San Bernardino Community College District

ADDENDUM NO. 1

CRAFTON HILLS COLLEGE
EXTERIOR LIGHTING IMPROVEMENTS
NIB # CC02-3626.01
Project No. CC02-3626-01

SAN BERNARDINO COMMUNITY COLLEGE DISTRICT
550 E. Hospitality Lane, Suite 200
San Bernardino, CA 92408

NOTICE TO BIDDERS
This Addendum forms a part of the Contract and modifies the original documents dated July 4, 2020. It is intended that all work affected by the following modifications shall conform to the related provisions and general conditions of the contract of the original drawings and specifications. Modify the following items wherever appearing in any drawing or sections of the specifications. Acknowledge receipt of Addendum No. 1 in the space provided on the Bid Proposal Form. Failure to do so may subject bidder to disqualification.

1. CHANGES TO THE PROJECT MANUAL

SECTION 26 08 00 - COMMISSIONING REQUIREMENTS

PART 1 – GENERAL

1.1 **SUMMARY**

A. This section includes requirements that apply to the implementation of commissioning for lighting and lighting controls.

B. A Commissioning Agent/Provider/Specialist appointed by the Owner's Representative will manage the commissioning process. The Contractor is responsible to provide representatives for reference systems to support the commissioning agent.

C. The commissioning activities have been developed to verify that the building systems to be commissioned meet the owner's requirements, and to support the owner in meeting the guidelines for the following:

1. 2019 California Building Standards Code, Title 24, Part 6, Energy Code sections 120.8(a) through (i) compliance.
2. 2019 California Building Standards Code, Title 24, Part 11, Green Building Standards sections 5.410.2 through 5.410.2.6 compliance.

D. Related Documents:

1. Owner's Project Requirements by reference for information only.
2. Basis of Design by reference for information only.
3. Commissioning Plan.

1.2 DEFINITIONS AND ABBREVIATIONS

A. Basis of Design (BOD) – document that records concepts, calculations, decisions, and product selections used to meet the OPR and to satisfy applicable regulatory requirements, standards, and guidelines. The document includes both narrative descriptions and lists of individual items that support the design. The BOD should cover all systems to be commissioned.

B. Commissioning Issues Log (CIL) – formal and ongoing record of problems or concerns discovered during the course of the Cx process and their resolution.

C. California Energy Commission (CEC) – California's primary energy policy and planning agency, committed to reducing energy costs and environmental impacts of energy use while ensuring a safe, resilient, and reliable supply of energy.

D. Commissioning (Cx) – the process of verifying and documenting that a building and its systems and assemblies are planned, designed, installed, tested, and can be operated and maintained to meet the owner's project requirements and contract documents.

E. CxA – Qualified Commissioning Authority, Specialist, Agent, or Coordinator overseeing the commissioning activities.

F. Owner's Project Requirements (OPR) – document that details the functional requirements of a project and the expectations of how it will be used and operated. These include project goals, measurable performance criteria, cost considerations, benchmarks, success criteria, and supporting information.

G. O&M – Operations and Maintenance

H. Systems, subsystems, equipment, and components: where these terms are used together or separately, they shall mean “as-built” systems, subsystems, equipment, and components.

1.3 SYSTEMS TO BE COMMISSIONED:

A. Commissioning of the lighting and lighting control systems specified in Division 26 is part of the construction process. Documentation and testing of these systems, as well as training of the Owner’s Operation and Maintenance personnel is required in cooperation with the Owner and the Owner’s Commissioning Agent.

B. Sampling: It shall be assumed that there will be no sampling. If the CxA or Owner deem sampling acceptable, the CxA will select the specific equipment or system to be tested.

1.4 COMMISSIONING TEAM

A. The commissioning team shall consist of, but not be limited to, commissioning authority, owner’s representative, design team, contractor, representing subcontractors, and acceptance technicians.

B. Members Appointed by the Owner:

1. Independent commissioning firm that is certified in commissioning.

C. Members Appointed by the Contractor:

1. Systems to be commissioned sub-contractors and/or vendor representatives with expertise and authority to act on the contractor’s behalf in respective systems to perform commissioning process activities.

2. Certified Lighting Acceptance Test Technician to verify and certify lighting systems compliance with California Building Code, Title-24, Part 6.

1.5 CONTRACTOR’S RESPONSIBILITIES

A. The Contractor and subcontractors shall comply with all the Commissioning requirements.
B. Coordinate representatives with expertise and authority to act on their behalf to participate in and perform commissioning process activities.
C. Provide the CxA with overall and look-ahead construction schedules.

D. Integrate all commissioning activities and milestones into the project schedules.
E. Provide documents listed in the submittal section to the CxA for review concurrently with the Design Team.
F. Complete the Pre-functional Checklists provided by the CxA for each piece of equipment to be commissioned.
G. Provide completed California non-residential certificate of compliance installation and acceptance forms (NRCI and NRCA, respectively).
H. Develop and conduct the systems O&M training program/plan for the maintenance staff and other appropriate parties.
I. Compile the Systems Manual and distribute to the CxA for review.
J. Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, recommend corrective action.
K. Cooperate with the CxA for resolution of issues recorded in the Issues Log.
L. Complete commissioning process test procedures under direction of the CxA.
M. Provide all calibrated instruments and tools necessary to fulfill the commissioning testing requirements.
N. The commissioning process does not take away from or reduce the responsibility of the Contractor to provide a finished and fully functional product.

1.6 COMMISSIONING AUTHORITY RESPONSIBILITIES

A. Organize and lead the commissioning team.
B. Provide commissioning plan(s) and report(s).
C. Review and comment on design and construction submittals.
D. Convene commissioning team meetings.
E. Provide documents listed in the submittal section for Cx Team review and reference.
F. Review the completed Prefunctional Checklists provided by the Contractor.
G. Witness and document functional performance tests.
H. Prepare and maintain the Cx Issues Log.

1.7 SUBMITTALS

A. Contractor

1. Construction overall and look-ahead schedules
2. Equipment Submittals for systems to be commissioned
3. DALT Plan and Report (if applicable)
4. Completed Pre-functional Checklists
5. California certificate of compliance installation forms (NRCI)

6. Startup Reports (contractor's with certifications and/or manufacturer's)
7. California certificate of compliance acceptance forms (NRCA)
8. Control System Shop Drawings
9. Control System Point-to-Point Checks
10. Control System Trend Data Log Reports
11. Commissioning Issues Log Responses/Actions
12. Systems Manual for Equipment to be Commissioned
13. Training Plan and Attendees Sheet

B. Commissioning Authority

1. Commissioning Plan(s)
2. Design and Construction Submittal Review Comments
3. Pre-functional Checklists (PFC)
4. Functional Performance Tests (FPT)
5. Commissioning Issues Log
6. Commissioning Report
7. Deferred Testing Commissioning Report Addendum

1.8 NONRESIDENTIAL CERTIFICATE OF INSTALLATION AND ACCEPTANCE

A. In compliance with the California Building Energy Code, before an occupancy permit is granted the nonresidential certificates indicated on the Title-24 sheets of the design plans shall be completed. Applicable forms shall be completed and signed by the Contractor or responsible subcontractor. Completed forms shall be readily available onsite for the enforcing agency and provided to the CxA. Most recent forms can be downloaded from the California Energy Commission website https://energycodeace.com/nonresidentialforms

1.9 SYSTEMS MANUAL

A. A document focusing on the operation of systems to be commissioned that provides information needed to understand, operate, and maintain the equipment and systems to be commissioned. The Systems Manual is in addition to the record construction drawings, documents, and the O&M Manuals supplied by the Contractor. At a minimum the System Manual shall include:

1. Executive summary, OPR, BOD, and Cx Report
2. Site information, facility description, project history, current requirements, and contacts.

3. Description of major building systems to be commissioned.
4. Site equipment inventory and maintenance notes.
5. Basic O&M documentation, including general site operating procedures, basic troubleshooting, maintenance requirements and schedule, site events log, and warranties.
6. As-built drawings and one-line diagrams of commissioned systems
7. As-built control sequences of operations, point lists, and drawings
8. Recommended recommissioning schedule and tests
9. Recommended schedule for calibration of sensors and actuators

1.10 O&M TRAINING PLAN

A. A document outlining the O&M personnel training to enable them to adequately operate and maintain each equipment type or system to be commissioned. Training materials should include system and equipment overview, review and demonstration of operation, servicing, and preventative maintenance, review of the Systems Manual, and review of the record drawings. At a minimum the plan includes: learning goals and objectives, training agenda, topics, length of instruction, instruction information and qualifications, location, attendance forms, and training materials.

PART 2 – PRODUCTS

2.1 TOOLS AND INSTRUMENTATION

A. Contractor and subcontractors shall provide all calibrated instruments and tools necessary to fulfill the commissioning testing and training requirements.

PART 3 – EXECUTION

3.1 CONSTRUCTION/ACCEPTANCE PHASE

A. Cx meetings - The CxA will conduct meetings on a needed basis to discuss the commissioning activities. At minimum, a kick-off meeting will be conducted by the CxA with the Contractor to discuss the commissioning process and review roles and responsibilities. Additional onsite and teleconference meetings will be conducted by the CxA where Contractor and relevant subcontractors shall be present to discuss issues, schedule, startup, testing, etc.

B. Contractor submittals – Contractor shall provide CxA with equipment submittals for the systems to be commissioned for the CxA to review and develop pre-functional and functional verification checklists.

C. Pre-functional Verification – prior startup the Contractor shall provide the CxA with completed pre-functional checklists and California Certificate of Installation (NRCI) forms for systems to be commissioned. The CxA will conduct site visits and meetings as needed. The CxA will provide observation reports and an updated issues log. The Contractor shall provide responses and resolutions the Issues Log.

D. Start-up Verification – Contractor shall provide the CxA with the completed contractor and/or manufacturer equipment start-up documents, certifications, California Certificate of Acceptance Forms (NRCA), and point-to-point checks for the systems to be commissioned to validate systems are ready for testing. Items left incomplete, which later cause deficiencies or delays during FPTs, may result in back charges to the responsible contractor.

E. Commissioning Issues Log – The CxA will document deficiencies and concerns through the commissioning process in the Cx Issues Log and track the resolution of the issues. The log shall be distributed to the Cx Team for resolution and documentation.

F. Functional Performance Tests (FPT) – The CxA shall develop FPT procedures for the systems to be commissioned that include verification of proper operation of equipment features. The Contractor and Design Team shall review and provide input for development of procedures. Functional performance tests shall demonstrate the correct operation of each component, system and system-to-system interface in accordance with the Commissioning Plan. Functional performance testing reports shall contain information addressing each of the building components tested, the testing methods utilized, and include any readings and adjustments made. Once the Contractor has confirmed systems are operation according to the contract documents, the tests are to be executed by the Contractor under the direction and observation of the CxA. The CxA shall document test results and update the issues log.

G. Retesting - Any required retesting due to items of non-compliance in material, installation, or setup will be corrected and retested at the cost of the responsible contractor.

H. O&M and Systems Manual – Prior to O&M training the Contractor shall compile the O&M and systems manuals for the equipment to be commissioned for Owner and CxA review.

I. Final Cx Report – Upon completion of the Cx Process, the CxA will prepare the Final Cx Report documenting the commissioning process activities undertaken through the design and construction phases of the building project. The report shall be completed and provided to the Owner as well as the Jurisdictional Authority upon request.

3.2 CLOSE-OUT / TRAINING PHASE

A. O&M submittal review - The CxA shall review submittals to verify the O&M information provided by the contractor meets the intent of O&M submittal contract requirements and provides benefit to the O&M user for training and operational reference.

B. O&M Training – The Contractor shall develop and conduct the systems operation training program/plan for the maintenance staff and other appropriate parties. The CxA shall review, comment on, and document the training plan provided by the Contractor and verify that training requirements of the contract documents for the systems to be commissioned have been met. A list of the date(s) and times of the training, an attendance sheet, and a summary of the training is to be provided to the CxA for inclusion in the final Cx Report.

3.3 POST-OCCUPANCY / SEASONAL PHASE

A. Warrant Period Issues - prior to seasonal testing the CxA will review with ownership concerns and issues discovered during the construction phase and warranty period. Items will be retested with the Contractor as needed.

B. Deferred/seasonal testing – deferred or seasonal testing will be necessary to ensure operation of daylight savings adjustments and warranty period issues. The CxA may determine additional testing may be necessary based on ambient conditions, schedule issues, or other conditions preventing testing during the construction/acceptance phase.

C. Cx Report Addendum – The CxA shall prepare an Addendum to the Final Cx Report post the with updated pertinent documentation to indicate whether systems continue to perform according to the contract documents.

END OF SECTION

2. CHANGES TO THE DRAWINGS

A. Sheet E-0.0: Scope of work regarding boom lift revised as follows: CONTRACTOR IS TO PURCHASE **NEW** SELF-PROPELLED TELESCOPIC BOOM LIFT GENIE MODEL S-40. BOOM LIFT PURCHASE TO BE A SEPARATE LINE ITEM WITHIN THE BID SUBMITTAL. BOOM LIFT IS NOT TO BE USED BY THE CONTRACTOR OR THE CONTRACTOR'S PERSONNEL AT ANY TIME DURING THE CONSTRUCTION PROCESS. CONTRACTOR IS TO DELIVER BOOM LIFT, PURCHASE ORDER AND SUPPLEMENTAL DOCUMENTS TO THE FACILITIES DIRECTOR AT CLOSE OF PROJECT.

GENERAL INFORMATION:

A. Please be advised the Request for Clarification and Questions are in response to the original RFTOP and are included within this Addendum No. 1. The RFC's / Questions and Responses are as follows:

1. Will traffic control be required along the main roads for this project?

   1.A: Formal traffic controls will not be required but contractor is responsible to safe off areas vehicular, pedestrian, traffic or parking.

2. Is all work to be performed during normal business hours, roughly 7am to 5pm?

   2.A: In the Supplementary General Conditions Article 27.D of the NIB, working hours are 7am to 7pm

3. Can the contract duration be adjusted if COVID related issues disrupt supply chain and availability of product?

   3.A: Project team will work with the contractor as things unfold during construction.

4. Will the school provide laydown areas for storage of materials and dumpsters for trash and recycling? If so, where would they be located?

   4.A: Parking Lot O has been designated as the laydown area as indicated on plans.

5. We received the bid documents for the above referenced project but were unable to locate the engineer's estimate. If possible, please reply to this email with the engineer's estimate or kindly forward this to the person best able to provide this information.

   5.A: The engineers estimate is in the range of $720,000 to $880,000.

6. Can you provide me with an estimated budget for this project? Also, a start date?

   6.A: See answer to question 5

7. May we ask for the License Requirement and Engineer's Estimate?

   7.A: C10 license required and see answer to question 5

8. C10 or B License required?

   8.A: C10 license required.

9. Regarding the itemized unit pricing - Are all the itemized unit prices to be included in the Base Bid? If so, what is the intended use for the Unit Pricing?

   9.A: Provide unit pricing within base bid. The intent is to provide unit pricing in the case additional units are required during construction.

10. DRAWING NUMBER: E-0.2 Fixture #23 Typical - Please confirm that all the new Louis Poulsen Fixture will mount to existing poles without issue.

    10.A: The new Louis Poulsen fixtures will mount to the existing poles. No additional components are required.

11. DRAWING NUMBER: E-0.2 – E-0.7 Typ All Fixtures - Please confirm that new wiSCAPE will fit and mount in all existing fixtures, as required.

    11.A. All new wiSCAPE controllers will mount in existing fixtures as specified in drawings.

12. DRAWING NUMBER: E-0.2 – E-0.7 Typ All Fixtures - Please confirm that new LED Retrofit components fit in existing fixtures as required.

    12.A: All new LED retrofit kits are of the same manufacturer and are designed to install in existing housings.

13. DRAWING NUMBER: E-0.2 – E-0.7 Typ All Fixtures - Please confirm that all existing fixtures are actually able to be opened and accessed for re-work, as this has been an issue on previous projects we have worked on at this campus. Especially the stair and ramp fixtures.

    13.A: All fixtures in scope are designed with access to components specified to be replaced.

14. The Project consists of the full replacement of the exterior lighting control system, and for the retrofit of the remaining fluorescent and metal halide lamps with new LED light sources in the exterior parking lots and walls. Replacement of lighting controls in this bid are only for the same retrofits that are to be done or it includes the exterior lights retrofitted prior as well?

    14.A: Replacement of lighting controls is as the scope delineates.

Attachments:

Crafton Hills College Commissioning Plan

End of Addendum 1

Commissioning Plan

Crafton Hills College
Exterior Lighting Improvements
11711 San Canyon Road
Yucaipa, CA 92399

Project No. CC02.3626.01

July 8, 2020

SAN BERNARDINO COMMUNITY COLLEGE DISTRICT

Prepared by:

Salas O'Brien
South West Operations Commissioning
3220 Executive Ridge, Suite 210
Vista, CA 92081
760.560.0100 | salasobrien.com

Table of Contents

Commissioning Plan

Appendix

Commissioning Overview

1.1 Summary

A. This section includes general requirements that apply to the implementation of commissioning without regard to specific systems, assemblies, or components.

B. The commissioning activities have been developed to verify that the building systems to be commissioned meet the owner's requirements, and to support the owner in meeting the guidelines for the following:

1. 2019 California Building Standards Code, Title 24, Part 6, Energy Code sections 120.8(a) through (i) compliance.

2. 2019 California Building Standards Code, Title 24, Part 11, Green Building Standards sections 5.410.2 through 5.410.2.6 compliance.

C. Related Documents:

1. Owners Project Requirements (OPR)
2. Basis of Design (BOD)
3. Project specification section 26 08 00

1.2 Definitions and Abbreviations

A. Basis of Design (BOD) – document that records concepts, calculations, decisions, and product selections used to meet the OPR and to satisfy applicable regulatory requirements, standards, and guidelines. The document includes both narrative descriptions and lists of individual items that support the design. The BOD should cover all systems to be commissioned.

B. Commissioning Issues Log (CIL) – formal and ongoing record of problems or concerns discovered during the Cx process and their resolution.

C. Commissioning (Cx) – the process of verifying and documenting that a building and its systems and assemblies are planned, designed, installed, tested, and can be operated and maintained to meet the owner's project requirements and contract documents.

D. CxA – Qualified Commissioning Authority, Specialist, Agent, or Coordinator overseeing the commissioning activities.

E. Owner's Project Requirements (OPR) – document that details the functional requirements of a project and the expectations of how it will be used and operated. These include project goals, measurable performance criteria, cost considerations, benchmarks, success criteria, and supporting information.

F. Systems, subsystems, equipment, and components: where these terms are used together or separately, they shall mean "as-built" systems, subsystems, equipment, and components.

1.3 Project Overview and Project Team

A. Crafton Hills College, part of the San Bernardino Community College District (SBCCD), will undergo a campus-wide improvement of their exterior lighting control system and retrofitting of the remaining metal-halide and fluorescent pole top and step lights with new LED type.

B. Commissioning is a process that relies upon frequent and direct communications, as well as collaboration between all parties to the construction process. A high level of communication and cooperation between the commissioning team is essential to the success of the commissioning effort. The CxA shall have direct communication with the owner's representative. The commissioning team shall consist of, but not be limited to, commissioning authority, owner's representative, design team, Contractor, and representing subcontractors.

C. Members Appointed by the Owner:

1. Design team Architect and Engineers responsible for the project design.
2. CxA with professional engineering registration and certified in commissioning by AABC Commissioning Group to lead the commissioning process through design and construction phase for the shell and partial tenant improvement work.

D. Members Appointment by the Contractor:

1. Systems to be commissioned sub-contractors and/or vendor representatives with expertise and authority to act on the contractor's behalf in respective systems to perform commissioning process activities (e.g. mechanical, electrical, plumbing, TAB, controls).
2. CALCTP Certified Acceptance Test Technician to verify and certify lighting control compliance with California Building Code, Title-24, Part 6.

Team Member	Organization	Name	Phone	Email
Cx Authority / Principal in Charge	Salas O'Brien Commissioning	Farzad Tadayon, PE, CxA	760.842.1800	farzad.tadayon@salasobrien.com
Cx Authority / Project Manager	Salas O'Brien Commissioning	Adam Bolduc, PE, CxA	760.842.1800	adam.bolduc@salasobrien.com
Cx Lead Specialist	Salas O'Brien Commissioning	Steven Barrow, CALCTP ATT	760.842.1800	steven.barrow@salasobrien.com
Cx Technical Specialist	Salas O'Brien Commissioning	Kevin Walker, CALCTP ATT	760.842.1800	kevin.walker@salasobrien.com
Owner's Representative	Crafton Hills Community College	Larry Cook, Scott Preston, and Ryan Smith	909.389.3384 415.596.5933	lcook@sbccd.cc.ca.us Scott.Preston@aecom.com rsmith@sbccd.cc.ca.us
Electrical Designer of Record	Design West Engineering	Jonathan Bianchet, and Arcadio Nungaray	909.890.3700	JBianchet@designwesteng.com
Contractor Project Manager	T.B.D.			
Contractor Quality Control Manager	T.B.D.			
Contractor Superintendent	T.B.D.			
Electrical / Lighting Subcontractor	T.B.D.			
Lighting Program Subcontractor	T.B.D.			
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1.4 Systems to be Commissioned

A. Pre-functional Review: This includes activities such as site observations, delivering site observation reports, completing or reviewing pre-functional checklists, reviewing equipment submittals, inspection checklists, or any other various check or checklist completed prior to functional operation of the equipment or system.

B. Off-Site Functional Verification: This includes activities performed by the CxA while not witnessing or directing operation verification while on site with a contractor. Activities could include operation trend data review, point-to-point checklist review, TAB report review, startup documentation review, or any other various check or checklist completed during the operational setup or operation of the equipment or system.

C. On-Site Functional Verification: This includes activities performed by the Cx while witnessing or directing operation verification while on site with a contractor. Activities could include witnessing startup activities or directing operational verification tests of any of the commissioned systems.

Equipment and Sub-Systems	Pre-functional Review	Off-Site Functional Performance Tests	On-Site Functional Performance Tests
Lighting Controls – Division 26			
Exterior Lighting (new and integrated)	100%	100%	100%
Lighting Control System	100%	100%	100%

1.5 Roles and Responsibilities

A. Owner's Responsibilities

1. Provide the OPR documentation to the CxA and Contractor for information and use.
2. Assign operation and maintenance personnel and schedule them to participate in commissioning team activities and training.
3. Provide the construction documents, prepared by the Design Team and approved by the Owner, to the CxA and Contractor for use in developing the commissioning plan, systems manual, and operation and maintenance training plan.

B. Design Team Responsibilities

1. Coordinate Design Review Kickoff Meeting with Owner and CxA.
2. Provide design submittal schedule to the CxA for reference.
3. Provide design submittal packages (drawings, specifications, and BOD) to the CxA for review.
4. Provide responses to CxA design review comments.
5. Incorporate Cx and Training requirements into the construction documents.
6. Review and comment on Cx test documents.

C. Contractor's Responsibilities

1. The Contractor and subcontractors shall comply with all the Commissioning requirements.
2. Coordinate representatives with expertise and authority to act on their behalf to participate in and perform commissioning process activities.
3. Provide the CxA with overall and look-ahead construction schedules.
4. Integrate all commissioning activities and milestones into the project schedules.

5. Provide documents listed in the submittal section to the CxA for review concurrently with the Design Team.
6. Complete the Pre-functional Checklists provided by the CxA for each piece of equipment to be commissioned.
7. Complete California non-residential certificate of compliance installation and acceptance forms (NRCI and NRCA, respectively).
8. Develop and conduct the systems O&M training program/plan for the maintenance staff and other appropriate parties.
9. Compile the Systems Manual and distribute to the CxA for review.
10. Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, recommend corrective action.
11. Cooperate with the CxA for resolution of issues recorded in the Issues Log.
12. Complete commissioning process test procedures under direction of the CxA.
13. Provide all calibrated instruments and tools necessary to fulfill the commissioning verification/testing requirements.
14. The commissioning process does not take away from or reduce the responsibility of the Contractor to provide a finished and fully functional product.

D. Commissioning Authority Responsibilities

1. Organize and lead the commissioning team.
2. Provide commissioning plan(s) and report(s).
3. Convene commissioning team meetings.
4. Provide documents listed in the submittal section for Cx Team review and reference.
5. Witness and document functional performance tests.
6. Prepare and maintain the Cx Issues Log.

1.6 Submittals

A. Owner

1. Owner's Project Requirements

B. Design Team

1. Design schedule
2. Design submittal packages (drawings, specifications, and BOD)
3. Design review responses

C. Contractor

1. Construction overall and look-ahead schedules
2. Equipment Submittals for systems to be commissioned
3. Completed Pre-functional Checklists
4. California certificate of compliance installation forms (NRCI)
5. Startup Reports (contractor's with certifications and/or manufacturer's)
6. California certificate of compliance acceptance forms (NRCA)
7. Control System Shop Drawings
8. Control System Point-to-Point Checks

9. Control System Trend Data Log Reports
10. Commissioning Issues Log Responses/Actions
11. Systems Manual for Equipment to be Commissioned
12. O&M Training Plan and Attendees Sheet

D. Commissioning Authority

1. Commissioning Plan(s)
2. Design Review Comments
3. Pre-Functional Checklists
4. Systems Functional Performance Test Procedures
5. Commissioning Report
6. Deferred Testing Commissioning Report Addendum

1.7 Nonresidential Certificate of Installation and Acceptance

A. In compliance with the California Building Energy Code, before an occupancy permit is granted the nonresidential certificates indicated on the Title-24 sheets of the design plans shall be completed. Applicable forms shall be completed and signed by the Contractor or responsible subcontractor. Completed forms shall be readily available onsite for the enforcing agency and provided to the CxA. Most recent forms can be downloaded from the California Energy Commission website https://energycodeace.com/nonresidentialforms

1.8 Systems Manual

A. A document focusing on the operation of systems to be commissioned that provides information needed to understand, operate, and maintain the equipment and systems to be commissioned. The Systems Manual is in addition to the record construction drawings, documents, and the O&M Manuals supplied by the Contractor. At a minimum the System Manual shall include:

1. Executive summary, OPR, BOD, and Cx Report
2. Site information, facility description, project history, current requirements, and contacts.
3. Description of major building systems to be commissioned.
4. Site equipment inventory and maintenance notes.
5. Basic O&M documentation, including general site operating procedures, basic troubleshooting, maintenance requirements and schedule, site events log, and warranties.
6. As-built drawings and one-line diagrams of commissioned systems
7. As-built control sequences of operations, point lists, and drawings
8. Recommended recommissioning schedule and tests
9. Recommended schedule for calibration of sensors and actuators

1.9 O&M Training Plan

A. A document outlining the O&M personnel training to enable them to adequately operate and maintain each equipment type or system to be commissioned. Training materials should include system and equipment overview, review and demonstration of operation, servicing, and preventative maintenance, review of the Systems Manual, and review of the record drawings. At a minimum the plan includes: learning goals and objectives, training agenda, topics, length of instruction, instruction information and qualifications, location, attendance forms, and training materials.

Commissioning Process and Sequence

2.1 Design Phase Commissioning

A. OPR Review – The CxA shall review and update the OPR.

B. Cx meetings - The CxA will conduct meetings on a needed basis to discuss the commissioning activities. At minimum, a kick-off meeting will be conducted by the CxA with the Owner's representatives and design team to discuss the commissioning process and review roles and responsibilities.

C. Design Review – The CxA shall review and provide comments to design submittal packages (BOD, plans, and specifications) at approximately 90 percent complete (at a minimum).

D. Cx Specifications – The CxA shall provide or modify project specifications for commissioning.

E. Cx Plan – The CxA shall develop the Cx Plan based upon the OPR, BOD, design drawings, and design specifications to document how the project will be commissioned. At a minimum, the plan shall include general project information, commissioning goals, systems to be commissioned, plans to test, commissioning team, roles and responsibilities, and process activities. The plan shall be reviewed and approved by the Owner. The Cx Plan shall be incorporated into the design bid documents.

2.2 Construction Phase

A. Cx meetings - The CxA will conduct meetings on a needed basis to discuss the commissioning activities. At minimum, a kick-off meeting will be conducted by the CxA with the Contractor to discuss the commissioning process and review roles and responsibilities. Additional onsite and teleconference meetings will be conducted by the CxA where Contractor and relevant subcontractors shall be present to discuss issues, schedule, startup, testing, etc.

B. Contractor submittals – Contractor shall provide CxA with equipment submittals for the systems to be commissioned for the CxA to review and develop pre-functional and functional verification checklists.

C. Pre-functional Verification – prior startup the Contractor shall provide the CxA with completed pre-functional checklists and California Certificate of Installation (NRCI) forms for systems to be commissioned. The CxA will conduct site visits and meetings as needed. The CxA will provide observation reports and an updated issues log. The Contractor shall provide responses and resolutions the Issues Log.

D. Start-up Verification – Contractor shall provide the CxA with the completed contractor and/or manufacturer equipment start-up documents, certifications, California Certificate of Acceptance Forms (NRCA), and point-to-point checks for the systems to be commissioned to validate systems are ready for testing. Items left incomplete, which later cause deficiencies or delays during FPTs, may result in back charges to the responsible contractor.

E. Functional Performance Testing (FPT) – The CxA shall develop FPT procedures for the systems to be commissioned that include verification of proper operation of equipment features. The Contractor and Design Team shall review and provide input for development of procedures.

Functional performance tests shall demonstrate the correct operation of each component, system and system-to-system interface in accordance with the Commissioning Plan. Functional performance testing reports shall contain information addressing each of the building components tested, the testing methods utilized, and include any readings and adjustments made. Once the Contractor has confirmed systems are operation according to the contract documents, the tests are to be executed by the Contractor under the direction and observation of the CxA. The CxA shall document test results and update the issues log. It shall be assumed that there will be no sampling. If the CxA or Owner deem sampling acceptable, the CxA will select the specific equipment or system to be tested.

F. Retesting - Any required retesting due to items of non-compliance in material, installation, or setup will be corrected and retested at the cost of the responsible contractor.

G. O&M and Systems Manual – Prior to O&M training the Contractor shall compile the O&M and systems manuals for the equipment to be commissioned for Owner and CxA review.

H. Final Cx Report – Upon completion of the Cx Process, the CxA will prepare the Final Cx Report documenting the commissioning process activities undertaken through the design and construction phases of the building project. The report shall be completed and provided to the Owner as well as the Jurisdictional Authority upon request.

2.3 Close-Out / Training Phase

A. O&M submittal review - The CxA shall review submittals to verify the O&M information provided by the contractor meets the intent of O&M submittal contract requirements and provides benefit to the O&M user for training and operational reference.

B. O&M Training – The Contractor shall develop and conduct the systems operation training program/plan for the maintenance staff and other appropriate parties. The CxA shall review, comment on, and document the training plan provided by the Contractor and verify that training requirements of the contract documents for the systems to be commissioned have been met. A list of the date(s) and times of the training, an attendance sheet, and a summary of the training is to be provided to the CxA for inclusion in the final Cx Report.

2.4 Post-Occupancy / Seasonal Phase

A. Warranty Period Issues – prior to seasonal testing the CxA will review with ownership concerns and issues discovered during the construction phase and warranty period. Items will be retested with the Contractor as needed.

B. Deferred/seasonal testing – deferred or seasonal testing will be necessary to ensure operation of daylight savings adjustments and warranty period issues. The CxA may determine additional testing may be necessary based on ambient conditions, schedule issues, or other conditions preventing testing during the construction/acceptance phase.

C. Cx Report Addendum – The CxA shall prepare an Addendum to the Final Cx Report post the with updated pertinent documentation to indicate whether systems continue to perform according to the contract documents.

APPENDIX A

APPENDIX B

SAN BERNARDINO COMMUNITY COLLEGE DISTRICT

CRAFTON HILLS COLLEGE

CHC - Exterior Lighting Improvements

Owner's Project Requirements

This document defines the Owner's requirements for the project.

July 9, 2020

Version 1.1

Prepared by:

Salas O'Brien and Design West Engineering
3220 Executive Ridge, Suite 210 | Vista, CA 92081
760.560.0100 | salasobrien.com

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1. Overview and Scope

1.1 Overview and Definition

1. The Owner's Project Requirements (OPR) provide an explanation of the ideas, concepts and criteria that are considered to be very important to the owner, coming out of the programming and conceptual design phases and which are desired to be tracked throughout design and construction. The OPR is developed by the owner, not the design team. The OPR provides the direction for the design team.

2. The OPR document sets the functional goals that the design is judged against and establishes the basis of the criteria used during construction to verify actual performance. The OPR does not list items that are already required by code. The OPR is generally not a description of what specifically will be included in the project design but is the more general feature and categorical performance criteria to be met by the design. Where practical and known, the OPR includes measurable indicators used to verify that the performance requirements were met.

3. The OPR will be followed by the basis of design or design narrative written by the design team and included with design package submissions. The basis of design documents the primary thought processes and assumptions behind the design decisions and describes the design elements being incorporated to meet the OPR.

1.2 Scope

1. This document includes requirements for the systems that are more likely to be included under the formal commissioning umbrella or be impacted by their interactions.

2. This document focuses on the lighting systems and on the sustainability requirements of the project. Other areas impacted by commissioning or commissioned systems are covered more broadly.

3. The design areas included in this document are:
    a. Electrical
    b. Sustainability
    c. Commissioning
    d. General requirements
    e. Design process

4. Design Kickoff Meeting Attendees:
    a. Owner's Representatives – Larry Cook, Scott Preston, Ryan Smith
    b. Electrical Engineer – Jonathan Bianchet, Arcadio Nungaray
    c. Commissioning Agent – Emmanuel Gutierrez

2. Project Goals

2.1 Environmental and Sustainability Goals

1. Title24 voluntary measures or Tiers sought, or other specific green building rating system or program credits and/or level of certification sought (e.g. LEED, Net Zero, Passive House)
    a. Full replacement of exterior lighting control system in about 425 campus exterior lighting fixtures with web based wireless distributed system (MESH network) with dimming.
    b. Retrofit remaining fluorescent and metal halide lamps with new LED
    c. Lighting systems & controls (new controls system for all exterior lighting and some retrofit lamps)

2.2 Energy Efficiency Goals

1. Lighting system efficiency which is less than the California Energy Code performance approach energy budget by ____ %
    a. Compliance with Title 24 is the only requirement, any percentage above compliance is considered good but not a goal.

2.4 Project Program

Including facility functions and hours of operation, and need for afterhours operation – Describe primary purpose, program and use of proposed project:

1. Project program areas including intended use and anticipated occupancy schedules, future expandability and flexibility of spaces
    a. The project shall consist of retrofitted LED lighting and new controls for exterior parking lots, tennis courts, walkways, and stairs.

2. Budget or operational constraints
    a. The estimated cost of construction is $500,000

3. Applicable codes
    a. 2019 California Building Code
    b. 2019 California Electrical Code
    c. 2019 California Energy Code
    d. San Bernardino Community College District Standards

2.5. Equipment and Systems Expectations

Describe the following for each system commissioned:

a) Level of quality, reliability, equipment type, automation, flexibility, maintenance and complexity desired
Lighting systems shall require minimal maintenance and have available support from the manufacturer. The system does not require redundancy. The quality of the equipment shall be that of widely available manufacturer's standard product offering. Unique or custom lighting equipment shall be

approved by the Owner prior to implementation into construction documents.

All products should be on the market for at least 3 years.

Contractor shall include all original purchase orders in turnover documents to SBCCD/CHC.

b) Specific efficiency targets, desired technologies, or preferred manufacturers for lighting controls.
There are neither preferred manufacturers nor efficiency targets required. The lighting designer shall provide the client with 2-3 manufacturers that satisfy the owner's requirements for review. The Title 24 minimum is the only baseline. 10% of all new components to be provided to the owner as additional stock.

c) Degree of system integration, automation and functionality for controls, i.e., load shedding, demand response, energy management
Existing EXERGY control system will be completely removed and replaced with a new control system; manufacturer is yet to be decided. Control system shall be a web-based, wireless, distributed system with schedulable individual and group fixture control and dimming capability. Motion sensing controls are not desired at this time due to reliability concerns causing possible safety issues.

The system shall not be on the campus-wide, wireless, wide area network (WAN) because it is unreliable in the parking lot areas.

The project requires expandability be built into the system

Existing EXERGY system has current dimmed levels that design team should capture

Analytics is a want, not necessarily a need, but a system that could provide it would be better.

Avoiding recurring maintenance fees for cloud services or other fees would be better.

SBCCD/CHC would prefer a 5-year warranty on all products under this project

2.6 Building Occupant and O&M Personnel Expectations

Describe the following:

a) How building will be operated and by whom

The building will be operated by the Owner's staff. It is expected that a person will be on-site during normal business hours.

b) Level of training and orientation required to understand, operate and use the building systems for building operation and maintenance staff, as well as occupants
Training will be provided for 1 to 2 facilities personnel either by a certified technician or by the manufacturer to ensure proper operation and maintenance.

Online technical support is a must as new CHC facility staff is brought on board. Lighting manufacturers who can provide this, preferably for free and on-demand, is preferred.

c) Building operation and maintenance staff location and capabilities
At least one maintenance staff person will be located on-site and respond to issues on an as-needed basis. Simple repairs will be conducted by on-site personnel. Issues more complex than this will be outsourced to a knowledgeable contractor.

2.7 Lighting Levels

a) Light levels for this project are:
Current IESNA light level recommendations shall be followed. Minimum light levels at the ground level will be maintained for parking lots and walkways. Extra lighting will be provided if there are safety concerns.

2.8 Lighting Control

a) What control of lighting is required in the various types of spaces (exterior walkways, parking lots, stairs, etc.)? Examples occupancy sensors to turn on or off, scheduled lighting controls and lighting sweeps and photosensor control.
Stairway and walkway lights to controlled by time schedule. Parking lot lighting to be controlled by photosensor/astronomical time switch. Pole lighting located along the road are currently scheduled to turn on 10 minutes before sundown. After 11pm, the lighting along the road turns off except for every fifth light. That fixture remains on but dimmed to 50%. This level of control is expected to be the minimum capability of the new system.

The owner has existing dimming settings and would like dimming tuning in the contractor's scope of work.

2.9 Lighting Acceptance

a) Lighting Acceptance Certification.
The Contractor shall complete Lighting Acceptance Testing in compliance with the 2019 California Building Standards Code, Title-24, Part 6 Energy

Code section 130.4 with an independent CALCTP Certified Acceptance Test Technician.

b) Lighting Acceptance Test Technician Information.
To be provided by the Contractor.

2.10 Commissioning

a) Overview.
Commissioning (Cx) is a systematic process of ensuring that all the building systems are installed and perform interactively according to the design intent and the owner's project requirements and operational needs. The commissioning process does not take away from nor reduce the responsibility of the contractor to provide a finished and fully functioning product.

b) Commissioning Requirements.
The project shall be commissioned in compliance with the following guidelines:
- 2019 California Building Standards Code, Title 24, Part 6, Energy Code section 120.8
- 2019 California Building Standards Code, Title 24, Part 11, Green Building Standards section 5.410.2

c) Systems to be commissioned.
Lighting Controls.

d) Commissioning Team.
The Owner has hired an independent commissioning agent, noted below, to manage the commissioning process through design and construction phases. The Designer and Contractor shall provide a representative with expertise and authority to act on their behalf in the respective system to be commissioned.

e) Owner's Commissioning Agent Information.
Salas O'Brien
Farzad Tadayon, Managing Principal, farzad.tadayon@salasobrien.com
3220 Executive Ridge, Ste 210, Vista, CA 92081
760.560.0100 | www.salasobrien.com

f) Commissioning Process.
Refer to the commissioning plan.

APPENDIX C

Schematic Design Narrative

Crafton Hills College
Exterior Lighting Improvements

04/22/2020

Prepared for:

CRAFTON HILLS COLLEGE

11711 Sand Canyon Rd.

Yucaipa, CA. 92399

Prepared By:

DESIGN WEST ENGINEERING
275 West Hospitality Lane, Suite 100

San Bernardino, CA 92408

(909) 890-3700

DWE Project #20-078

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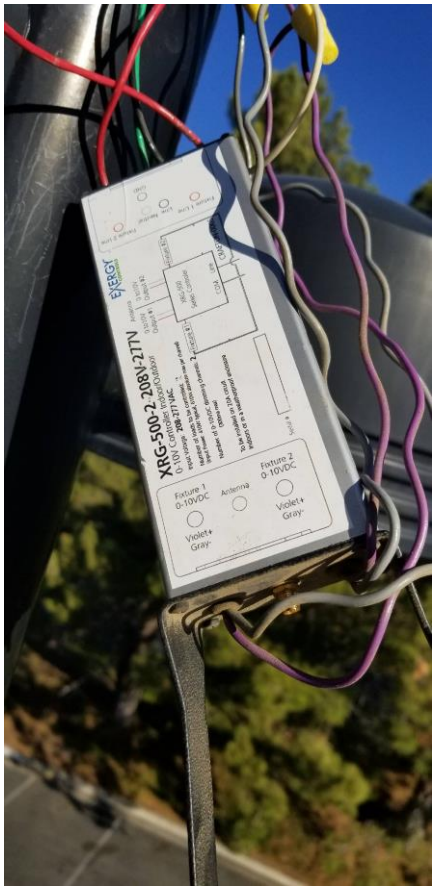
SCOPE OF SERVICES

PROJECT DESCRIPTION

Crafton Hills College, part of the San Bernardino Community College District (SBCCD), will undergo a campus-wide improvement of their exterior lighting control system and retrofitting of the remaining metal-halide and fluorescent pole top and step lights with new LED type. Based on our research, this project will not be reviewed by (DSA).

EXISTING CONDITIONS

The existing EXERGY lighting controllers are located at four lighting control distributions throughout the site along with wireless controllers located at each parking lot fixtures, street pole top fixtures and walkway fixtures. In addition, there are existing siemens & LC&D controllers in various buildings controlling the remaining lighting on a circuit-base level. Faculty from Design West Engineering completed a survey of the existing conditions on 2/21/2020, 3/31/2020, and 4/3/2020 to collect information on the existing lighting controls systems and light fixture types and quantities. The various pole top fixtures will be referenced as A1, A2, & A3, the post top walkway fixtures are referred to as B1, and the step lights will be depicted as S1 herein.



Existing EXERGY Controls in a A1 Fixture

Existing EXERGY Controller

Existing Step Light – S1

Existing Dual-Head Pole Top – A2

Existing Walkway Post Top – B1

PROPOSED LIGHTING CONTROLS AND FIXTURES

The existing EXERGY controls system has a very user-intuitive software and is, from discussions with M&O staff, liked for its ability to correct issues with inoperable controllers to have fixture-based controllers mesh with adjacent controllers. Unfortunately for the District, EXERGY as a company has closed its doors and will no longer support or manufacture product. Without a reliable source, the District cannot replace any damaged components or plan for future growth to be interconnected with one single manufacturer's system. The design team has met with various controls vendors at the early stages of the design and discussed with the District to meet all the requirements and standards they are accustomed to. System shall be expandable for any potential growth on campus. The design intent will reference the Hubbell wiSCAPE controls system. The proposed lighting controls will comprise of the installation of a fully programmable system with individual fixtures networking together wirelessly through strategically placed Gateways and wireless smart modules located at each A1, A2, A3, and B1 fixtures. Each Gateway connects to a network via an Ethernet connection or cell modem and has the ability to manage up to 1000 modules. The fixtures will be retrofitted with an Internal Fixture Module allowing the fixtures to have On/Off control with full-range dimming. In addition, these modules come equipped with digital inputs for motion sensors, photocells, and low-voltage switches, if desired. The wiSCAPE software suite is an easy to use web-based application with a customizable dashboard. This software can be a hosted Software as a Service (SaaS) or installed on site. It can manage and monitor a vast network of devices, nodes, groups and scenarios (or presets) and provide alarms, notifications and real-time status visually displayed on a map of the site. The existing B1 fixture heads will be removed and replaced with new Louis Poulson Kipp model LED type. The S1 fixtures will be removed and replaced with new Amerlux Passo CR LED recessed luminaires. These fixtures will continue to be controlled via a switched-leg conductor from an adjacent networked fixture.

The following includes scope and additional items discussed:

- The removal and replacing of all existing EXERGY control system components with new controls system and equipment.
- Install new lighting control system components in approximately 425 campus exterior lighting fixtures.
- Control System shall be a web based wireless distributed system.
- System shall have schedulable individual and group fixture control with dimming capability with up to 35 groups.
- New control system shall have multi-fixture pre-programmed dimming capability.
- Remote user access shall have limited user authority, as defined by system administrators.
- All existing type B1 walkway fixtures shall be retrofitted with approved LED replacements compatible with new control system.
- All existing EXERGY control components shall be completely removed from all fixtures and locations.
- All removed parts are to be returned to owner unless directed not to.

- Consideration of the location of all new fixture nodes/antennas. Concerns from the District for placement of this component as the current setup finds a small antenna at the top-most part of the area poles making it susceptible to damage from birds & other wildlife.
- Motion controls are not desired to be installed per the District.
- All campus monument lights shall be integrated into the new control system.
- All existing monument light fixtures to be retrofitted to LED type.
- All existing stairway and walkway lights to be integrated into the new control system.
- All existing stairway and walkway lights to be retrofitted with new approved LED retrofit kits or approved LED type replacement.
- Integrate existing LED tennis courts into new exterior lighting control system.
- Provide to owner 10% stock of all new components.

PRELIMINARY COST ESTIMATE

MATERIAL	QTY	UNIT		IN PLACE COST
ITEM #1 UNDERGROUND ELECTRICAL				
TRENCH	1000	FT	$	2,222.48
BACKFILL TRENCH	1000	FT	$	826.20
2#10 1#10GRD - 1"C	1000	FT	$	9,537.98
TOTAL COST THIS SECTION			**$**	**12,586.66**
ITEM #2 EXTERIOR LIGHTING				
FIXTURE - B1	187	EA	$	285,787.89
FIXTURES - S1	244	EA	$	85,065.84
LIFT RENTAL	2	EA	$	9,004.36
TOTAL COST THIS SECTION			**$**	**379,858.09**
ITEM #3 SERVICE AND CONTROLS				
425 NODES, GATEWAY, SITE COMMISIONING	1	EA	$	167,825.50
ENTERPRISE SOFTWARE START-UP	1	EA	$	17,500.00
YEARLY COST		EA	$	-
TOTAL COST THIS SECTION			**$**	**17,500.00**
SUB TOTALS		>>>>>>>>>>>>>>>>>		
SALES TAX 8.25%		>>>>>>>>>>>>>>>>>		
LABOR HOURLY RATE		>>>>>>>>>>>>>>>>>		
TOTALS		>>>>>>>>>>>>>>>>>		
CONTRACTORS MARKUP 15%		>>>>>>>>>>>>>>>>>		
GRAND TOTAL MATERIAL & LABOR		>>>>>>>>>	**$**	**606,635.59**

DISCLAIMER:
This Cost Estimate has been prepared in accordance with generally accepted professional practices for the intended project use. There is no guarantee this estimate will not vary from actual consstruction costs.
Design West Engineering shall be not be held accountable for reliance on this cost estimated for financial purposes.

The following applicable codes and standards will be referenced.

CODES AND STANDARDS

1. 2019 Building Standards Administrative Code, Part 1, Title 24 C.C.R.
2. 2019 California Building Code (CBC), Part 2, Title 24 C.C.R. (UBC with Amendments)
3. 2019 California Electrical Code (CEC), Part 3, Title 24 C.C.R. (NEC with Amendments)
4. 2019 California Mechanical Code (CMC), Part 4, Title 24 C.C.R. (UMC with Amendments)
5. 2019 California Plumbing Code (CPC), part 5, Title 24 C.C.R. (UPC with Amendments)
6. 2019 California Fire Code, Part 9, Title 24 C.C.R. (UFC with Amendments)
7. 2019 California Referenced Standards, Part 12, Title 24 C.C.R.
8. 2019 Title 19 C.C.R., Public Safety, State Fire Marshal Regulations.
9. Americans with Disabilities Act
10. All Other Applicable State and Local Codes and Ordinances

BASIC ELECTRICAL MATERIALS

1. Raceway systems will generally consist of metal boxes interconnected with Electric Metallic Tubing (EMT.)
    a. PVC Schedule 40 will be used for all underground installations.
2. Conductors will be copper. Insulation will be THWN or XHHW rated for 90°C; however, design will be based on 75°C ratings.
    a. Four wire feeders where neutral is considered a current carrying conductor will have an additional 80% derating.
    b. A maximum of nine current-carrying conductors, using code designated derating factors, will be installed in any raceway.
    c. All conductors including neutrals and grounding conductors will be color coded.
3. Wiring devices will be specification grade, 20 ampere, minimum, color as selected.

GROUNDING

1. New dedicated equipment grounding conductors will be provided on all new circuits and connected to the existing grounding system present at each location.

END

APPENDIX D

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760.560.0100

COMMISSIONING DESIGN REVIEW LOG

Project name: Crafton Hills College Exterior Lighting Improvement
Project location: 11711 Sand Canyon Road, Yucaipa, CA 92399
Updated: 7/6/2020

COMPANY	ROLE	REMARKS BY	TEXT COLOR	GENERAL NOTE
Salas O'Brien (SOBE)	CxA	Steve Barrow and Adam Bolduc	Black	Review is for general conformance with the owner's project requirements and information given in the contract documents specifically to the commissioning scope of the heating, ventilation, air conditioning, domestic hot water, and lighting. Commissioning provider/agent comments are not met as a peer review or direction.
Owner	Owner	-	Green	
Contractor TBD	KTR	TBD	Purple	
Design West Engineering	EEOR	Electrical Engineer	Red	

NO.	REFERENCE	REMARKS	RESPONSE	BACKCHECK	RESPONSE
D-01	Complete set	6/12/20: No Title 24 calculations provided, confirm no calculations are required. Code reference - 2019 Nonresidential Compliance Manual 6.6.4 and 6.7, Section 130.2(b) and 130.4	Calculations for 'B' type fixtures will be provided on 100% CD/Bid plans. The following fixtures comply with exception 140.7(a): S1 & S2 fixtures solely light ADA ramps L1 fixtures – sign lights comply with 130.3 & 140.8(a)2. L2 fixtures are landscape lighting.	06/30/20: No calculations provided for 'B' type fixtures, please add to set.	Calculations for 'B' type fixtures have been provided on Bid plans. See sheet E-7.1. 07/06/2020: Resolved
D-02	Complete set	6/12/20: No B.U.G. ratings provided, please provide.	B.U.G. ratings will be provided on plans for the 'B' type fixtures.	06/30/20: Resolved, item closed. B.U.G. Rating provided within fixture cutsheet.	
D-03	Complete set	6/12/20: No panel schedules referenced within set to verify modified lighting loads.	All new fixtures have lower wattages than their existing counterpart. All modified circuits have reduced lighting loads. Panel Schedules will not be provided.	06/30/20: Resolved, item closed. New lighting load is less than previous lighting load.	

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NO.	REFERENCE	REMARKS	RESPONSE	BACKCHECK	RESPONSE
D-04	E-0.2 thru E0.4	6/12/20: Existing fixtures with new LED fixture heads and controls that are greater than 40w and mounted 24'-0" or less above ground, require motion sensors. Motion sensing controls can't have move than 1500w of lighting power by a single sensor. Code reference - 2019 Nonresidential Compliance Manual 6.4.2 and Section130.2(c)2 & 3	Per Section 141.0(b)2L, compliance with 130.2(c) is not required.	06/30/20: Resolved, item closed. Motion sensors are not required.	
D-05	Specification	Control system specifications not included within design documents. Provide within next submittal.			
D-06	Specification	Documentation for long range 2.4GHz control not provided or shown within plans.			
D-07	Specification	Provide specifications for integral motion sensors within all fixture types requiring motion sensor and stepped dimming. Fixtures that have mounting height levels lower than 24' and wattage exceeding 40watts should provide these requirements. Not shown within plan for these required fixture types			
D-08	Specification	Motion sensor range diagrams should be provided for each motion sensor type.			
D-09	Specification	Photocell cutsheet and specification not provided within design, please provide.			
D-10	Specification	Provide cutsheets/shop drawings of new dimming control panel. Control panel should provide dimming capabilities to meet full range dimming as required per design plans and specifications. Provide cutsheets that provide information stating new system can meet specifications provided SECTION 260943.			

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NO.	REFERENCE	REMARKS	RESPONSE	BACKCHECK	RESPONSE
D-11	Specification	Existing control panels are to be demolished within design plans. Provide load summary and relay schedule of new circuits to be controlled for each panel.			
D-12	Specification	Provide warranty information on new control system. System should meet minimum 5-year requirements and all requirements stated within specification section 2.6			

Please see code sections for guide reference only:

6.4.1 Luminaire Cutoff Requirements

§130.2(b)

The 2019 Standards include a new threshold metric based on initial luminaire lumens for the BUG rating requirement. All outdoor luminaires that emit 6,200 lumens or greater must comply with Backlight, Uplight, and Glare ("BUG") requirements contained in Section 5.106.8 of the CalGreen Code (Title 24, Part 11).

6.4.2 Requirements of Outdoor Lighting Controls

§130.2(c)

The primary requirements for outdoor controls are as follows:

1. **Lights Off During Daytime**: All outdoor lights shall be automatically controlled so that lights are turned off when daylight is available. [§130.2(c)1]
2. **Scheduling Controls**: All outdoor lights shall be automatically controlled by a time-based scheduling controls. [§130.2(c)2]
3. **Motion Sensing Controls**: Outdoor luminaires greater than 40 watts and mounted less than 24 ft. and above the ground shall be motion controlled, so that the lighting power of each luminaire shall be automatically reduced by at least 50 percent. This applies to luminaires providing general hardscape lighting, outdoor sales lot lighting, vehicle service station hardscape lighting, or vehicle service station canopy lighting. [§130.2(c)2]

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C. Motion Sensing Controls

§130.2(c) 3

Outdoor luminaires greater than 40 watts, where the bottom of the luminaire is mounted 24 ft. or less above the ground, shall be operated with motion sensing controls if they are used in the following applications:

Please see below requirements for lighting control and all lighting fixtures selected within project. Provide Listing approved fixtures and controls and the required documentation stating per below CEC directive.

It is the responsibility of the manufacturer to certify its lighting control products as required by the applicable California Appliance Efficiency Standards (also known as Title 20 Standards). The approved products will be listed in the CEC's directories or in an appliance efficiency database.

Please keep in mind these are review comments, and can be discussed and reviewed prior to final commissioning requirements.

- END OF COMMENTS -

APPENDIX E

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COMMISSIONING SUBMITTAL REVIEW

Project name: x
Project location: x
Submittal: x
Reviewer: x

☐ **No Exceptions Taken** ☒ **Response(s) Required** ☐ **Resubmit Specific Items** ☐ **Revise and Resubmit**	Checking is only for general conformance with the design concept of the project and general compliance with the information given in the contract documents specifically to the commissioning scope of the heating, ventilation, air conditioning, domestic hot water, and lighting. Any action shown is subject to the requirements of the plans and specifications. Contractor is responsible for: dimensions which shall be confirmed and correlated at the job site; fabrication processes and techniques of construction; coordination of work with that of all other trades and the satisfactory performance of work.

NO.	SHEET	DISCIPLINE	COMMENT	RESPONSE / ACTION	RESPONSE BY
S-01					
S-02					
S-03					
S-04					

- END OF COMMENTS -

APPENDIX F

Steps for Contractor Execution

1.0 Prior to equipment startup, the Contractor shall provide the CxA with California required non-residential lighting installation forms indicated on the contract document T-24 sheets to be completed by the installing subcontractor. Download the most recent NRCI forms from California's website: https://energycodeace.com/nonresidentialforms

2.0 The CxA will review for compliance and include within the report.

3.0 Recommend the Contractor keep copies of completed forms on-site should authority having jurisdiction or inspector request to review.

CERTIFICATE OF INSTALLATION		NRCI-LT0-01-E
Outdoor Lighting		(Page 1 of 2)
Project Name:	Enforcement Agency:	Permit Number:
Project Address:	City:	Zip Code:

GENERAL INFORMATION			
DATE OF BUILDING PERMIT:	PERMIT #:		
BUILDING TYPE	☐ Nonresidential Outdoor Lighting		
PHASE OF CONSTRUCTION	☐ New Construction	☐ Addition	☐ Alteration
If more than one person has responsibility for building construction, each person shall prepare and sign an Installation Certificate document applicable to the portion of construction for which they are responsible; alternatively, the person with chief responsibility for construction shall prepare and sign the Installation Certificate document(s) for the entire construction.			

SCOPE OF RESPONSIBILITY	
Enter the date of approval by enforcement agency of the Certificate of Compliance that provides the specifications for the energy efficiency measures for the scope of responsibility for this Installation Certificate.	Date:

In the table below, identify all construction documents that show that the outdoor lighting and controls were installed as it was proposed in the Certificates of Compliance.

Document Title or Description	Applicable Sheets or Pages, Tables, Schedules, etc.	Date Approved By the Enforcement Agency

CERTIFICATE OF INSTALLATION		NRCI-LT0-01-E
Outdoor Lighting		(Page 2 of 2)
Project Name:	Enforcement Agency:	Permit Number:
Project Address:	City:	Zip Code:

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT	
1. I certify that this Certificate of Installation documentation is accurate and complete.	
Documentation Author Name:	Documentation Author Signature:
Documentation Author Company Name:	Date Signed:
Address:	CEA Certification Identification (If applicable):
City/State/Zip:	Phone:

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of Installation is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code in the applicable classification to accept responsibility for the system design, construction, or installation of features, materials, components, or manufactured devices for the scope of work identified on this Certificate of Installation and attest to the declarations in this statement (responsible builder/installer), otherwise I am an authorized representative of the responsible builder/installer.
3. The constructed or installed features, materials, components or manufactured devices (the installation) identified on this Certificate of Installation conforms to all applicable codes and regulations, and the installation conforms to the requirements given on the plans and specifications approved by the enforcement agency.
4. I reviewed a copy of the Certificate of Compliance approved by the enforcement agency that identifies the specific requirements for the scope of construction or installation identified on this Certificate of Installation, and I have ensured that the requirements that apply to the construction or installation have been met.
5. I will ensure that a completed signed copy of this Certificate of Installation shall be posted, or made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a completed signed copy of this Certificate of Installation is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Builder/Installer Name:	Responsible Builder/Installer Signature:	
Company Name: (Installing Subcontractor or General Contractor or Builder/Owner)	Position With Company (Title):	
Address:	CSLB License:	
City/State/Zip:	Phone:	Date Signed:

CERTIFICATE OF INSTALLATION		NRCI-LTO-02-E
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GENERAL INFORMATION		
DATE OF BUILDING PERMIT:	PERMIT #:	
BUILDING TYPE	☐ Nonresidential Outdoor Lighting	
PHASE OF CONSTRUCTION	☐ New Construction	☐ Addition ☐ Alteration

SCOPE OF RESPONSIBILITY	
Enter the date of approval by enforcement agency of the Certificate of Compliance that provides the specifications for the energy efficiency measures for the scope of responsibility for this Installation Certificate.	Date:

Requirements in the Standards:

§130.4(b) - Before an Energy Management Control System (EMCS), or Lighting Control System can be recognized for compliance with the lighting control requirements in Part 6 of Title 24, the person who is eligible under Division 3 of the Business and Professions Code to accept responsibility for the construction or installation of features, materials, components, or manufactured devices shall sign and submit this Installation Certificate.

If any of the requirements in this Installation Certificate fail the Energy Management Control System or Lighting Control System installation requirements, these options for controlling lighting shall not be recognized for compliance with the Building Energy Efficiency Standards.

Check all that apply:

PART 1 What type of Lighting Control System has been installed?

☐ **A. Energy Management Control System (EMCS) -** Is an automated control system that regulates the energy consumption of a building by controlling the operation of energy consuming systems and is capable of monitoring loads, and adjusting operations in order to optimize energy usage and respond to demand response signals.

The Energy Management Control System is installed to function as a lighting control required by Part 6 and its functionally meets all applicable requirements for each application for which it is installed, in accordance with Section 110.9, 130.2, 130.4, 150.0(k), and 150.2, and complies with Nonresidential Appendix NA7.7.2.

☐ **B. Lighting Control System -** Requires two or more components to be installed in the building to provide all of the functionality required to make up a fully functional and compliant lighting control.

The installed Lighting Control System is installed to comply with applicable requirements in Section 110.9, 130.2, 130.4, 150.0(k), and 150.2, and complies with Reference Nonresidential Appendix NA7.7.1.

PART 2 Lighting Control Functional requirements:

Check all that are in compliance with the Standards when verifying the installation of an EMCS or Lighting Control System.

☐ A. All outdoor lighting controls and equipment have been installed in accordance with the manufacturer's instructions.

☐ B. All installed EMCS systems meet each respective lighting control for which it is installed for meeting requirements in Section 110.9, 130.2, 130.4, 150.0(k), and 150.2.

☐ C. Components of all installed lighting control systems meet applicable requirements in Section 110.9, 130.2, 130.4, 150.0(k), and 150.2.

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Energy Management Control System or Lighting Control System		(Page 2 of 4)
Project Name:	Enforcement Agency:	Permit Number:
Project Address:	City:	Zip Code:

☐ D. The EMCS or Lighting Control System functions as one or more of the checked items below, and complies with the applicable requirements:

☐ 1. The installed controls meet applicable requirements for automatic scheduling controls in Section 110.9(b)1.

Check all that are applicable to the installed controls:

- ☐ Time-switch controls
- ☐ Astronomical time-switch controls
- ☐ Multi-level time-switch controls
- ☐ Time-switch controls installed outdoors

☐ 2. The installed controls meet applicable requirements for motion sensing controls in Section 110.9(b)4.

PART 3 Requirements for which the control is being installed to comply with:

Identify all requirements in the Standards for which the EMCS or Lighting Control System is installed to function as and complies with:

Check all that are in compliance with the Standards, Section 130.2:

☐ A. During daytime, the installed EMCS or lighting control system turn off all controlled outdoor lighting. Check all that are applicable to the installed controls:
- ☐ Photocontrols;
- ☐ Astronomical time-switch control;
- ☐ Other control capable of automatically shutting OFF the outdoor lighting when daylight is available

☐ B. (Automatic scheduling control functionality) During normally unoccupied schedule, the installed EMCS or lighting control system function as one or more of the checked items below. Check all that are applicable to the installed controls:
- ☐ Reduce the outdoor lighting power between 50 percent and 90 percent.
- ☐ Turn the lighting off.

☐ C. (Automatic scheduling control functionality) For any override function included with the installed EMCS or lighting control system, the override function turns lighting on during its scheduled dim or off state for no more than 2 hours when an override is initiated.

☐ D. (Motion sensing control functionality) During unoccupied periods, the installed controls either reduce the lighting power of each controlled luminaire by at least 50 percent, or turn off the luminaire.

☐ E. (Motion sensing control functionality) After 15 minutes of vacancy in the outdoor area covered by the motion sensing controls, the installed controls either dim or turn off the lighting.

☐ F. (Motion sensing control functionality) No more than 1500 watts of lighting power is controlled by a single motion sensor.

☐ G. (Motion sensing control functionality) Motion sensing controls must be installed for the following luminaires, and may be installed for other outdoor lighting and in combination with other outdoor lighting controls. Check all that are applicable:
- ☐ Outdoor luminaires other than building façade, ornamental hardscape, outdoor dining, or outdoor sales frontage lighting, where the bottom of luminaire is mounted 24 feet or less above grade.
- ☐ Outdoor wall mounted luminaires installed for building façade, ornamental hardscape or outdoor dining lighting that have a bilaterally symmetric distribution as described in the IES handbook (typically referred to as “wall packs”) mounted 24 feet above grade or lower.

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Check all that are applicable and in compliance with the Standards:

- ☐ A. Single-Family Building Outdoor Lighting.
  - ☐ Outdoor lighting attached to building, private patios, entrances, balconies, and porches: All lighting must be controlled by a manual on and off switch and one of the following:
    - ☐ Astronomical time clock control
    - ☐ Photocontrol and either a motion sensor or an automatic time switch control
  - ☐ Parking lots and carports with 8 vehicles or more per site: All lighting must comply with nonresidential outdoor lighting control requirements.
  - ☐ Parking lots and carports with less than 8 vehicles per site: The lighting must comply with one of the following:
    - ☐ Residential outdoor lighting control requirements in Section 150.0(k)3A
    - ☐ Nonresidential outdoor lighting control requirements in Section 130.2.
- ☐ B. Low-Rise Residential Building Outdoor Lighting.
  - ☐ All lighting attached to the residence or to other buildings on the same lot must comply with one of the following:
    - ☐ Section 150.0(k)3A.
    - ☐ Section 130.2.
  - ☐ Private patios, entrances, balconies, porches and other lighting not regulated by Section 150.0(k)3B: All lighting must comply with one of the following:
    - ☐ Residential outdoor lighting control requirements in Section 150.0(k)3A
    - ☐ Nonresidential outdoor lighting control requirements in Section 130.2.
  - ☐ Parking lots and carports with 8 vehicles or more per site: All lighting must comply with nonresidential outdoor lighting control requirements.
  - ☐ Parking lots and carports with less than 8 vehicles per site: The lighting must comply with one of the following:
    - ☐ Residential outdoor lighting control requirements in Section 150.0(k)3A
    - ☐ Nonresidential outdoor lighting control requirements in Section 130.2.
- ☐ C. High-Rise Residential Building Outdoor Lighting.
  - ☐ Outdoor lighting attached to the building that is not controlled from within the dwelling unit must comply with Section 130.2.
  - ☐ Outdoor lighting attached to the building that is controlled from within the dwelling unit must comply with Section 150.0(k)3A.
  - ☐ Parking lot and carport lighting must comply with Section 130.2.

CERTIFICATE OF INSTALLATION		NRCI-LTO-02-E
Energy Management Control System or Lighting Control System		(Page 4 of 4)
Project Name:	Enforcement Agency:	Permit Number:
Project Address:	City:	Zip Code:

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT	
1. I certify that this Certificate of Installation documentation is accurate and complete.	
Documentation Author Name:	Documentation Author Signature:
Documentation Author Company Name:	Date Signed:
Address:	CEA Certification Identification (If applicable):
City/State/Zip:	Phone:

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of Installation is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code in the applicable classification to accept responsibility for the system design, construction, or installation of features, materials, components, or manufactured devices for the scope of work identified on this Certificate of Installation and attest to the declarations in this statement (responsible builder/installer), otherwise I am an authorized representative of the responsible builder/installer.
3. The constructed or installed features, materials, components or manufactured devices (the installation) identified on this Certificate of Installation conforms to all applicable codes and regulations, and the installation conforms to the requirements given on the plans and specifications approved by the enforcement agency.
4. I reviewed a copy of the Certificate of Compliance approved by the enforcement agency that identifies the specific requirements for the scope of construction or installation identified on this Certificate of Installation, and I have ensured that the requirements that apply to the construction or installation have been met.
5. I will ensure that a completed signed copy of this Certificate of Installation shall be posted, or made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a completed signed copy of this Certificate of Installation is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Builder/Installer Name:	Responsible Builder/Installer Signature:	
Company Name: (Installing Subcontractor or General Contractor or Builder/Owner)	Position With Company (Title):	
Address:	CSLB License:	
City/State/Zip:	Phone:	Date Signed:

NRCI-LTO-02-E User Instructions

This Certificate of Installation must be submitted whenever a lighting control system, and whenever an Energy Management Control System (EMCS), has been installed to comply with any of the outdoor lighting control requirements in the Standards.

If this Certificate of Installation is not submitted, or if all of the appropriate boxes have not been checked, the lighting controls system or the EMCS will not be recognized for compliance with the lighting control requirements in the Standards.

Note that if lighting control systems are installed, a Certificate of Acceptance must also be submitted.

Check all appropriate boxes in this certificate as a declaration that the control system has been installed to meet all of the minimum specifications and functionalities.

- Part 1 – Identify if the system is a lighting control system, or an EMCS, by checking the appropriate boxes.
- Part 2 - Lighting Control Functional requirements: Check all boxes that apply to verify the functionality of the Lighting Control System or EMCS.
- Part 3 – Check all boxes to indicate what sections of the Standards the control has been installed to comply with.

INSTALLATION VERIFICATION	Y/N	COMMENTS
Have the manufacturer equipment data submittals been approved by the Engineer of Record.		
Lighting control panel is installed in location as indicated on plans		
Lighting control panel relay schedule is within the panel		
Installed lighting fixtures are installed per plans		
Outdoor photosensor is installed in location as indicated on plans		
Motion sensors are installed per plans if applicable		

Completed By:

Print Name _____ Company _____

Signature _____ Date _____

-- End of Checklist --

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760.560.0100 | www.salasobrien.com

SITE OBSERVATION REPORT # xx

Project name:	x
Project location:	x
Observation date/time:	x
Weather Conditions:	T_{db}: 72°F, RH: 9%, mostly sunny
Observation by:	Adam Bolduc, Salas O'Brien (adam.bolduc@salasobrien.com) Casey Coffman, Salas O'Brien (casey.coffman@salasobrien.com)
Attendees:	x x
Report by:	Casey Coffman (casey.coffman@salasobrien.com)
Attachments:	*Commissioning Issues Log xx/xx/xxxx*

Summary:

xxxx:

- xxx

Next Steps:

- xxx

APPENDIX G

Steps for Contractor Execution

1.0 The Contractor shall provide the CxA with California required non-residential Lighting Certificate of Acceptance forms indicated on the contract document T-24 sheets to be completed by the installing subcontractor. Download the most recent NRCA forms from California's website: https://energycodeace.com/nonresidentialforms

2.0 The CxA will review the acceptance documentation and include within the Final Commissioning Report.

3.0 Recommend Contractor keep copies of completed forms on-site should authority having jurisdiction or inspector request to review.

OUTDOOR LIGHTING ACCEPTANCE TESTS

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Outdoor Lighting Control Acceptance Document	(Page 1 of 3)

Project Name:	Enforcement Agency:	Permit Number:
Project Address:	City:	Zip Code:

Compliance Results: **[COMPLIES *or* DOES NOT COMPLY]**	Enforcement Agency Use: Checked by/Date

Intent:	This document is used to demonstrate compliance with acceptance requirements in §130.4(a)6 and Reference Nonresidential Appendix NA7.8 for outdoor lighting controls. Attach additional sets of pages 1 through 2, as required, for all controls that must be tested.

Indicate all types of outdoor lighting controls tested for this project:	
☐	Photo controls *(Sections A-1 and B-1 of this document should be completed)*
☐	Automatic scheduling controls (including astronomical time switch controls) not used in conjunction with motion sensors *(Sections A-2 and B-2 of this document should be completed)*
☐	Automatic scheduling controls (including astronomical time switch controls) and motion sensors used in conjunction *(Sections A-3 and B-3 of this document should be completed)*

Photo Controls

Building:	Floor:	Room:	Control:

A-1. Photo Control Construction Inspection (NA7.8.3)

☐	a.	The photo control is installed. (NA7.8.3)	

Construction Inspection Compliance: ◯ Complies ◯ Does Not Comply

B-1. Photo Control Functional Testing (NA7.8.4)

Confirm compliance (**Y** - yes / **N** - no) for the control being tested.

a.	During daytime simulation, all controlled outdoor lighting is turned off. (NA7.8.4(a), §130.2(c)1)	
b.	During nighttime simulation, all controlled outdoor lighting is turned on. (NA7.8.4(b))	

Functional Testing Compliance: ◯ Complies ◯ Does Not Comply

Automatic Scheduling Controls (Not Used in Conjunction with Motion Sensors)

Building:	Floor:	Room:	Control:

A-2. Automatic Scheduling Control Construction Inspection (NA7.8.7)

☐	a.	The automatic scheduling control is installed. (NA7.8.7(a))
☐	b.	The automatic scheduling control is programmed with ON and OFF schedules that match the schedules in the construction documents. ***OR*** If the schedule is unknown, the programmed schedule matches the default schedule where the OFF schedule is from 12:00 A.M. to 6:00 A.M. and the ON schedule is all other night time hours, 7 days per week. (NA7.8.7(b))
☐	c.	Demonstrate and document the lighting control programming including ON and OFF schedules for weekdays, weekends, and holidays (if applicable). (NA7.8.7(c))
☐	d.	The correct time and date are properly set in the control. (NA7.8.7(d))

Construction Inspection Compliance: ◯ Complies ◯ Does Not Comply

B-2. Automatic Scheduling Control Functional Testing (NA7.8.8)

Confirm compliance (**Y** - yes / **N** - no) for the control being tested.

a.	During daytime simulation, all controlled outdoor lighting is turned off. (NA7.8.8(a), §130.2(c)1)	
b.	During nighttime simulation, all controlled outdoor lighting is turned on in accordance with the programmed schedule. (NA7.8.8(b), §130.2(c)2B)	
c.	During nighttime simulation, the power of controlled outdoor lights is turned off or reduced by at least 50% in accordance with the programmed schedule. (NA7.8.8(c), §130.2(c)2A, §130.2(c)2B)	

Functional Testing Compliance: ◯ Complies ◯ Does Not Comply

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Project Name:	Enforcement Agency:	Permit Number:
Project Address:	City:	Zip Code:

Automatic Scheduling Controls and Motion Sensors Used in Conjunction			
Building:	Floor:	Room:	Controls:

A-3. Automatic Scheduling Control and Motion Sensor Construction Inspection (NA7.8.7)		
☐	a.	The automatic scheduling control is installed. (NA7.8.7(a))
☐	b.	The automatic scheduling control is programmed with ON and OFF schedules that match the schedules in the construction documents. ***OR*** If the schedule is unknown, the programmed schedule matches the default schedule where the OFF schedule is from 12:00 A.M. to 6:00 A.M. and the ON schedule is all other night time hours, 7 days per week. (NA7.8.7(b))
☐	c.	Demonstrate and document the lighting control programming including ON and OFF schedules for weekdays, weekends, and holidays (if applicable). (NA7.8.7(c))
☐	d.	The correct time and date are properly set in the control. (NA7.8.7(d))
☐	e.	The motion sensor has been located to minimize false signals. (NA7.8.7(a))
☐	f.	The motion sensor is not triggered by motion outside of controlled area. (NA7.8.7(b))
☐	g.	The desired motion sensor coverage is not blocked by obstructions that could adversely affect performance. (NA7.8.7(c))
Construction Inspection Compliance: ◯ Complies ◯ Does Not Comply		

B-3. Automatic Scheduling Control and Motion Sensor Functional Testing (NA7.8.8) Confirm compliance (**Y** - yes / **N** - no) for the control being tested.		
☐	Motion sensor is in a sample group. (NA7.8.2) If sampling method is used, attach a page listing the tested and untested sensors in the sample group. If motion sensor is one of the untested sensors in the a sample group, indicate not applicable (**N/A**) in lines d through l.	
Step 1: Daytime simulation		
a.	During daytime simulation, all controlled outdoor lighting is turned off. (NA7.8.8(a), §130.2(c)1)	
Step 2: Nighttime simulation		
b.	During nighttime simulation, all controlled outdoor lighting is turned on in accordance with the programmed schedule. (NA7.8.8(b), §130.2(c)2B)	
c.	During nighttime simulation, the power of controlled lighting is turned off or reduced by at least 50% in accordance with the programmed schedule. (NA7.8.8(c), §130.2(c)2A, §130.2(c)2B)	
Step 3: Simulate motion in the controlled area. (NA7.8.8(b))		
d.	The status indicator operates correctly. (NA7.8.8(b)i, §110.9(b)4C)	
e.	The controlled lighting turns on immediately upon entry into the controlled area. (NA7.8.8(b)ii, §130.2(c)3B)	
f.	The signal sensitivity is adequate to achieve desired control. (NA7.8.8(b)iii)	
Step 4: During simulation of the normally occupied schedule, simulate no occupancy in the controlled area. (NA7.8.8(c))		
g.	The power of controlled lighting is reduced by at least 50% within 15 minutes from the start of an unoccupied condition. Fraction of light output reduction is an acceptable proxy for reduction in lighting power. (NA7.8.8(c)i, §130.2(c)3A, §130.2(c)3B)	
h.	The sensor does not trigger a false "on" from movement outside of the controlled area. (NA7.8.2, Step 2(b))	
i.	The signal sensitivity is adequate to achieve the desired control. (NA7.8.8(c)ii)	
Step 5: During simulation of the normally unoccupied schedule, simulate no occupancy in the controlled area. (NA7.8.8(d))		
j.	The power of controlled lighting is reduced by at least 50% within 15 minutes from the start of an unoccupied condition. Fraction of light output reduction is an acceptable proxy for reduction in lighting power. (NA7.8.8(d)i, §130.2(c)3A, §130.2(c)3B)	
k.	The sensor does not trigger a false "on" from movement outside of the controlled area. (NA7.8.2, Step 2(b))	
l.	The signal sensitivity is adequate to achieve the desired control. (NA7.8.8(d)ii)	
Functional Testing Compliance: ◯ Complies ◯ Does Not Comply		

CERTIFICATE OF ACCEPTANCE		NRCA-LTO-02-A
Outdoor Lighting Control Acceptance Document		(Page 3 of 3)
Project Name:	Enforcement Agency:	Permit Number:
Project Address:	City:	Zip Code:

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT	
I certify that this Certificate of Acceptance documentation is accurate and complete.	
Documentation Author Name:	Documentation Author Signature:
Documentation Author Company Name:	Date Signed:
Address:	CEA/ATT Certification Identification (If applicable):
City/State/Zip:	Phone:

FIELD TECHNICIAN'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of Acceptance is true and correct.
2. I am the person who performed the acceptance verification reported on this Certificate of Acceptance (Field Technician).
3. The construction or installation identified on this Certificate of Acceptance complies with the applicable acceptance requirements indicated in the plans and specifications approved by the enforcement agency, and conforms to the applicable acceptance requirements and procedures specified in Reference Nonresidential Appendix NA7.
4. I have confirmed that the Certificate(s) of Installation for the construction or installation identified on this Certificate of Acceptance has been completed and signed by the responsible builder/installer and has been posted or made available with the building permit(s) issued for the building.

Field Technician Name:	Field Technician Signature:	
Field Technician Company Name:	Position with Company (Title):	
Address:	ATT Certification Identification (if applicable):	
City/State/Zip:	Phone:	Date Signed:

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. I am the Field Technician, or the Field Technician is acting on my behalf as my employee or my agent and I have reviewed the information provided on this Certificate of Acceptance.
2. I am eligible under Division 3 of the Business and Professions Code in the applicable classification to accept responsibility for the system design, construction or installation of features, materials, components, or manufactured devices for the scope of work identified on this Certificate of Acceptance and attest to the declarations in this statement (responsible acceptance person).
3. The information provided on this Certificate of Acceptance substantiates that the construction or installation identified on this Certificate of Acceptance complies with the acceptance requirements indicated in the plans and specifications approved by the enforcement agency, and conforms to the applicable acceptance requirements and procedures specified in Reference Nonresidential Appendix NA7.
4. I have confirmed that the Certificate(s) of Installation for the construction or installation identified on this Certificate of Acceptance has been completed and is posted or made available with the building permit(s) issued for the building.
5. I will ensure that a completed, signed copy of this Certificate of Acceptance shall be posted, or made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a signed copy of this Certificate of Acceptance is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Person Name:	Responsible Person Signature:	
Responsible Person Company Name:	Position with Company (Title):	
Address:	CSLB License:	
City/State/Zip:	Phone:	Date Signed:

CERTIFICATE OF ACCEPTANCE		NRCA-LTI-04-A
Demand Responsive Lighting Control Acceptance Document		(Page 1 of 4)
Project Name:	Enforcement Agency:	Permit Number:
Project Address:	City:	Zip Code:

Compliance Results: **[COMPLIES *or* DOES NOT COMPLY]**	Enforcement Agency Use: Checked by/Date

Intent:	This document is used to demonstrate compliance with acceptance requirements in §130.4(a)5 and Reference Nonresidential Appendix NA7.6.3 for demand responsive lighting controls. Attach additional sets of pages 2 through 3, as required, for all controls that must be tested.

Indicate functional testing methods used for this project:	
☐	Illuminance measurement *(Sections A and B-1 of this document should be completed)*
☐	Current measurement *(Sections A and B-2 of this document should be completed)*

A. Construction Inspection (NA7.6.3.1)		
☐	a.	The demand responsive control is capable of receiving a demand responsive signal directly or indirectly through another device. (NA7.6.3.1(a))
☐	b.	The demand responsive control is a certified OpenADR 2.0a or OpenADR 2.0b Virtual End Node (VEN), as specified under Clause 11, Conformance, in the applicable OpenADR 2.0 Specification. (NA7.6.3.1(a), §110.12(a)1A) ***OR*** The demand responsive control is certified by the manufacturer to the Energy Commission as being capable of responding to a demand response signal from a certified OpenADR 2.0b VEN by automatically implementing the control functions requested by the VEN for the equipment it controls. (NA7.6.3.1(a), §110.12(a)1B)
☐	c.	The demand responsive control is capable of communicating using one or more of the following: Wi-Fi, ZigBee, BACnet, Ethernet, or hard-wiring. (NA7.6.3.1(a), §110.12(a)2)
☐	d.	The demand responsive control continues to perform all other functions provided by the control when communications are disabled or unavailable. (NA7.6.3.1(a), §110.12(a)4)
☐	e.	If the demand response signal is received from another device (such as an EMCS), that system must itself be capable of receiving a demand response signal from a utility meter or other external source. (NA7.6.3.1(b))
Construction Inspection Compliance: ◯ Complies ◯ Does Not Comply		

CERTIFICATE OF ACCEPTANCE		NRCA-LTI-04-A
Demand Responsive Lighting Control Acceptance Document		(Page 2 of 4)
Project Name:	Enforcement Agency:	Permit Number:
Project Address:	City:	Zip Code:

B-1. Functional Testing using Illuminance Measurement (NA7.6.3.2, Method 1)		
Building: Floor: Room: Control:		
☐	Space is representative of sample. (NA7.6.3.2) If sampling method is used, attach a page listing untested spaces in sample.	
Step 1: Select one location for illuminance measurement. The chosen location must not be in a skylit or primary sidelit area and the illuminance meter must not have a direct view of a window or skylight. If this is not possible, perform the test at a time and location at which daylight illuminance provides less than half of the design illuminance. (NA7.6.3.2, Method 1(a))		
a.	Enter the design illuminance value in footcandles (fc).	fc
Step 2: Full output test (NA7.6.3.2, Method 1(b))		
b.	Using the manual switches/dimmers, set the lighting system to full output. The lighting in areas with photo controls or occupant/vacancy sensors may be at less than full output or may be off. (NA7.6.3.2, Method 1(b)1)	
c.	Measure the illuminance at the selected location and enter the value in footcandles (fc). (NA7.6.3.2, Method 1(b)2)	fc
d.	Simulate a demand response condition using the demand responsive control. (NA7.6.3.2, Method 1(b)3)	
e.	Measure the illuminance at the selected location with the electric lighting system in the demand response condition and enter the value in footcandles (fc). (NA7.6.3.2, Method 1(b)4)	fc
f.	Calculate the percent reduction in illuminance from the full output condition to the demand response condition and enter the value in %. (Percent reduction = [(line c - line e) / line c] x 100%)	%
g.	Enter the area of the controlled space in square feet (ft^2).	ft^2
h.	Calculate the area-weighted average reduction in illuminance from the full output condition to the demand response condition for the building using the given formula and enter the value in %. (NA7.6.3.2, Method 1(b)5) Area-weighted average reduction = $\frac{[(f1*g1)+(f2*g2)+(f3*g3)+\cdots]}{[g1+g2+g3+\cdots]}$ x 100%	%
i.	The area-weighted average reduction (line h) is at least 15%. (NA7.6.3.2, Method 1(b)5, §110.12(c)) Enter yes (**Y**) or no (**N**).	
j.	The combined electric light and daylight illuminance is not reduced to less than 50% of the design illuminance in the tested space. (NA7.6.3.2, Method 1(b)5) ([line e / line a] ≥ 50%) Enter yes (**Y**) or no (**N**).	
Step 3: Minimum output test (NA7.6.3.2, Method 1(c))		
k.	Using the manual switches/dimmers in each space, set the lighting system to minimum output (but not off). The lighting in areas with photo controls or occupant/vacancy sensors may be at more than minimum output or may be off. (NA7.6.3.2, Method 1(c)1)	
l.	Measure the illuminance at the selected location and enter the value in footcandles (fc). (NA7.6.3.2, Method 1(c)2)	fc
m.	Simulate a demand response condition using the demand responsive control. (NA7.6.3.2, Method 1(c)3)	
n.	Measure the illuminance at the selected location with the electric lighting system in the demand response condition and enter the value in footcandles (fc). (NA7.6.3.2, Method 1(c)4)	fc
o.	The illuminance in the demand respond condition (line n) is not reduced to below the lesser of: the illuminance in the minimum output condition (line l) or 50% of the design illuminance (line a). (NA7.6.3.2, Method 1(c)5) Enter yes (**Y**) or no (**N**). Exception: In daylit spaces, the illuminance in the demand response condition (line n) may reduce below the illuminance in the minimum output condition. However, the combined electric light and daylight illuminance in the demand response condition must still be at least 50% of the design illuminance (line a). (NA7.6.3.2, Method 1(c)5 EXCEPTION)	
Functional Testing Compliance: ◯ Complies ◯ Does Not Comply		

CERTIFICATE OF ACCEPTANCE		NRCA-LTI-04-A
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Project Name:	Enforcement Agency:	Permit Number:
Project Address:	City:	Zip Code:

B-2. Functional Testing using Current Measurement (NA7.6.3.2, Method 2)

Building:	Floor:	Room:	Control:

☐	Space is representative of sample. (NA7.6.3.2) If sampling method is used, attach a page listing untested spaces in sample.	
Step 1: At the lighting circuit panel, select at least one lighting control circuit that serves spaces required to meet §130.1(e) and §110.12. (NA7.6.3.2, Method 2(a))		
Step 2: Full output test (NA7.6.3.2, Method 2(b))		
a.	Using the manual switches/dimmers, set the lighting system to full output in the space served by the selected circuit. The lighting in areas with photo controls or occupant/vacancy sensors may be at less than full output or may be off. (NA7.6.3.2, Method 2(b)1)	
b.	Measure the current at the selected circuit and enter the value in amperes (A). (NA7.6.3.2, Method 2(b)2)	A
c.	Calculate the sum of all the circuit currents in the full output condition and enter the value in amperes (A). (NA7.6.3.2, Method 2(b)5)	A
d.	Simulate a demand response condition using the demand responsive control in the space served by the selected circuit. (NA7.6.3.2, Method 2(b)3)	
e.	Measure the current at the selected circuit with the electric lighting system in the demand response condition and enter the value in amperes (A). (NA7.6.3.2, Method 2(b)4)	A
f.	Calculate the sum of all the circuit currents in the demand response condition and enter the value in amperes (A). (NA7.6.3.2, Method 2(b)5)	A
g.	Calculate the percent reduction in current at the selected circuit from the full output condition to the demand response condition and enter the value in %. (Percent reduction = [(line b - line e) / line b] x 100%)	%
h.	Calculate the total percent reduction in current from the full output condition to the demand response condition and enter the value in %. (NA7.6.3.2, Method 2(b)5) (Total percent reduction = [(line c - line f) / line c] x 100%)	%
i.	The total percent reduction in current (line h) is at least 15%. (NA7.6.3.2, Method 2(b)5) Enter yes (**Y**) or no (**N**).	
j.	The percent reduction in current at the selected circuit is no more than 50%. (NA7.6.3.2, Method 2(b)5) (line g ≤ 50%) Enter yes (**Y**) or no (**N**).	
Step 3: Minimum output test (NA7.6.3.2, Method 1(c))		
k.	Using the manual switches/dimmers in each space, set the lighting system to minimum output (but not off) in the space served by the selected circuit. The lighting in areas with photo controls or occupant/vacancy sensors may be at more than minimum output or may be off. (NA7.6.3.2, Method 2(c)1)	
l.	Measure the current at the selected circuit and enter the value in amperes (A). (NA7.6.3.2, Method 2(c)2)	A
m.	Simulate a demand response condition using the demand responsive control in the space served by the selected circuit. (NA7.6.3.2, Method 2(c)3)	
n.	Measure the current at the selected circuit with the electric lighting system in the demand response condition and enter the value in amperes (A). (NA7.6.3.2, Method 1(c)4)	A
o.	The current in the demand respond condition (line n) is not reduced to below the lesser of: the current in the minimum output condition (line l) or 50% of the current value at full output (line b). (NA7.6.3.2, Method 2(c)5) Enter yes (**Y**) or no (**N**). Exception: Circuits that supply power to the daylit portion of enclosed spaces as long as the current for lighting in the non-daylit portions of the enclosed space in the demand response condition is not reduced below the lesser of 50% power input level or the current in the minimum light output condition. (NA7.6.3.2, Method 2(c)5 EXCEPTION)	
Functional Testing Compliance: ◯ Complies ◯ Does Not Comply		

DEMAND RESPONSIVE LIGHTING CONTROL ACCEPTANCE DOCUMENT

CERTIFICATE OF ACCEPTANCE		NRCA-LTI-04-A
Demand Responsive Lighting Control Acceptance Document		(Page 4 of 4)
Project Name:	Enforcement Agency:	Permit Number:
Project Address:	City:	Zip Code:

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT	
I certify that this Certificate of Acceptance documentation is accurate and complete.	
Documentation Author Name:	Documentation Author Signature:
Documentation Author Company Name:	Date Signed:
Address:	CEA/ATT Certification Identification (If applicable):
City/State/Zip:	Phone:

FIELD TECHNICIAN'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of Acceptance is true and correct.
2. I am the person who performed the acceptance verification reported on this Certificate of Acceptance (Field Technician).
3. The construction or installation identified on this Certificate of Acceptance complies with the applicable acceptance requirements indicated in the plans and specifications approved by the enforcement agency, and conforms to the applicable acceptance requirements and procedures specified in Reference Nonresidential Appendix NA7.
4. I have confirmed that the Certificate(s) of Installation for the construction or installation identified on this Certificate of Acceptance has been completed and signed by the responsible builder/installer and has been posted or made available with the building permit(s) issued for the building.

Field Technician Name:	Field Technician Signature:	
Field Technician Company Name:	Position with Company (Title):	
Address:	ATT Certification Identification (if applicable):	
City/State/Zip:	Phone:	Date Signed:

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. I am the Field Technician, or the Field Technician is acting on my behalf as my employee or my agent and I have reviewed the information provided on this Certificate of Acceptance.
2. I am eligible under Division 3 of the Business and Professions Code in the applicable classification to accept responsibility for the system design, construction or installation of features, materials, components, or manufactured devices for the scope of work identified on this Certificate of Acceptance and attest to the declarations in this statement (responsible acceptance person).
3. The information provided on this Certificate of Acceptance substantiates that the construction or installation identified on this Certificate of Acceptance complies with the acceptance requirements indicated in the plans and specifications approved by the enforcement agency, and conforms to the applicable acceptance requirements and procedures specified in Reference Nonresidential Appendix NA7.
4. I have confirmed that the Certificate(s) of Installation for the construction or installation identified on this Certificate of Acceptance has been completed and is posted or made available with the building permit(s) issued for the building.
5. I will ensure that a completed, signed copy of this Certificate of Acceptance shall be posted, or made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a signed copy of this Certificate of Acceptance is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Person Name:	Responsible Person Signature:	
Responsible Person Company Name:	Position with Company (Title):	
Address:	CSLB License:	
City/State/Zip:	Phone:	Date Signed:

Purpose of Test:	To verify exterior lighting control is operating per design
Instrumentation:	Lighting control panel Photocell cover device
Estimated Time Per Zone:	10-30 minutes
Safety Hazards:	None.
Prerequisites:	Lighting controls complete, panel installed Lighting controls shop drawings Lighting control acceptance test documentation NRCA-LTO-02-A

Zone: Exterior Lighting Zone 1		
Test Description:	**Results**	**Pass/Fail (P/F):**
1. Daytime Simulation		
Record time:		
Is photosensor protected from direct sunlight?		
Record current programmed "ON" schedule:		
Record current programmed "OFF" schedule:		
Are lights "OFF" per schedule and photosensor input.		
Record photosensor input value:		
2. Nighttime Simulation		
Record method of simulation (Time = Time / Photocell =Photo)		
Are lights "ON" per schedule and/or photocell input?		
Return all overrides to their initial operation settings.		

Deficiencies/Notes:

1. –
2. –

Purpose of Test:	To verify lighting control of daylight harvesting is operating per design
Instrumentation:	Lighting control panel Photocell cover device
Estimated Time Per Zone:	15-30 minutes per zone
Safety Hazards:	None.
Prerequisites:	Lighting controls complete, panel installed Lighting controls shop drawings Lighting control acceptance test documentation NRCC-LTI-03-A

Test Description:	**Zone:**	**Pass/Fail (P/F):**
1. Initial Conditions		
Is control type open or closed loop (O/C)?		
Is photosensor located per plans?		
Is photosensor protected from direct sunlight?		
Record lighting signal change time interval set by contractor:		
2. Identify Reference Location		
Identify the Reference Location as the area within the zone furthest from daylight sources. (secondary zone)		
Return all overrides to their initial operation settings.		
3. No Daylight Baseline Test		
Simulate conditions without daylight; close blinds or cover fenestration.		
Record lighting signal percentage or illuminance foot-candles at reference location.		
Verify luminance levels are adequate for type of simulation.		
4. Full Daylight Test		
Simulate conditions with full daylight.		
Temporarily adjust sensor settings to shorten time delay for testing if needed.		
Verify luminance levels decrease and are adequate for type of simulation.		
Record lighting signal percentage or illuminance foot-candles at reference location.		
Return all overrides to their initial operation settings.		
5. Partial Daylight Test - Continuous Dimming		
Simulate conditions with partial daylight.		

Test Description:	Zone:	Pass/Fail (P/F):
Temporarily adjust sensor settings to shorten time delay for testing if needed.		
Verify luminance levels increase and are adequate for type of simulation.		
Record lighting signal percentage or illuminance foot-candles at reference location.		
Verify luminance is no less than the No Daylight measurement.		
Verify luminance is no greater than 150% of the No Daylight measurement, or no greater than 35% of full-load power.		
Verify luminaires do not flicker or generate abnormal noise. (Yes=no issues)		
Return all overrides to their initial operation settings.		
6. Multi-Level and Dimming (If Applicable)		
Verify installed dimmer switch matches design documents.		
Verify dimmer switch overrides daylight control. (If applicable)		
Record time delay after dimmer override to return to normal daylight controls.		
Verify dimmer switch functions per design documents without luminaire flicker or noise.		
Verify the first stage activates the percent of lights indicated in design documents.		
Verify a reasonably uniform amount of illuminance is achieved when dimming or staging the luminaires.		
Return all overrides to their initial operation settings.		

Deficiencies/Notes:

1. Note 1
2. Note 2

APPENDIX H

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Vista, CA 92081
760.560.0100

COMMISSIONING ISSUES AND RESOLUTIONS LOG

Project name: xxx
Project location: xxx
Updated: 4/7/2020

No.	Date Observed	Equipment / System	Issue Comments	Response / Action Taken	Est. Resolution Date	Status
1.01						
1.02						
2.01						

- END OF COMMENTS -

SUPPORTING PHOTOS		
#	#	#
#	#	#

- END OF PHOTOS -

APPENDIX I

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Vista, CA 92081
760.560.0100

Operations and Maintenance Training Summary - Lighting

Project name: -
Project location: -
Attendees: *Please provide an attendance sheet*

General Training Requirements – Specification 01 79 00 – Demonstration and Training

The table below indicates the training requirements identified in the general training specification 01 79 00. The information following the table are detailed recommendations for training on each system identified in the 01 79 00 specification.

System	Specification Division	Training Type	Training Location	Training Contractor	Date	Remarks
Lighting	26 00 00	In person 8-hour class	Site	Subcontractor	TBD	Basic Materials and Methods, Service and Distribution, Switchboards, Disconnects, Grounding, Transformers, Panelboards, Overcurrent Protective Devices, Contactors, Voltage Surge Suppression, Testing, Lighting, Interior and Exterior Luminaires, Lamps and Accessories, Emergency Lighting, Heating Tracing

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Lighting Control System Recommended Training Requirements – Specification 26 08 00

Electrical System	Area Served	Training Contractor	Recommended Training Topics
Lighting Control			• Lighting Control Panel locations • Scene types, switching between scenes, and editing scenes • Occupancy sensor locations and operation • Daylighting harvesting and photocell location and operation • Dimming operation and general switch operation for various zones • Exterior lighting schedule and photocell location and operation • General troubleshooting information • Service contact information

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O&M TRAINING ATTENDEES

Project name: -
Project location: -
Date: -

Name	Initials	Company	Phone Number	Email Address	Role

- END OF ATTENDEES -

APPENDIX J