will be responsible to pay the costs of all testing and the costs of all alterations to the equipment or machinery to bring it up to specifications, any subsequent testing, or the complete cost of replacing the equipment or machinery with new equipment or machinery that meets the specifications.

.13 Recheck operation and calibration of all controls, instruments, and operators. Recalibrate as required. All controls shall be fine tuned for accurate response, precise sequencing, and smooth operation.

.14 All set points and schedules shall be reviewed and adjusted as required.

.15 System operations in the fire mode shall be tested in the presence of the authorities having jurisdiction. Obtain a written statement/certificate of approval of all operations.

.16 System operations in the emergency power mode shall be tested in coordination with Division(s) 20 - 25. Obtain a written statement/certificate of approval of all operations.

.5 When all the above is complete the Functional Performance testing phase can proceed.

3.3 FUNCTIONAL PERFORMANCE TESTING

.1 Refer to Section 01 91 13 Part 1.7 for a list of systems to be commissioned and to Part 3.6 for a description of the functional performance test process.

.2 The functional performance testing phase shall not commence until the commissioning process START-UP, PREFUNCTIONAL CHECKLISTS AND INITIAL CHECKOUT - Phase 2 – System Activation, Testing and Balancing is complete.

.3 The functional performance process shall include, but not be limited to, the following:

.1 Insulation resistance of all systems in accordance with codes or as specified for a particular system

.2 Voltage readings (each phase) for each piece of equipment (motors, transformers, etc.) when operating at full load

.3 Current readings (each phase) for each piece of equipment (motors, transformers, etc.) when it is operating at full load

.4 Current readings for each feeder under normal load to determine system balance

.5 Operational test to prove the proper operation of controls and interlocks.

.6 Ground resistance test (neutral connected and neutral not connected)

.7 Systems operation tests as described herein

.8 Lighting Measurement Verification

.9 Lighting Control Systems

.10 Building Distribution System

.1 Prior to energizing any portion of the electrical system perform Megger tests on all feeders. Results to conform to the Canadian Electrical Code, to the satisfaction of the Local Inspection Authority having jurisdiction, and to the Consultant.

.2 Upon substantial performance, and again immediately prior to final review, check the load balance on all feeders at distribution centres, motor control centres and panel boards. Tests to be performed by turning on all possible loads in the project and checking load current balance. If bload unbalance exceeds 15% reconnect circuits to balance load.

.3 Make voltage checks throughout the project after the project has been in operation for 30 days, and at this time, if directed by the Consultant, adjust transformer tap settings. Readings taken shall be logged, tabulated and any adjustments made to building system shall be suitably incorporated in the Operation and Maintenance manuals.

.4 All protective devices to be tested and calibrated on site proper to energizing. Ensure proper operation as calculated on coordination studies provided by equipment suppliers. Testing and calibration to consist of verification of published curves and setting of devices at specified settings. Complete report to be submitted to the Consultant within 7 days of completion of testing.

.11 Low Voltage Switchgear and Motor Controls (600 volts and below):

.1 Phasing continuity, identification test of bussing per latest provided manufacturer's as-built drawings

.2 Mechannical torque test of all bus and cable terminations to recommended manufacturer's levels.

.3 Insultation resistance test-phase to phase and phase to ground using appropriate DC test level for voltage level of equipment.

.4 Contact resistance test: using 100 amp contact resistance tester,

.5 Commissioning of all breaker units per manufacturer's installation and maintenance instructions provided including full mechanical/electrical operation inspection and tests.

.6 Metering: calibration function test all meters installed in switch/gear. (Revenue metering by special permission only.)

.12 Power Factor Readings:

.1 Division 26 to allow for certified power factor readings in base tender amount. Readings to be taken after the complex is fully occupied and operational for 60 days.

.2 Power factor shall be recorded at the following locations:

.1 Main Distribution Centres

.2 Motor Controls Centres

3.4 TESTING DOCUMENTATION, NON-CONFORMANCE AND APPROVALS

.1 Refer to Section 01 91 13, Part 3.7 for specific details on non-conformance issues relating to pre-functional checklists and tests.

.2 Refer to Section 01 91 13, Part 3.9 for issues relating to functional performance tests.

3.5 OPERATIONS AND MAINTENANCE (O&M) MANUALS

.1 The following O&M manual requirements are general do not replace O&M manual documentation requirements elsewhere in these specifications.

.2 Division 26 shall compile and prepare documentation for all equipment and systems covered in Division 26 and deliver this documentation to the CM for inclusion in the O&M manuals, according to this section and Section 26 05 00, prior to the training of owner personnel.

.3 Review of the commissioning related sections of the O&M manuals shall be made by the A/E and by the CA. Refer to Section 01 91 13, Part 3.8 for details.

3.6 TRAINING OF OWNER PERSONNEL

.1 Demonstration and Instructions shall not proceed until the FUNCTIONAL PERFORMANCE TESTING Phase is complete and accepted.

.2 Detail information regarding contents, duration and instructors for any particular building system is included in Section 01 91 15: Commissioning –Training

.3 The Training Plans are produced conjointly by the Consultant and the Commissioning Authority to meet project-specific requirements and they include details provided by the Facility Property Manager relating to numbers and prerequisite qualifications and skills of trainees, type of training (i.e. observation, hands-on, classroom), etc

.4 The CA coordinates and schedules, with the GC, the overall training for the commissioned systems. The CA develops criteria for determining that the training was satisfactorily completed, including attending some of the training, etc. The CA recommends approval of the training to the GC using a standard form. The PM also signs the approval form.

.5 The Training Plans are included in Specification Section 01 91 15 – Commissioning – Training and Section 01 91 14 - Commissioning Plan.

.6 Electrical Contractor. The electrical contractor shall have the following training responsibilities:

.1 Provide the CA with a training plan two weeks before the planned training according to the outline described in Section 01 91 13, Part 3.9.

.2 Provide designated Owner personnel with comprehensive training in the understanding of the systems and the operation and maintenance of each major piece of commissioned electrical equipment or system.

.3 Training shall start with classroom sessions, if necessary, followed by hands on training on each piece of equipment, which shall illustrate the various modes of operation, including startup, shutdown, fire/smoke alarm, power failure, etc.

.4 During any demonstration, should the system fail to perform in accordance with the requirements of the O&M manual or sequence of operations, the system will be repaired or adjusted as necessary and the demonstration repeated.

.5 The appropriate trade or manufacturer's representative shall provide the instructions on each major piece of equipment. This person may be the start-up technician for the piece of equipment, the installing contractor or manufacturer's representative. Practical building operating expertise as well as in-depth knowledge of all modes of operation of the specific piece of equipment are required. More than one party may be required to execute the training.

.6 The training sessions shall follow the format outlined in Section 01 91 15 and illustrate whenever possible the use of the O&M manuals for reference.

.7 Hands-on training shall include start-up, operation in all modes possible, including manual, shut-down and any emergency procedures and maintenance of all pieces of equipment.

.8 The electrical contractor shall fully explain and demonstrate the operation, function and overrides of any local packaged controls, not controlled by the central control system.

.9 Training shall occur after functional testing is complete, unless approved otherwise by the Project Manager.

.7 Duration of Training. The electrical contractor shall provide training on each piece of equipment according to the schedule listed in Section 01 91 15.

3.7 DEFERRED TESTING, POST SUBSTANTIAL PERFORMANCE SITE INSPECTIONS AND TESTING

.1 Refer to Section 01 91 13, Part 3.13 and 01 91 14 Part 7.10 for requirements of deferred testing.

.2 The Commissioning Authority and the Contractor shall allow for at least 2 separate 4 hour visits to the site for general trouble shooting and overseeing the operation and maintenance of all systems and equipment during the first full year warranty period following the final Commissioning and Substantial Performance Certificate being issued.

.3 These site meetings are over and above normal trouble and warranty call backs.

.4 These site visits shall be coordinated with post-occupancy review performed by the LEED Commissioning Authority.

.5 The purpose of these site visits is to investigate and troubleshoot the system operations and any problems and to ensure that all systems and equipment are being properly operated and maintained.

.6 The Commissioning Authority shall be responsible for notification to all relevant contractors and/or suppliers who would be involved in the adjustment, repair, or replacement of any part of a system under warranty.

.7 Following completion of any repair, replacement, adjustment, or other remedial work the Commissioning Authority shall visit the site, inspect the work and operations of the systems, and ensure that the work is complete and any problems are resolved.

.8 Following each visit to the site, the Commissioning Authority shall submit a detailed report to the Owner, LEED Commissioning Authority and the Consultant outlining his findings at the site, any problems encountered with the operation and maintenance of all systems, and any repair work or correctional action taken and the outcome of same.

3.8 WRITTEN WORK PRODUCTS

.1 Written work products of Contractors will consist of the start-up and initial checkout plan described in Section 01 91 13 and the filled out start-up, initial checkout and pre-functional checklists.

END OF SECTION