



Street Lighting Contractor Scope of Work

The Energy Network Project ID

A14CSL1

Prepared for

The City of Culver City

Prepared by

The Energy Network

Scope of Work Developed by

kW Engineering

October 6, 2015

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A Project Supported by The Energy Network

The Energy Network, administered by Los Angeles County, was authorized by the California Public Utilities Commission to help eligible public agencies in Southern California harness their collective action, save energy, reduce operating costs and protect precious resources. To expand public agency participation in utility energy efficiency programs, The Energy Network is offering a range of free energy efficiency services to assist public agencies with accelerating energy retrofits.

The Street Lighting Upgrade project at the City of Culver City is being supported by The Energy Network. The services provided as Construction Management Support are defined on a separate documented titled **Construction Management Roles and Responsibilities**. Please refer to this document to better understand the relationship and role of The Energy Network Project Manager and assigned Energy Consultant.

Participation of The Energy Network is entirely at the discretion of the City of Culver City and The Energy Network may modify or terminate its services based on funding availability at any time.

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1. Summary of Scope of Work

The City of Culver City currently owns and operates 1,491 streetlights under their LS-2 accounts. The City's streetlight inventory predominantly consists of High Pressure Sodium (HPS) and Mercury Vapor (MV) cobrahead fixtures of various wattages, though other fixture types are included in the scope as well.

The City has identified an energy conservation opportunity through the replacement of the City-owned streetlights with Light-Emitting Diode (LED) and induction (IND) fixtures. This project will replace all existing LS-2 streetlights. The residential street lights will be replaced with LED fixtures of various wattages, and the 'arterial' street lights will be replaced with induction fixtures.

Table 1 presents the inventory of existing fixtures to be removed and replacement fixtures to be installed. The model of LED and induction fixtures has been selected for retrofit, and Table 1 reflects the model numbers and fixture wattages as shown in the Comet Electric Contractor Price Proposal, A14CSL08 – Culver City Street Lighting (Original Scope), dated 09/17/2015:

Table 1: Existing Cobrahead Fixtures and LED/Induction Replacement Fixtures

Existing Fixtures		New Fixtures		
Type	Wattage	Fixture Type	Estimated Wattage	Qty. of Fixture
HPS	150	CREE BXSP-B-HT-XXX-B-40K	68	145
HPS	200	CREE BXSP-B-HT-XXX-B-40K	87	5
HPS	250	CREE BXSP-C-HT-XXX-E-40K	101	36
HPS	400	CREE BXSP-C-HT-XXX-F-40K	139	11
MV	100	CREE BXSP-B-HT-XXX-A-40K	25	101
MV	175	CREE BXSP-B-HT-XXX-A-40K	42	197
MV	250	CREE BXSP-B-HT-XXX-B-40K	68	8
MV	400	CREE BXSP-B-HT-XXX-B-40K	87	30
HPS	50	*Crystal CLP-ACRN3-40CLED	45	23
HPS	70	*Crystal CLP-ACRN3-40CLED	45	169
HPS	100	*Crystal CLP-ACRN3-40CLED	45	115
HPS	50	Crystal VL-CLP-CH29 40	40	2
HPS	70	Crystal VL-CLP-CH29 40	40	19
HPS	100	Crystal VL-CLP-CH29 65	65	21
HPS	150	Crystal VL-CLP-CH29 80	80	33
HPS	200	Crystal VL-CLP-CH36 120	120	36
HPS	250	Crystal VL-CLP-CH36 120	120	207
HPS	310	Crystal VL-CLP-CH36 200	200	1
HPS	400	Crystal VL-CLP-CH36 250	250	70
MV	100	Crystal VL-CLP-CH29 65	65	18
MV	175	Crystal VL-CLP-CH29 80	80	24
MV	250	Crystal VL-CLP-CH36 120	120	65
MV	400	Crystal VL-CLP-CH36 250	250	148
MV	700	Crystal VL-CLP-CH36 250	250	1
MV	1000	Crystal VL-CLP-CH36 250	250	6
			Total	1,491

* Crystal Lighting to provide shield inside the interior of the Post Top LED fixtures for Dark-Sky Compliance of fixtures and to reduce light pollution

Additional details on the specified fixtures is provided in Section 4.1 below.

A full list of specific streetlights to be replaced with LED and induction luminaires is provided in the attached spreadsheet titled 'Closeout Checklists.' Also provided is a list of Southern California Edison (SCE)-maintained inventory maps for the LS-2 fixtures, titled 'Project Maps.'

The following parties are involved during the project construction:

- Agency CM: Public agency representative assigned as Construction Manager
- Contractor: The installation contractor

2. General

2.1 Terms and Conditions

Contractor will adhere to the following terms and conditions throughout the project:

- a) Contractor will conduct all work between Monday and Friday during normal working hours, defined as 8:00 am to 5:00 PM for residential streets and 9:00 am – 3:00 pm for the arterial streets.
- b) Contractor will comply with safety requirements and practices in accordance with Agency requirements and Cal/OSHA.
- c) Contractor will do all that is necessary to maintain a safe working environment for Contractor's employees, Agency and facility employees and the general public who might be present.
- d) Contractor will work with the Agency facility staff to understand and abide by any site-specific security procedures.
- e) Contractor will be diligent in following the technical specifications set forth in this Scope of Work and leave the construction sites with no damage to streets and roadways, sidewalks, medians, traffic signals, street and roadway signage, fixture poles and arms, landscaping, and other site features and characteristics.
- f) The site will be, at the conclusion of work, left in a condition of cleanliness such that no adverse evidence of work remains.
- g) Contractor is responsible for securing all necessary permits (including business license and encroachment permit) and will abide by local laws and regulations.
- h) All work will be performed in accordance with all national, state, and local codes.
- i) It is the Contractor's responsibility to include the proper Adjustment Factor(s) and the necessary tasks and quantities in the Price Proposal for completion of the work described herein. The risk associated with incorrect Adjustment Factor(s), missing tasks, and inaccurate quantities from the Price Proposal shall be borne by the Contractor.
- j) Contractor's Price Proposal is based on the final and approved Detailed Scope of Work and per the inventory shown on the Closeout Checklist (provided as a separate spreadsheet file) and the corresponding replacement fixture mapping Tables 1, considered as the Base Price. Contractor is to provide unit-based pricing, for each fixture type and size, as part of this Price Proposal. Unit prices to be listed on Appendix F.
- k) Contractor will be compensated for work performed and fixtures installed. Any increase on the Base Price due to smaller inventory will require written approval by the Agency and will follow procedures set forth for change orders. Any decrease on Base Price due to larger inventory will result in a lower Base Price to the Agency.
- l) Prior to ordering of equipment and fixtures, Contractor is to verify fixture quantities, types and installation needs. Final project invoice price will be

based upon the quantity of each fixture type installed multiplied by the unit price for that fixture.

- m) Contractor will provide clear and complete invoices with sufficient project information per utility requirements (Appendix G).

2.2 Prevailing Wages

Contractor shall be required to pay the prevailing rate of wages in accordance with the Labor Code and the State of California prevailing wage laws.

2.3 Additional Site Specific Requirements

Contractor will secure all necessary permits to abide by local laws and regulations.

2.4 Project Management

Contractor will fulfill the following requirements to facilitate project management:

- a) Contractor will perform the roles and assume responsibilities as per the responsibility matrix provided in Appendix A.
- b) If Contractor proposes substituting a piece of equipment different from the design, Contractor will submit a substitution request – Appendix B
- c) Contractor will provide an overall schedule for each week, and a minimum one week look-ahead schedule identifying work areas for each day and/or night.
- d) At the end of each shift, Contractor will provide a daily progress report log for that shift to the Agency Construction Manager to facilitate next-day verification/inspection; communication will also include problems (e.g., access issues) and details for the next day's work schedule – Appendix C
- e) The contractor and/or the Agency can initiate a supplemental task order. All parties are responsible for reviewing supplemental task orders
- f) Contractor will notify the Agency CM when the project has been completed.
 - Close-out will include true-up of the quantity of each retrofit code installed.
 - Agency CM will generate punch list items. Contractor will perform punch list items.
 - Contractor will furnish the final construction As-Built Documents as described below.
 - Contractor will cooperate with testing process and final inspection.

2.5 Meetings

The Contractor will attend the following meetings complete with preparation and follow-up:

- a) Pre-construction logistics meeting – for introduction to team members, to understand roles and responsibilities, to discuss the construction schedule, and to learn the submittal transmittal process. At the pre-construction meeting, the

Agency CM and the Contractor will establish a mechanism for ongoing verification and inspection of work.

- b) Construction kick-off meeting – to resolve any remaining pre-construction issues and begin onsite construction.
- c) Submittal review meetings as required - for discussion of major submittal-related issues that cannot be resolved through the submittal transmittal process.
- d) Periodic construction meetings, as needed – to discuss punch list items, safety issues and the construction progress.
- e) Final job walk – to convey substantial completion to project team members and request final acceptance. The Contractor will schedule this meeting and the Agency CM plus facility personnel shall attend.
- f) Contractor will review meeting minutes circulated after key meetings and resolve all action items assigned to the Contractor by the due date indicated therein.

2.6 Logistics

Contractor will coordinate logistics with the Agency to ensure safe and timely execution of the work. At a minimum the Contractor will perform the following activities:

- a) Contractor will work with the Agency to coordinate and develop an appropriate traffic safety plan.
- b) Contractor will comply with safety requirements and practices as outlined in the NJPA contract and in compliance with local Agency requirements and in accordance with Cal/OSHA.
- c) The City will be responsible for notifying residents and businesses in the area of construction as scheduled. The Contractor will be responsible for arranging traffic control, and submitting traffic control plans and procedures for agency review and approval.
- d) Contractor will do everything necessary to maintain a safe working environment for its employees, Agency employees, facility tenants, and the general public.
- e) A plan for storage and staging area(s) will be determined during the pre-construction meeting.
- f) Contractor will be responsible for the security of the Contractor's property, equipment, construction materials and all other items on the staging area or construction site.
- g) Contractor will check in with the Agency CM at the start of each shift. The Agency will facilitate access to scheduled locations.
- h) All equipment and materials demolished under the terms of this project are to become the property of the Contractor and are to be removed from the site and will be disposed of in accordance with state and city requirements. Recyclable, non-hazardous material will be recycled. Work areas will be cleaned up prior to vacating for the day.
- i) Contractor will coordinate with the Agency CM prior to moving the Contractor's equipment, tools, and materials onto the construction site at the start of the project.

3. Submittals

Contractor will provide submittals as outlined below:

3.1 Preconstruction Submittals

Within ten (10) working days of approval of the construction schedule, Contractor will provide the following submittals:

- Proposed construction schedule with major milestones indicated. May include but not limited to:
 - o Equipment order
 - o Anticipated equipment delivery date
 - o Construction start and completion by site or major area
 - o Project walk through and punch list development
 - o Project sign off
- Work Plan
- Traffic Control Plan
- Safety Plan submittal per Cal OSHA standards
- Construction Permits
- Product data for the equipment specified
 - o All new fixtures as specified in Table 1
 - o Long-Life Photocell
- Mounting details for new fixtures

3.2 Close-Out

Within ten (10) working days of notifying the Agency CM of substantial completion, Contractor will provide the following:

- a) Final updated “as built” records of all newly installed LED streetlights, including all wattages, pole numbers, locations and other associated attributes; this includes a copy of the Closeout Checklist spreadsheet that has been updated by the Contractor to reflect the full inventory of removed and installed fixtures, as verified in the field.
- b) Final signed-off punch list – Appendix D
- c) Executed Notice of Construction Completion and Warranty Period – Appendix E
- d) O&M manuals for installed equipment
- e) Materials list of components installed for reordering purposes
- f) Material recycling documents
- g) Warranty documentation for installed equipment

Submittals will not be considered complete until they are reviewed and approved by the Agency. Contractor will make corrections noted and transmit the revised submittal for approval.

4. Execution

4.1 Technical Specifications

Fixture Selection

- a) The contractor will select appropriate LED cobrahead and post top fixtures based on the following criteria:
 - i. All LED fixtures must be listed on the DLC list of pre-qualified LEDs.
 - ii. The installed LED fixtures shall maintain or increase the mean effective lumens of the existing fixtures across all illuminated surfaces.
 - iii. Installed fixtures shall have integrated photocells.
 - iv. Fixtures shall be selected with the appropriate distribution pattern per their location and designation.
 - v. Fixtures shall have an uplight rating of 0 per IES TM15-2011 standards.
 - vi. Fixtures shall have a backlight rating no greater than 2 per IES TM15-2011 standards.
 - vii. Estimated fixture wattages in Table 1 shall be used as a guide for selecting fixtures. Some deviations from these estimates are expected, but major changes in fixture wattage must be approved by The City of Culver City.
- b) The contractor will select appropriate induction fixtures based on the following criteria:
 - i. The installed induction fixtures shall maintain or increase the mean effective lumens of the existing fixtures across all illuminated surfaces.
 - ii. Installed fixtures shall have integrated photocells.
 - iii. Fixtures shall have an uplight rating of 0 per IES TM15-2011 standards.
 - iv. Fixtures shall be selected with the appropriate distribution pattern per their location and designation.
 - v. General fixture make, model, and wattages in Table 1 shall be used as a guide for selecting fixtures. Specific color temperature and finish shall be determined by the contractor after conferring with the City. Any deviations from the fixtures specified by Culver City must be approved by the city prior to purchase or installation.

Installations

Contractor Shall:

- a) Remove existing High-Pressure Sodium (HPS) and Mercury Vapor (MV) cobrahead and post top street lighting fixtures.
- b) Replace the fixtures with LEDs or induction fixtures as specified in Table 1 and in the Closeout Checklist. In the event that the fixture in the field does not match the fixture specified in the Closeout Checklist for a particular pole, the contractor shall install a fixture to replace what is in the field according to the replacement fixture mappings specified in Table 1. The contractor shall then correct the Closeout Checklist to list the actual fixture removed (type and wattage) and the actual fixture installed (type and wattage).
- c) Ensure that installed fixtures are level to the ground.
- d) Verify in the field that the photocells function properly after installation.
- e) Furnish labor, materials and incidentals including, but not limited to, complete lighting fixtures and wiring necessary for the streetlights to be replaced on existing street lighting poles for 120/240 volt multiple circuit street lighting systems.
- f) Provide and install fixtures with integrated long-life photocells.
- g) Manage delivery and staging of material to the site, including any secured storage considerations.
- h) Properly dispose of all removed fixtures and non-recyclable materials including hazardous waste, such as lead-based material.
- i) The contractor will be responsible for maintaining traffic control during installation.
- j) During installation, the contractor will ensure that all fixtures and poles have Utility-compliant labeling and badging and will install or replace all labels and/or stickers as required.

Test Installation

Prior to proceeding with the full street lighting replacement, the city has requested a test installation of fixtures to ensure that the selected fixtures meet expectations. The contractor shall therefore follow the above installation procedures on a small sample of locations prior to conducting the full installation. Up to three sample locations will be selected, and will each encompass one city block or less. The sample locations will be selected so that each proposed fixture wattage is represented, and each location type is represented. The likely sample installations will include:

- A residential street with LED cobrahead fixtures
- A residential street with LED post-top fixtures
- An arterial street with induction cobrahead fixtures

4.2 Warranty Requirements

All Work furnished shall be guaranteed against defective materials, workmanship and/or improper performance for a period of one year after final acceptance of the Work.

Contractor is to provide extended warranty options as separate line items on Price Proposal for the Agency's consideration.

4.3 Implementation Verification

- a) Contractor will provide a list of fixtures that have been removed and fixtures that have been installed each week, in the form of an updated Closeout Checklist.
- b) At the completion of the project, the Contractor will supply to the Agency a completed Closeout Checklist spreadsheet listing the existing street lighting fixtures removed and new fixtures installed including wattage, fixture type, and location, using a template provided by the Agency.
- c) The Agency will observe a sample of streetlights to confirm proper operation of photocells and fixtures. The Agency will observe operation of the street lights during daylight hours to confirm lights are off, and during night time hours to confirm lights are on. The Agency will notify the Contractor of any non-functioning photocells and/or fixtures for repair or replacement.

4.4 Close-Out

For project close out, Contractor will complete the following tasks:

- a) The Contractor will participate with the Agency in review of the punch list and the final job walk. The Contractor will correct any remaining punch list items before final acceptance is granted.
- b) Within ten (10) working days of notifying the Agency CM of substantial completion, the Contractor will train City personnel in all aspects of routine operation, maintenance, and safety of the lighting fixtures installed.
- c) Deliver all required close out documents, as listed in Section 3.2.

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Appendix A: Responsibility Matrix

Task	Agency CM	Contractor
Construction		
Secures Construction Permit	S/R	P
Prepares Construction Schedule	R/A	P
Perform Construction		P
Construction Documentation		P
Submittals and RFIs	R/A	P
Review & Approve Invoices	P	
Process Invoices	P	
Inspection of Work	P	
Construction Progress Reports/Log	R	P
Initiate Change Orders	R/A	P/R
Prepare Meeting Agendas/Minutes	P	R
Attend Project Meetings	P	P
Develop Punch Lists	S	P
Correct Punch List Items	R/A	P
O&M Manuals and Training	R/A	P
Final Inspection	P/A	S
Acceptance	P/A	
P = Primary; S = Support; R = Review, A = Approval Agency CM = Public Agency Assigned Construction Manager Contractor = Construction Firm		

Appendix B: Substitution Request Form

[Sample Form]

Substitution Request Form

SR #: _____

Task Order #: _____

Project Name: City of Culver City LS-2 Street Lighting _____

Contractor: _____

Subject: _____

Spec. Section: _____ Dwg. #: _____

Page #: _____ Sub: _____

PM USE ONLY

Directed To: _____

Date Received: _____

Date Transferred: _____

Date Received: _____

Date Transferred: _____

PRIORITY: ☐ Routine ☐ Urgent ☐ Please Expedite

INFORMATION NEEDED

Bid Item:

Justification:

Cost Comparison to Original Product:

Time Impact:

Quality Impact:

Maintenance Impact:

Warranty Impact:

Safety Impact:

Energy Usage Impact:

Product Lifecycle Impact:

Date

Contractor

REPLY

Date

Reviewer

Appendix D: Construction Punch List

[Sample Form]

CONSTRUCTION PUNCHLIST

☐ Lighting ☐ Mechanical/Controls ☐ Other _____
Contractor: _____

Task Order #: _____

Facility Name: City of Culver City LS-2 Street Lighting

Facility Address: _____

Note: Refer to the line-by-line construction record by reference number when available.

Item #	Description of Punch List Item	Approximate Value	Date Completed
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Approximate Total Value: _____

☐ There are no Punch list Items at this time.

Punch List Created by: _____
Contractor Representative Date

Appendix E: Notice of Construction Completion and Warranty Period

To: (Agency Representative)

From: _____
(Contractor's Name and Company)

Task Order #: _____

Project Name: City of Culver City LS-2 Street Lighting _____

1) Date of final inspection: _____

2) Date of construction completion: _____

3) Warranty period begins: _____ Ends: _____

Warranty Length: _____

4) Additional Warranties, if any:

Warranty Type: _____

Warranty Period begins: _____ Ends: _____

Warranty Length: _____

5) Have as-builts and other Project documents been submitted?

_____ Yes

_____ No

_____ Not Applicable

Contractor Signature

Date: _____

Agency Representative Signature

Date: _____

(Contractor: After completion of the project, send signed form to Agency Representative to complete Performance Evaluation on back page. This form must be completed prior to final invoice and payment. Payment will be made once city council accepts the work completed.)

PERFORMANCE EVALUATION

Agency Representative: After completion of the performance evaluation below, send signed form to The Energy Network Project Manager. This form must be completed prior to approval of the final invoice and payment.

Contractor Evaluation	Value: 0-Low; 4-High	Note:
Quality of Work:		
Timely Performance:		
Working Relationship with Agency and facility Staff:		
Competency to Perform Work/Service:		
Sensitivity to Citizen Contact:		
Understanding of Project:		
Problems Encountered After Project Completed:		
Responsiveness to Problems During Project:		

Agency Representative Signature

Date: _____

The Energy Network Project Manager

Date: _____

Appendix F: Fixture Unit Base Pricing

The following table provides fixture pricing quotes. The contractor has selected Induction and LED make and models based on the Technical Specifications in Section 4.1 and has priced fixtures accordingly. The following is from the Comet Electric Contractor Price Proposal, A14CSL08 – Culver City Street Lighting (Original Scope), dated 09/17/2015.

Existing Fixtures	New Fixtures			
Type	Wattage	Make/Model	Wattage	PRICE EACH w/TAX
HPS Cobra	150	Cree BXSP-B-HT-XXX-B-40K	68	\$535.95
HPS Cobra	200	Cree BXSP-B-HT-XXX-B-40K	87	\$535.95
HPS Cobra	250	Cree BXSP-C-HT-XXX-E-40K	101	\$453.42
HPS Cobra	400	Cree BXSP-C-HT-XXX-F-40K	139	\$613.34
MV Cobra	100	Cree BXSP-B-HT-XXX-A-40K	25	\$407.00
MV Cobra	175	Cree BXSP-B-HT-XXX-A-40K	42	\$407.00
MV Cobra	250	Cree BXSP-C-HT-XXX-E-40K	68	\$535.95
MV Cobra	400	Cree BXSP-C-HT-XXX-E-40K	87	\$535.95
HPS Post Top	50	Crystal CLP-ACRN3-40CLED	45	\$561.29
HPS Post Top	70	Crystal CLP-ACRN3-40CLED	45	\$561.29
HPS Post Top	100	Crystal CLP-ACRN3-40CLED	45	\$561.29
HPS Cobra	50	Crystal VL-CLP-CH29 40	40	\$319.71
HPS Cobra	70	Crystal VL-CLP-CH29 40	40	\$319.71
HPS Cobra	100	Crystal VL-CLP-CH29 65	65	\$343.66
MV Cobra	100	Crystal VL-CLP-CH29 65	65	\$343.66
HPS Cobra	150	Crystal VL-CLP-CH29 80	80	\$357.20
MV Cobra	175	Crystal VL-CLP-CH29 80	80	\$357.20
HPS Cobra	200	Crystal VL-CLP-CH36 120	120	\$509.24
HPS Cobra	250	Crystal VL-CLP-CH36 120	120	\$509.24
MV Cobra	250	Crystal VL-CLP-CH36 120	120	\$509.24
HPS Cobra	310	Crystal VL-CLP-CH36 200	200	\$536.32
HPS Cobra	400	Crystal VL-CLP-CH36 250	250	\$536.32
MV Cobra	400	Crystal VL-CLP-CH36 250	250	\$536.32
MV Cobra	700	Crystal VL-CLP-CH36 250	250	\$536.32
MV Cobra	1000	Crystal VL-CLP-CH36 250	250	\$536.32

Appendix G: Invoicing & Post-Installation

In order to quickly and effectively support the Agency in obtaining Utility incentives and On Bill Financing funds, the Contractor shall ensure that the Invoice includes the following information:

1. Contractor Name and Address
2. Customer Name and Address
3. Invoice Date
4. Installation Date
5. Installation Location Name and Address
6. Itemized list of materials by:
 - a. Quantity
 - b. Make
 - c. Model
 - d. Text Description
 - e. Fully Burdened Line or Extended Price