



**CHICAGO  
INFRASTRUCTURE  
TRUST**

# Chicago Smart Lighting Project Request For Information

September 17, 2015

In coordination with the **City of Chicago**



and the **Chicago Park District**



# Chicago Smart Lighting Project

## *Request for Information*

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### Table of Contents

#### Table of Contents

- 1. Introduction ..... 4**
  - 1.1 Chicago Smart Lighting Project Objectives ..... 4
  - 1.2 PROJECT Benefits ..... 5
  - 1.3 RFI Submission Requirements..... 5
  - 1.4 RFI Submissions, Questions, and Comments ..... 6
- 2. Chicago Outdoor Lighting Context..... 6**
  - 2.1 Chicago Street Light Inventory ..... 6
  - 2.2 Chicago Lighting Infrastructure History ..... 7
  - 2.3 Chicago Park District Outdoor Lighting Inventory ..... 8
- 3. Chicago Smart Lighting Project Overview ..... 8**
  - 3.1 Goals and Parameters ..... 8
  - 3.2 Scopes of Work ..... 9
  - 3.3 RFI Objectives, Requirements, and Assumptions ..... 11
  - 3.4 Funding Assumptions..... 12
- 4. RFI Submission Conditions ..... 13**
  - 4.1 Inquiry Only – No Contract ..... 13
  - 4.2 Changes to This RFI ..... 13
  - 4.3 Information Preparation Costs ..... 13
  - 4.4 Submittal of Confidential Information..... 14
  - 4.5 Ownership of Submitted Materials ..... 14
  - 4.6 Rights of the Trust ..... 15
  - 4.7 No Personal Liability..... 15
- APPENDIX A - RFI SUBMISSION GUIDELINES ..... 16**
  - 1. PROJECT Overview – Executive Summary ..... 16

2. Company Information and Past Experience..... 16

3. Approach ..... 16

4. Economics ..... 18

5. Financing ..... 19

6. Risk Transfer, Guarantees, Life Span Expectancies ..... 19

7. Ancillary Benefits ..... 19

8. Lessons Learned / Next Steps ..... 19

**APPENDIX-B – CITY OF CHICAGO LIGHTING INVENTORY ..... 21**

**APPENDIX C – CHICAGO PARK DISTRICT LIGHTING INVENTORY ..... 27**

# 1. Introduction

## 1.1 Chicago Smart Lighting Project Objectives

The Chicago Infrastructure Trust (“Trust”), on behalf of the City of Chicago (“City”) and the Chicago Park District (“Parks”), invites interested parties to respond to this Request for Information (“RFI”) regarding Chicago’s Smart Lighting Project, (“PROJECT”); a comprehensive streetlight modernization initiative intended to:

- a) Deliver an energy efficient street, alley, viaduct, and pathway lighting grid and lighting control network to the City and Parks under a design, build, and finance framework, and
- b) Potentially utilize the City’s and Parks’ existing outdoor lighting infrastructure for other services that enhance safety, quality of life, and reduce Chicago taxpayer expenditures, and
- c) Potentially utilize Chicago’s lighting infrastructure to expand the City’s fiber optic network allowing for the modernization of streetlight controls and the expansion of other City of Chicago digital technologies.

The City, Parks, and Trust recognize that advances in lighting and digital technologies have created fiscally prudent opportunities for local governments to improve public services, reduce long-term utility obligations, and advance sustainability goals through street lighting modernization projects. The primary PROJECT goal is to convert the City’s and Parks’ existing street lights to Light Emitting Diode (LED) equivalents to achieve improved performance and cost savings. The Trust also wishes to explore and evaluate cost-effective opportunities for creating a centralized lighting management system, which would improve asset management and provide better customer service. Thirdly, there is a desire to expand the City’s fiber optic and telecommunications network to advance communications services and offerings. Lastly, the Trust is interested in understanding possibilities for leveraging the streetlight network as a platform for additional services. Investments of this nature would ideally not only improve the condition and management of lighting assets citywide but also create new revenue and service opportunities that provide value to both the PROJECT and the public.

Like other municipal and local government entities throughout the country, the City and Parks are under fiscal constraints that limit their ability to fund substantial infrastructure projects with taxpayer dollars. These challenges, however, provide the public sector with unique opportunities for partnering with private sector funders and businesses to develop and deliver upgraded infrastructure projects that not only improve services, but reduce costs, and generate new revenue. This PROJECT is intended to be self-funding, i.e. all costs will be repaid over time through savings and/or new sources of revenue. Neither the City nor Parks is willing to incur any additional debt obligations to support the PROJECT. The PROJECT is not intended to be a privatization of the City or Parks’ operations and maintenance of their lighting systems.

The Trust is seeking the input of experienced and knowledgeable industry leaders to help envision, formulate, and assess strategies for achieving the various PROJECT goals. This RFI is strictly an inquiry. No contract or agreement will be entered into as a result of this process, nor does this RFI initiate a formal procurement. However, the information contained in the RFI responses will help the Trust, the City, and Parks advance their PROJECT planning efforts, which may result in the launch of a formal procurement.

## 1.2 PROJECT Benefits

The development of an energy efficient and enhanced lighting system will create significant benefits for the City and the Parks by:

- Creating local jobs;
- Advancing City's sustainability goals;
- Reducing City / Parks energy consumption and operations costs;
- Improving public safety;
- Enhancing public goods and services;
- Improving transportation, mobile energy, and connectivity options;
- Supporting future economic growth in the City of Chicago.

## 1.3 RFI Submission Requirements

The Trust welcomes responses to this RFI from organizations, individually or in teams, meeting any or all of the following eligibility criteria ("Qualifying Organizations"):

- a) Leading street lighting infrastructure contractors and major systems integrators with past project experience of similar scale and complexity;
- b) Streetlight technology suppliers with manufacturing experience and capabilities relevant to the PROJECT;
- c) Suppliers of distributed communication network technologies or services that use streetlight grids as platforms;
- d) Software suppliers with experience and capabilities relevant to the PROJECT;
- e) Investors with substantial development and investment track records in energy efficiency, communications, and/or smart lighting projects.

Organizations that do not meet the above RFI eligibility criteria are encouraged to participate in an RFI submission as part of a team that includes a Qualifying Organization. Organizations that do not respond to this RFI will not be precluded from participating in future PROJECT procurements.

RFI Response submissions are required to:

- a) Provide the requested information in the order and format outlined in the Response Guidelines attached herein as Appendix A
- b) Not exceed 50-pages
- c) Provide the economic information supporting your proposed approach in a Microsoft Excel format; as per the template attached herein as Appendix E.

Qualifying Organizations responding to this RFI will automatically be notified of any future PROJECT procurements, and may also be invited to submit additional information and/or participate in potential Industry Input Workshops.

The Trust's most recent Contracting Manual and any additional information regarding the Chicago Smart Lighting Project will be posted at [www.shapechicago.org](http://www.shapechicago.org). Qualifying Organizations are encouraged to review the Contracting Manual and monitor this site for any RFI addendums, as well as for any future PROJECT solicitation information.

## 1.4 RFI Submissions, Questions, and Comments

RFI Respondents are requested to submit one (1) digital copy of the requested information via e-mail to: [rfi@shapechicago.org](mailto:rfi@shapechicago.org)

The name of your organization and the words "Chicago Smart Lighting RFI" should be on the submission cover page and the e-mail subject line.

The Trust will also accept printed "hard copy" RFI responses delivered to:

The Chicago Infrastructure Trust  
35 E. Wacker Drive  
Suite 1450  
Chicago, IL 60601

Submissions shall be delivered no later than 5:00 p.m. CST on Monday, November 16, 2015. Late submissions will not be considered.

All questions concerning this RFI should be directed to: [rfi@shapechicago.org](mailto:rfi@shapechicago.org)

The Chicago Smart Lighting webpage at [www.shapechicago.org](http://www.shapechicago.org) will be updated with all submitted questions and answers; please review this Q&A before asking additional questions.

If your organization wishes to be notified of any RFI changes or future addendum please send primary point of contact's: name, email address, and phone number to: [rfi@shapechicago.org](mailto:rfi@shapechicago.org) with the words "Smart Lighting Contact" in the email subject line.

## 2. Chicago Outdoor Lighting Context

### 2.1 Chicago Street Light Inventory

The City and Parks collectively operate and maintain a network of approximately 348,500 outdoor lights including: street, alley, viaduct, pathway, and lakefront lights.

The City maintains an extensive roadway lighting system of approximately 232,100 streetlight fixtures, 72,000 alley light fixtures, and 23,500 viaduct fixtures. With a combined inventory of over 327,500 lighting fixtures, the City provides lighting as a core city service to residents, visitors, and businesses. The City's light fixture count is accurate as of December 2013, when the Chicago Department of Transportation and ComEd completed a full inventory of all City streetlights. Traffic signal lights are not included in this PROJECT. An estimated summary of the City's outdoor lighting inventory is attached herein as Appendix B.

The City owns the majority of their streetlights, poles, and bases. The exception is the City's alley fixtures which are affixed to poles owned and maintained by ComEd subject to a franchise agreement between the City and ComEd. By ordinance the City allows wireless carriers to mount equipment on certain City-owned streetlight poles in exchange for a fee. The Office of Emergency Management and Communications has added approximately 3,000 cameras to both City and Parks' streetlight poles throughout the city.

## 2.2 Chicago Lighting Infrastructure History

In the 1950s, the City installed new lighting infrastructure citywide; utilizing mercury vapor lamps. In the 1970s, the City performed a system-wide lighting upgrade; replacing the mercury vapor fixtures with high-pressure sodium fixtures. This project was only a lamp head upgrade; the City retained the 1950s era electrical poles, wiring, and infrastructure. Over the years as underground wiring has failed, City crews have often replaced underground wiring with aerial wiring. In 2009, using available federal funding, the City replaced high-pressure sodium streetlight fixtures with more energy efficient ceramic metal halide fixtures along Western Avenue and Lake Shore Drive. That fixture replacement undertaking did not include upgrading the electrical infrastructure.

As part of various street-scape renovation projects, the City does perform continuous lighting infrastructure upgrades to arterial and residential streets; recent projects have included converting to LED lamps. These efforts have impacted limited portions of the overall system; the majority of the City's streetlight system retains its 1950s vintage infrastructure. Because the majority of this streetlight infrastructure is in its seventh decade of service, the City's streetlight infrastructure continues to require increasing levels of maintenance. Much of the Legacy Inventory's electrical wiring is known to be brittle and delicate. Damaged underground cables are often replaced with temporary aerial wiring in lieu of fixing buried cables. Underground cables are often not encased in conduit.

In light of this history, the City's street lighting assets can be grouped into two general categories: the Modern Inventory and the Legacy Inventory. The Modern Inventory consists of approximately 125,138 fixtures that are located on newer infrastructure (and includes all alley fixtures). The Legacy Inventory consists of approximately 202,475 fixtures that are located on older infrastructure including approximately 50,000 fixtures on structurally sound embedded poles with overhead wiring that require an underground conduit upgrade. The Modern Inventory fixtures are good candidates for a lamp head LED conversion. The Legacy Inventory may or may

not require the installation of new infrastructure (poles, bases, conduit, wiring, controllers, etc.) to support the conversion to LED and improve operations.

The City also currently has about 450 miles of fiber optic cable strategically placed throughout sections of the city that support a variety of technological and communications systems integral to the City's functioning. The City currently does not own or operate any wireless mesh data networks.

### 2.3 Chicago Park District Outdoor Lighting Inventory

Parks is a corporate entity separate from the City. Parks maintains lighting for pathways, the lakefront, and parking lots. The Parks' lighting scope will include approximately 20,887 fixtures: 887 on the lakefront and approximately 20,000 along other pathways. Athletic field lighting is excluded from this PROJECT'S scope; although new remote monitoring and control capabilities for lights serving recreational and outdoor program spaces could potentially be included. Parks' current lighting inventory – attached herein as Appendix C – is estimated; no comprehensive inventory of Parks' lighting has been completed to date. A comprehensive inventory of all Park lighting and updating of the City inventory will be part of any future Chicago Smart Lighting Project. Similarly, Parks' street lighting fixtures can be grouped into two categories, with about 20,000 pathway fixtures fitting into Parks' Modern Inventory and 887 lakefront fixtures fitting into Parks' Legacy Inventory.

## 3. Chicago Smart Lighting Project Overview

### 3.1 Goals and Parameters

The principal PROJECT goal is to convert as much of the City's and Parks' lighting to LED and modernize as much of the lighting grid infrastructure as possible without the use of public capital; i.e. all PROJECT costs are funded from utility savings, new sources of revenue, available rebates and grants, and/or other cost savings.

The City and Parks' exterior lighting grid may offer a unique opportunity to add features that enhance the quality of urban life. The Trust is interested in learning more about new applications that could utilize the existing pole, mast arm, electrical power, or other streetlight components. For example, a Central Management System ("CMS") could provide energy cost reductions and operational efficiencies through lighting controls software, remote monitoring, and integrated work order creation. The City is also interested in cost-effective ways to expand the City's own, or a third party's leased, fiber optic cable network.

The Chicago Smart Lighting Project scope will likely be completed in phases, and include the selection, procurement and financing of the design and installation of some, or all, of following:

- a. Energy efficient lighting upgrades for the City's Modern Inventory. These fixtures are located on newer infrastructure and therefore well suited for conversion to LED equivalents.



- b. Energy efficient lighting upgrades for the Parks' Modern Inventory. These fixtures are located on newer infrastructure and therefore well suited for conversion to LED equivalents.
- c. Energy efficient lighting fixtures for City's Legacy Inventory and/or Parks' Legacy Inventory. These fixtures are located on older infrastructure and therefore may require system infrastructure upgrades to accommodate LED fixture upgrades.
- d. System infrastructure replacements (i.e., poles, bases, conduit, wiring, controllers) in the City's Legacy Inventory and for Parks' Legacy Inventory.
- e. Other technologies and services that either use streetlights as a platform or enhance their utility. These efforts will enhance the delivery of public services, create new revenue opportunities, and/or offer additional cost savings.

Because of the scale and complexity of the PROJECT, and to provide Respondents with flexibility in submitting proposals, Respondents may choose to submit ideas that address all of the above topics or only a portion of the above topics.

## 3.2 Scopes of Work

### Energy Efficient Lighting

The primary PROJECT scope includes energy efficient upgrades to existing Chicago lighting components – lamps, ballasts, controllers, and/or fixtures and management systems. Given recent advances and price decreases in LED technology, the Trust is interested in understanding the current estimated bulk purchase costs, installation costs, and expected energy savings and longevity of all energy efficient lighting components for each of the lighting types outlined in Appendices B and C. Please note expected product lifetimes and warranties, as the Trust is interested in exploring the implications of different contract lengths and gaining a clear understanding of total lifecycle economics. For comparison purposes please include two payback forecast calculations one in which utility costs that do not escalate over time and a separate analysis where utility costs do escalate over time.

### Lighting Grid Infrastructure

In addition to the LED conversion scope described above, the Trust is also interested in replacing all or a portion of the City's and the Parks' Legacy lighting system infrastructure – poles, bases, electrical wiring, electric conduit, controllers, etc. Specifically, the Trust is exploring if and how light grid modernizations can be self-funding as well as the economies of scale associated with this work happening concurrently with LED lamp conversions. The Trust is seeking current information on estimated costs for bulk purchase, installation, operations, and maintenance lighting grid components.

The Trust welcomes suggestions for redesigned pole types and pole spacing in order to: increase energy efficiency and reduce light pollution, without negatively impacting public safety, and/or enhance the ability to mount security cameras and other peripherals.

## Platform Technologies and Additional Services

While the Trust is interested in learning about any light grid technologies that benefit the public, of particular interest are those that reduce costs and/or offer financially self-sufficient revenue streams. Through this RFI, the Trust is seeking the private sector's assessment of the financial viability and cost-effectiveness of these functionalities within the overall PROJECT framework.

Respondents are invited to provide information and ideas on any technologies where streetlights might serve as a platform to provide additional services to residents, businesses, and the City. Some examples are:

*Enhanced Lighting Controls* impacting light: quality, intensity, color, dispersion, location, etc...

### *Communications and Connectivity*

- WiFi or other Internet services for businesses and residents
- Fiber optic network expansion (for both high and/or low bandwidth data coming from streetlights and platform technologies)
- Connecting streetlights and platform technologies through an existing or new third party fiber network, wireless network, and/or connectivity infrastructure
- Central Management System for remote control and monitoring
- Cellular data, cell phone towers, or signal amplifiers
- Vehicle-to-Infrastructure (V2I) or Vehicle-to-Vehicle (V2V) connections
- Bluetooth / near-field-communications
- Music and/or emergency broadcasting speakers

### *Monitoring and Sensing*

- Motion or noise
- Cameras – video, photography
- Energy usage
- Transportation metrics - vehicle / pedestrian / bicycle counting
- Parking space monitoring
- Climate: temperature, snow and ice, rain or flooding, humidity, air quality, etc.
- Environment: methane / natural gas leakage, vibrations, etc.

### *Applications and Software*

- Automated water meter reading
- Smart parking
- Traffic monitoring, management and/or signal timing adaptive to public safety
- Advanced vehicle location (AVL) software that enhances GPS accuracy
- Navigation systems: open, public, or subscription
- Driverless vehicle navigation
- Electronic signals in lieu of no parking posting prior to street cleaning, tree trimming, and water main maintenance
- Lighting color changes to provide safety warnings of storms, etc.

- Buttons linked to a response (e.g., blue button security system)
- Artistic illumination of sidewalks or crosswalks with colors and/or shapes making it easier, safer, and more fun to be a pedestrian

#### *Energy Generation and Storage*

- Solar PV
- Wind
- Batteries
- EV charging stations
- Device charging stations
- Home energy management communications

#### *Other applications not listed above*

### **3.3 RFI Objectives, Requirements, and Assumptions**

The City, Parks, and Trust are interested in RFI responses that expand their knowledge about any of the scope segments described above.

A primary outcome of this RFI process will be the Trust receiving current, well-informed, well thought-out, and clearly communicated PROJECT forecast scenarios. Qualified RFI responses will be thoroughly reviewed, analyzed, and used as a basis for recommending optimal scopes of lighting upgrade work along with a corresponding mix of platform technologies and services according to their proven cost-effectiveness.

RFI responses are expected to identify and quantify cost savings and/or additional revenue sources needed to fully design, implement, and finance the RFI Respondents proposed PROJECT scope.

Each qualified RFI submission will be considered as a stand-alone item as well as in potential combination with ideas submitted by others. Additionally, each proposed technology or deal structure's cost-effectiveness will be assessed at various scales of implementation; e.g. city wide vs. select areas.

RFI Respondents should include enough company information to verify that they possess the appropriate experience, resources, and skill sets to be considered a "Qualified Organization" for making credible recommendations.

The City's and Parks' PROJECT scopes will likely be treated separately. For example, excess energy savings from Parks will not be used to justify additional City lighting upgrades.

This RFI process is an integral part of the planning and design of an economically optimal, phased approach to this PROJECT; all interested parties are strongly encouraged to respond to this RFI to ensure their ideas and technologies will be considered for inclusion in future PROJECT solicitations.

For this RFI response, it should be assumed that all lighting infrastructure upgrades and all new technology implementations will be performed by outside contractors. The City and Parks are interested in exploring the option of performing some of the LED lamp head conversion work using internal City and Parks forces, potentially through a managed competition approach. City and Parks participation in the installation phase is not a PROJECT mandate. RFI Respondents should submit cost estimates that coincide with their preferred PROJECT deployment methods and clearly note those preferences.

The City and Parks intend to continue to be responsible for all street light operations and maintenance. The Trust is interested in understanding the impact on lighting warranties, energy savings guarantees, and/or other types of performance guarantees given Operations and Maintenance (O&M) will be performed by City internal forces. RFI economic projections should include clearly defined maintenance cost assumptions, including cost escalations, for the entire span of both the payback period and the useful life expectancy for all equipment and products.

The Trust anticipates PROJECT oversight responsibilities will be shared by both public and private partners and stakeholders. The Trust is considering all options and welcomes suggestions as to the optimal design of PROJECT oversight.

The City and Trust are interested in a public - private partnership that:

- Allows appropriate risk sharing – the Trust is aware that delivery of a new Chicago Smart Lighting Project will involve managing financial risks that may be more efficiently managed by a private partner;
- Maximizes competition;
- Provides greater cost and schedule certainty for the City and Parks; and
- Allows for a more favorable payment profile for the City and Parks.

### 3.4 Funding Assumptions

All PROJECT costs are to be fully funded from energy and operational savings as well as generated revenue. Risk associated with generating revenue or savings should be borne by the providing entity or otherwise guaranteed.

Financing terms should not exceed the expected useful life of equipment or technologies unless mid-term replacement costs are added into the PROJECT costs.

Payback cashflow calculations should be presented assuming 2 possible scenarios:

1. Energy utility costs do not escalate over time;
2. Energy utility costs escalate at a reasonable uniform rate over time.

Interested financiers are encouraged to respond with a list of their transaction history, funding capacity, and financing structure recommendations appropriate for this type of transaction.

The City and Parks will not issue general obligation debt to finance the PROJECT.

The Trust is a registered 501-(c)(3) Non-profit Organization and has issued tax-exempt debt as a conduit issuer “on behalf of” the City and Parks, and will offer to do so again for the PROJECT. Such tax-exempt debt sits on the balance sheet of the Trust, not the City or Parks, and does not affect the credit of the City or Parks.

### 3.5 Anticipated Procurement Process

Should the Trust decide to proceed with PROJECT procurement, in accordance with the City of Chicago ordinance that established the Trust, the procurement will be subject to the procurement and contracting regulations contained in the Chicago Municipal Code. The procurement will include goals for participation by minority and women-owned businesses.

The Trust may choose to pre-qualify potential proposers through a Request for Qualification (“RFQ”). The objective of an RFQ would be to pre-qualify proposers that can demonstrate the financial ability, the qualifications and experience necessary to complete the PROJECT.

The RFQ would be followed by a Request for Proposals (“RFP”). Only those entities pre-qualified by the Trust through the RFQ process would receive an invitation to submit proposals to a subsequent RFP. However, depending upon the outcome of this RFI process the Trust may consider a “one step” process, moving immediately to RFP stage.

## 4. RFI Submission Conditions

### 4.1 Inquiry Only – No Contract

This RFI is an inquiry only, and no contract or agreement will be entered into as a result of this process.

Neither the Trust nor any other agency guarantees that the PROJECT will advance to the public procurement stage or that the subsequent procurement, if any, will follow the approach described herein.

### 4.2 Changes to This RFI

At any time, at its sole discretion, the Trust may, by written addenda to this RFI, modify, amend, cancel and/or reissue this RFI.

If your organization wishes to be notified of any RFI changes or future addendum please send primary point of contact’s: name, email address, and phone number to: [rfi@shapechicago.org](mailto:rfi@shapechicago.org) with the words “Smart Lighting Contact” in the email subject line.

If an addendum is issued prior to the date information is due, it will be made available on the following website: [www.shapechicago.org](http://www.shapechicago.org). If an addendum is issued after information has been received, it may, at the Trust’s discretion, be provided only to those proposers whose submissions may be impacted by such change/addendum.

### 4.3 Information Preparation Costs

Neither the Trust, nor the City, nor Parks shall be liable for any costs incurred by the Respondent in the preparation, submission, presentation, or revision of its information, or in any other aspect of the Respondent's pre-information submission activity. No Respondent is entitled to any compensation except under an agreement for performance of services signed by a Trust-authorized representative and the Respondent.

#### 4.4 Submittal of Confidential Information

Information submitted to the Trust, the City, and the Parks, in response to this RFI or otherwise, may be subject to the Illinois Freedom of Information Act ("FOIA"), 5 ILCS 140/1 et seq.

However, Respondents may designate as confidential those portions of their Submissions that contain trade secrets or other proprietary data, which may be exempt from disclosure under FOIA. The City, the Parks, and the Trust will make the final determination as to whether information, even if marked "Confidential," will be disclosed pursuant to a request under FOIA, valid subpoena, or other legal requirement.

To designate portions of the Submission as confidential, Respondents must mark their Submissions, and any other information submitted, as follows:

1. Mark the cover page as follows: "This Submission includes trade secrets or other proprietary data." Include contact information for the person to be notified in the event of a FOIA request or subpoena relating to the submission.
2. Mark each page to be restricted with the following legend: "Confidential: Use or disclosure of information or data contained on this sheet is subject to the restriction on the title page of this Submission."

Indiscriminate labeling of material as "Confidential" may be grounds for leaving a Submission unread or otherwise disregarding the information therein.

In the event that the City, the Parks, or the Trust receives, pursuant to FOIA or a subpoena, a request for information that has been marked as "Confidential," the City, the Parks, or the Trust will provide the impacted Respondent with written notification of such requests to the address identified in the Submission. The City, the Parks, or the Trust would then work with the impacted Respondent so that the impacted Respondent may assist the City, the Parks, or the Trust in making the best case for non-disclosure. If these efforts are not successful and disclosure is required, the City, the Parks, or the Trust will coordinate such disclosure with the impacted Respondent. If this procedure is followed, Respondent agrees not to pursue any cause of action against the City, the Parks, or the Trust with regard to disclosure of information released pursuant to Freedom of Information Act requests, valid subpoenas, or other legally required disclosures.

#### 4.5 Ownership of Submitted Materials

All materials submitted in response to or in connection with this RFI shall become the property of the Trust. However, proprietary information marked as such will be protected as described in the Trust's Contracting Manual.

#### **4.6 Rights of the Trust**

The Trust reserves all rights at law and equity with respect to this RFI including, but not limited to, the unqualified right, at any time and in its sole discretion, to change or modify this RFI, to reject any and all information, to waive defects or irregularities in information received, to seek clarification of information, to request additional information, to request any or all Respondents to make a presentation, to undertake discussions and modifications with one or more Respondents, who, at any time, subsequent to the deadline for submissions to this RFI, may express an interest in the subject matter hereof.

No Respondent shall have any rights against the Trust, City, or Parks arising from the contents of this RFI, the receipt of information, or the incorporation in or rejection of information contained in any response or in any other document. The Trust makes no representations, warranties, or guarantees that the information contained herein, or in any addenda hereto, is accurate, complete, or timely or that such information accurately represents the conditions that would be encountered during the performance of any subsequent contract issued from a separate RFQ or RFP. The furnishing of such information by the Trust shall not create or be deemed to create any obligation or liability upon it for any reason whatsoever; and each Respondent, by submitting its information, expressly agrees that it has not relied upon the foregoing information, and that it shall not hold the Trust, City, or Parks liable or responsible therefore in any manner whatsoever.

#### **4.7 No Personal Liability**

No Trust, City, or Parks officer, agent or employee shall be charged personally with any liability by a Respondent or another or held liable to a Respondent or another under any term or provision of this RFI or any statements made herein or because of the submission or attempted submission of information or other response hereto or otherwise.

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## APPENDIX A - RFI SUBMISSION GUIDELINES

All Chicago Smart Lighting Project RFI Respondents are asked to submit their firm's proposed PROJECT approach and their organizational information in the format outlined below. It is worth reiterating that this RFI is not part of a formal procurement; therefore responses will be carefully reviewed but not evaluated or scored. The intent is to receive informed recommendations on possible approaches for meeting PROJECT goals and identify options for overcoming PROJECT challenges.

The broad and varied nature of this inquiry make it unlikely that any single Organization will be able to provide all the requested information but Respondents are encouraged answer every applicable section as completely as possible. All responses should, at a minimum, provide enough information to document that the Respondent has appropriate capacity and past experience to qualify their answers as credible and enough narrative description and economic forecast data to be able to assess the feasibility of their proposed scenario. Total response page count should not exceed 50 pages.

### 1. PROJECT Overview – Executive Summary

Please provide a brief narrative summary overview of your understanding of the PROJECT, and the highlights of your approach. Summary should clearly delineate which PROJECT scopes of work (*refer to Section 3.2*) your responses are referencing and a brief explanation of each proposed product or service's attributes and capabilities along with a summary description of unique characteristics of your approach. A brief summary of the proposed PROJECT economics should also be included.

### 2. Company Information and Past Experience

Please provide the following descriptive information for the responding team and members:

- Name of company or companies
- Key principals for company or companies and contact information
- Previous experience in outdoor lighting or platform services projects
- Summary description and/or summary term sheet from recent project

### 3. Approach

Please provide narrative description of your recommended approach with sufficient detail on how PROJECT goals, objectives, and obstacles will be addressed. Include a list of each proposed product or service grouped into the three Scopes of Work categories described above: 1) Energy Efficient Lighting; 2) Lighting Grid Infrastructure, or 3) Platform Technologies and Additional Services. Respondents are welcome to address all or a subset of these categories.



If recommending a specific product or service please expound on their attributes, capabilities and unique characteristics. For lighting products provide detailed information on relevant attributes such as wattages, lumens per watt, light quality, dimming control capabilities, lifespan ratings (TM-21), manufacturer's warranties etc.

If your product or service uses the streetlight grid as a platform to provide a third-party business model in which the City is not the buyer but rather the facilitator, please describe the business model and the perceived market size for your connected technology. Estimate optimal contract length.

Please suggest effective pricing strategies for third-party technologies and services using the streetlight platform. Ideally providing examples of comparable and competitive pricing structures for:

- Use of distributed communication networks,
- Access to distributed power sources, and
- Leased space on distributed assets, including streetlights.

If your approach provides networking capabilities to support connected lights and other communications, please describe the following:

- The new networking assets you would propose to put in place to support a connected Chicago Smart Lighting Project and/or enhance Chicago's communications capabilities.
- The different capabilities needed to support high bandwidth data needs (e.g., voice, data, and HD video) versus low bandwidth data needs (sensor signals, lighting control)?
- Opportunities to install aerial fiber and any cost synergies.

Delineate the benefits as well as anticipated issues and constraints inherent to third-party constructed energy efficient lighting, streetlight infrastructure, and/or platform technologies and services.

If applicable, please provide feedback on the following:

- PROJECT Phases - optimal phasing of the scopes of work. In particular, which categories should be prioritized and which may present greater challenges and might be better suited for later installation phases.
- Responsibility Allocation – responsibility matrix for successful execution of your recommended approach (e.g. information / activities expected from key stakeholders).
- Innovative PROJECT Deployment - describe where do you foresee significant opportunities to employ innovative design, construction methods, operation and maintenance regimes and/or materials to acquire efficiencies in cost and schedule.

- Project Interdependencies – describe how your product or service may impact other street lighting technology categories as well as how it might best be integrated into the overall PROJECT procurement.
- Promoting Competition - considerations that would maximize competition amongst technologies or services. Please provide any procurement suggestions to maximize value to the Trust, City, and Parks.

## 4. Economics

The proposed PROJECT economics summarized above in the Executive Summary should be supported by a detailed financial model in a Microsoft Excel format. Please include the following:

- A high level non-binding estimate of your product(s)' or service(s)' economics. The estimate should include up-front capital costs, on-going operating and financing costs, as well as savings and revenues anticipated for each item. Please break these estimates out into separate line items to the greatest degree possible.
- A clear list of assumptions used to drive their economic model. This assumptions list should include, but not be limited to, any dependent variables, economic assumptions, and/or deviations from this RFI's direction.
- Economic models should assume a 0.05366 \$/kWh as the unit cost for delivered street light electricity for City lights; and 0.06203 \$/kWh for Parks' lights.
- Operating hours for both City and Parks lights = 4,380 hours per year; i.e. "dusk to dawn" averaging 12 hours per day; 365 days per year.
- Each product or service's simple payback period.
- Clear notation of whether each product or service is "Cost Neutral" (i.e., self-funding either through cost savings or revenue generation) or "Generates Net Revenue" or a "Net Cost" (i.e., would increase City expenditures without commensurately raising revenues or savings).
- Include any costs for extended warranties, performance guarantees or insurance.

Notes:

- Cost estimates should coincide with preferred PROJECT deployment methods; please clearly notate and explain those preferences.
- Payback cashflow calculations should be presented assuming 2 possible scenarios:
  - Energy utility costs do not escalate over time;
  - Energy utility costs escalate at a reasonable uniform rate over time.
- If product or service creates O&M savings that are difficult to measure, please provide and describe a reasonable assumption (e.g., remote monitoring of connected lighting eliminates the need to send a truck out to diagnose problems).
- For Energy Efficient Lighting, please provide sufficient data to show your lighting product or service is a cost-effective strategy for any of the existing lighting assets.
- If applicable, explain how mid-contract lamp or other equipment replacement costs are treated within the economic model.

## 5. Financing

Please provide written outline of possible financing structures in line with PROJECT parameters. Indicate pros and cons of alternative structures along with recommendations of those that maximize value for the Trust, City, and Parks.

If you are a financier or have captive financing capabilities please provide a current estimate of the expected interest rate range and term using the recommended finance structure(s).

Please estimate the maximum principal amount and term length you would anticipate for this type of project.

Please provide feedback on the appropriate type of performance and payment security for this type of deal along with the rationale and anticipated City or Park requirements.

## 6. Risk Transfer, Guarantees, Life Span Expectancies

Please provide the expected product or service lifespans along with the types and lengths of available guarantees or warranties.

Please explain the interaction between warranties or guarantees and various operations and maintenance methods. For instance, would in-house, City operations and maintenance of your product or service invalidate its guarantee or otherwise harm the revenue or savings model you propose? If not, what kinds of operations and maintenance documentation by the City would be necessary to maintain this guarantee?

Indicate whether, and how, products have been proven to work in extreme hot and cold weather and under heavy wind and snow conditions. Describe how products' durability has been proven or demonstrated in past projects.

If applicable, please provide feedback on product or technology security; i.e. susceptibility to vandalism, hacking, etc.

## 7. Ancillary Benefits

Please detail the non-financial and/or non-utility public benefits to the City of Chicago and its residents, visitors, and/or businesses for each item, particularly if it is labeled a "Net Cost".

Indicate opportunities to manufacture, assemble, or otherwise produce any of the goods or services within the City of Chicago?

## 8. Lessons Learned / Next Steps

Please provide any known examples of other cities or towns where there have been problems with LED conversion projects especially with aging infrastructure.

Please provide any comments on past experience with outdoor lighting projects procurements especially key lessons learned or case studies that the Trust should consider to help ensure a successful outcome.

List the additional surveys, investigations, or tests the Trust should consider initiating prior to the start of a procurement process (e.g., inventory of Parks' lighting, tests on aging wiring's capacity and reliability, tests of wind vibration/snow/weather robustness of LED lighting, test of surge robustness of LED lighting, investigating utility rate structures for new capabilities such as dimming, assessment of current and historical operations and maintenance costs, assessment of theft and vandalism rates). Based on your experience, how can the Trust best ensure that specific needs of individual proposers are taken into account in this pre-procurement research?

Indicate what audits or tests would likely be needed before entering into the final contract.

Describe optimal way for you to competitively demonstrate your product's quality, controllability, interoperability, and/or other attributes.

Describe the specific critical exogenous conditions needed to guarantee the performance of your technology, and how these conditions best be assessed (e.g., whether City and Parks' aging Legacy infrastructure is prepared to handle LEDs). Suggest how City and Park staff might be used to help assess these conditions.

Please describe how your products might aid the PROJECT in eliminating wasted light that illuminates the sky, and if applicable, if your products are Dark Skies compliant.

For wireless carriers or others who currently pay to place their equipment on outdoor lights / poles, please provide feedback on the following:

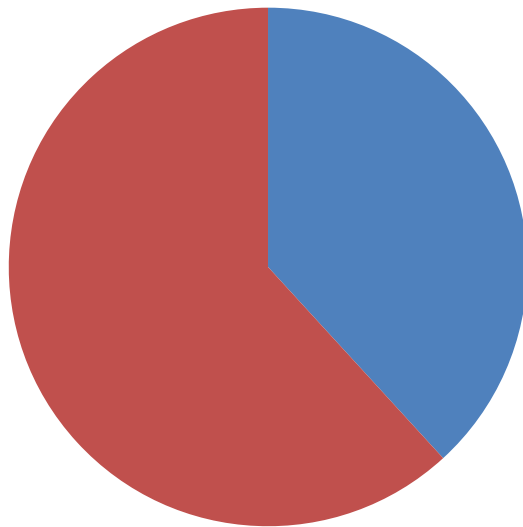
- Typical costs for installing your equipment on outdoor lights. Suggest opportunities for eliminating or reducing costs if the existing Chicago Smart Lighting Project network were to be upgraded; ideally list the specific upgrades needed to reduce costs.
- Cost synergies (e.g., on labor) for your equipment to be installed at the same time as other Chicago Smart Lighting Project-related equipment (e.g., fiber optic cable could be installed at the same time as new electrical wiring).

## APPENDIX-B – CITY OF CHICAGO LIGHTING INVENTORY

Note: All quantities below are estimated based on an inventory completed in December 2013.

### City Light Fixtures By Infrastructure Category

Infrastructure Category:	
Modern Inventory	125,138
Legacy Inventory	202,475
<b>Total Number of Fixtures</b>	<b>327,613</b>

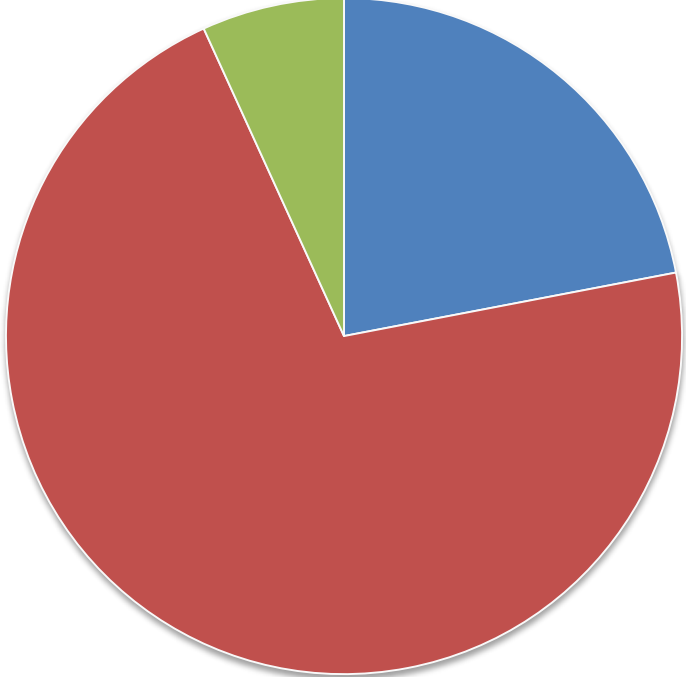


- Modern Inventory (38%)
- Legacy Inventory (62%)

Modern Inventory Fixtures (Pole Type)	# of Poles	Pole Breakdown (Dual or Single Fixture)	Light Fixture Quantities
Residential: Davit/ Arm	21,300	20,235 Dual	40,470
		1,065 Single	1,065
Arterial/Ornamental	1,700	850 Dual	1,700
		850 Single	850
Arterial Other (Underground Wiring)	7,000	1,000 Dual	2,000
		6,000 Single	6,000
Alley (ComEd Poles)	72,049	72,049 Single	72,049
Viaduct	N/A	N/A	1,004
<b>Total Number of Modern Inventory Light Fixtures</b>			<b>125,138</b>

Legacy Inventory Fixtures	Light Fixture Qtys.
Residential on Poor Infrastructure	100,680
Arterials on Poor Infrastructure	30,480
Embedded Arterial Poles (Requiring Underground Conduit Upgrade)	50,000
Viaducts on Poor Infrastructure	21,315
<b>Total Number of Legacy Inventory Light Fixtures</b>	<b>202,475</b>

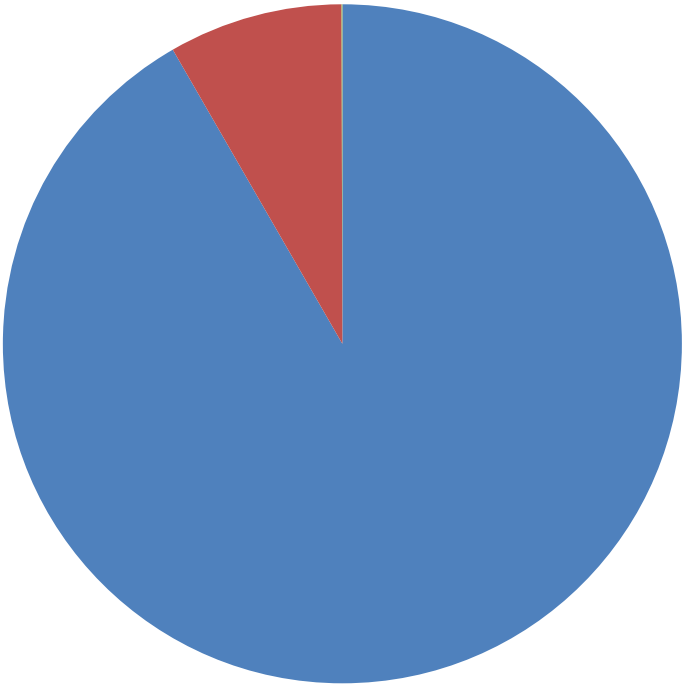
# City Light Fixtures By Location



Location	
Alley	72,049
Street	232,108
Viaduct	23,456
<b>Total Number of Fixtures</b>	<b>327,613</b>

- Alley (22.0%)
- Street (71%)
- Underpass (7%)

# City Light Fixtures By Light Type

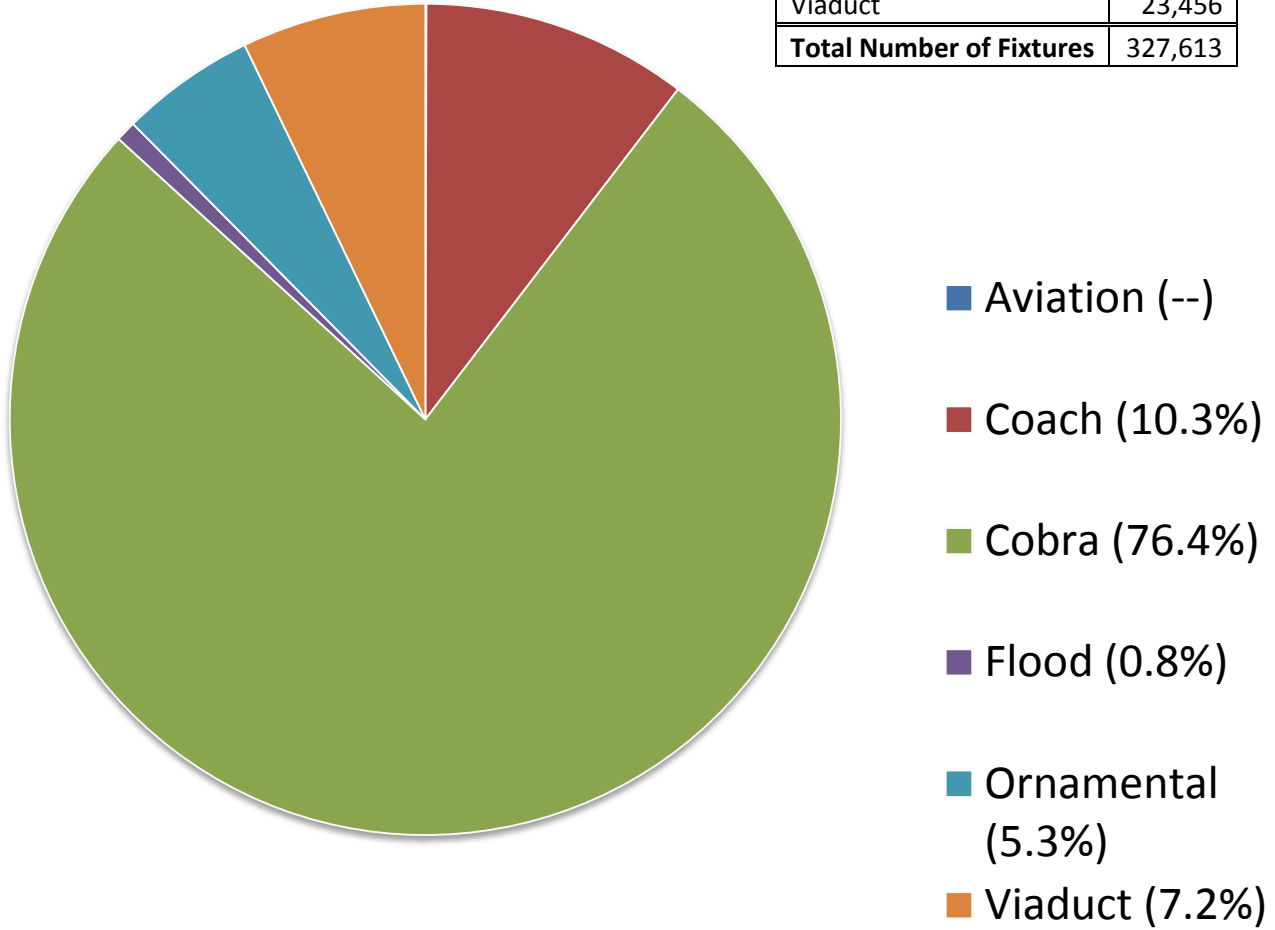


Light Type	
High Pressure Sodium	300,340
Metal Halide	27,138
LED	135
<b>Total Number of Fixtures</b>	<b>327,613</b>

- HPS (92%)
- MH (8%)
- LED (<1%)

# City Light Fixtures By Light Head Type

Fixture Type	
Aviation (LED)	135
Coach (Sidewalk )	33,935
Cobra	250,255
Flood	2,612
Ornamental	17,220
Viaduct	23,456
<b>Total Number of Fixtures</b>	<b>327,613</b>



## City Light Fixture Wattages

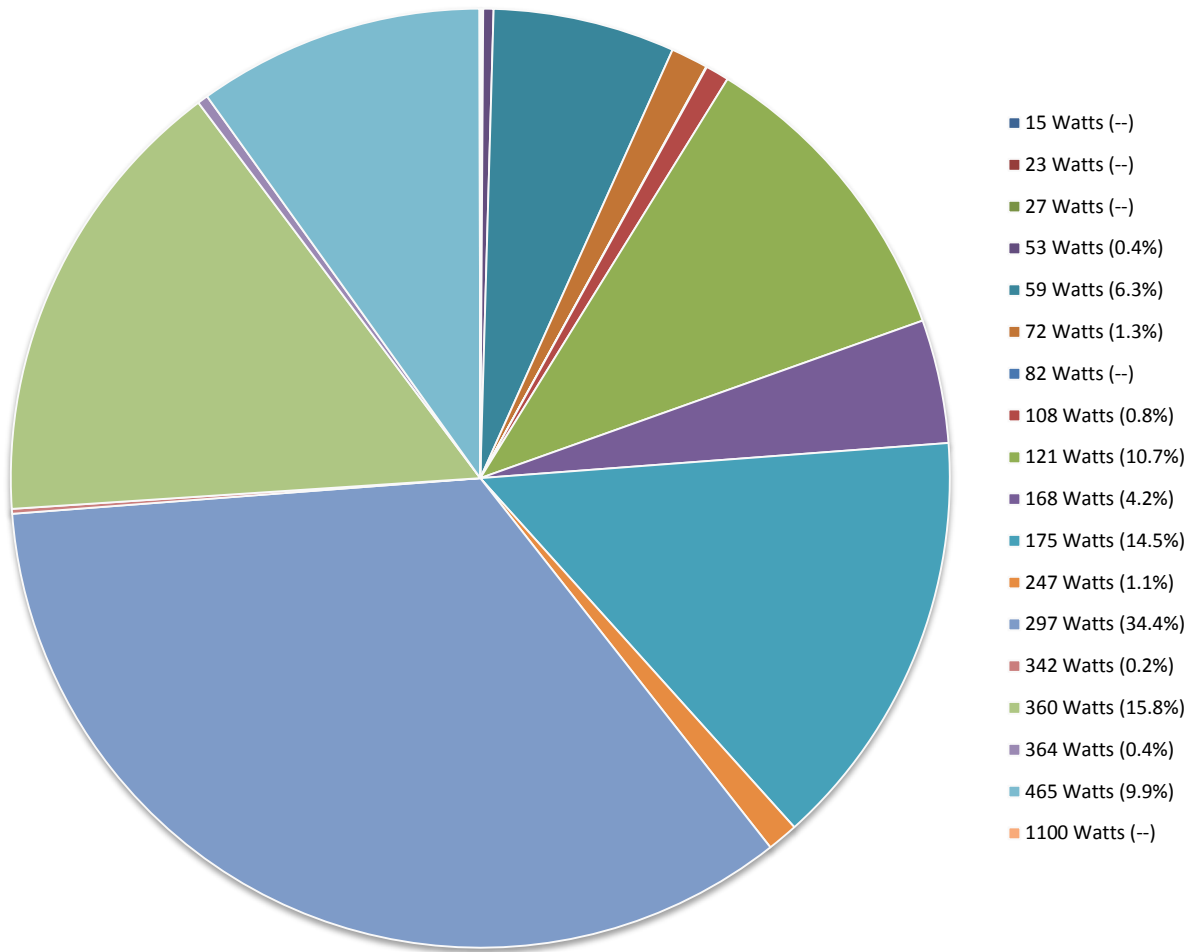
Fixture Head Type	Light Type	Wattage	Ballast Wattage	Quantity
<b>Aviation</b>				<b>135</b>
Aviation	LED	13	2	135
<b>Coach</b>				<b>33,935</b>
Coach	HPS	50	9	19,415
Coach	MH	60	12	4,186
Coach	MH	90	18	125
Coach	HPS	100	21	10,209
<b>Cobra</b>				<b>250,255</b>
Cobra	HPS	20	3	9
Cobra	MH	90	18	2,523
Cobra	MH	140	28	13,930
Cobra	HPS	150	25	39,567
Cobra	MH	210	37	3,476
Cobra	HPS	250	47	111,796
Cobra	HPS	310	50	47,888
Cobra	MH	315	49	1,193
Cobra	MH	315	27	546
Cobra	HPS	400	65	29,235
Cobra	HPS	1000	100	92
<b>Flood</b>				<b>2,612</b>
Flood	HPS	150	25	61
Flood	HPS	250	47	581
Flood	HPS	310	50	9
Flood	HPS	315	27	1
Flood	HPS	400	65	1,960
<b>Ornamental</b>				<b>17,220</b>
Ornamental	HPS	23	4	177
Ornamental	HPS	50	9	1,104
Ornamental	HPS	70	12	80
Ornamental	HPS	100	21	2,643
Ornamental	HPS	150	25	7,983
Ornamental	HPS	250	47	292
Ornamental	HPS	310	50	3,836
Ornamental	HPS	400	65	1,105
<b>Viaduct</b>				<b>23,456</b>
Viaduct	MH	45	8	1,159
Viaduct	HPS	100	21	22,297
<b>Total Light Fixtures</b>				<b>327,613</b>



## City Light Fixtures Combined Wattage

Component Wattage	Ballast Wattage	Combined Wattage	Number of Fixtures	Total Wattage
13	2	15	135	2,025
20	3	23	9	207
23	4	27	177	2,079
45	8	53	1,159	61,427
50	9	59	20,519	1,210,621
60	12	72	4,186	301,392
70	12	82	80	6,560
90	18	108	2,648	285,984
100	21	121	35,149	4,253,029
140	28	168	13,930	2,340,240
150	25	175	47,611	8,331,925
210	37	247	3,476	858,572
250	47	297	112,669	33,462,693
310	50	360	51,733	18,623,880
315	27	342	547	187,074
315	49	364	1,193	434,252
400	65	465	32,300	15,019,500
1,000	100	1,100	92	101,200
<b>Totals</b>			<b>327,613</b>	<b>85,482,660</b>

# City Lights Combined Wattage Summary



## APPENDIX C – CHICAGO PARK DISTRICT LIGHTING INVENTORY

Note: Quantities below are estimated; no current inventory available

Inventory Category	Location	Estimated Count	Type	Watts	Average Hours/Day	\$/kWh*
Legacy	Lakefront	190	High Pressure Sodium - Cobra	310	12	\$0.06203
Legacy	Lakefront	250	Metal Halide - Globes	175	12	\$0.06203
Legacy	Lakefront	447	Metal Halide - Flood	1,000	12	\$0.06203
Modern	Pathway	10,000	High Pressure Sodium	150	12	\$0.06203
Modern	Pathway	10,000	High Pressure Sodium	310	12	\$0.06203
<b>Total</b>		<b>20,887</b>				
* Includes supply and T&D charges that scale with usage						

**Total Chicago Park District Lighting Inventory in Project Scope – 20,887**

